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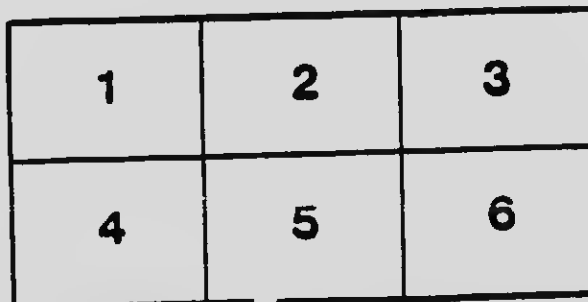
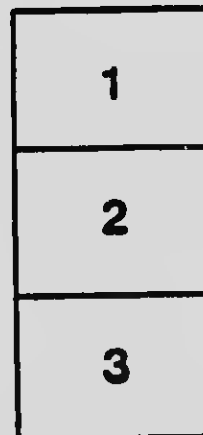
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THE FRONTIERSMAN'S  
POCKET-BOOK





Drawn by H. W. Kneelock

COOPER, LEGION OF FRONTIERSMEN.

FORO.

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ON

# THE FRONTIERSMAN'S POCKET-BOOK

COMPILED AND EDITED  
BY ROGER POCOCK

ON BEHALF OF THE COUNCIL OF THE LEGION  
OF FRONTIERSMEN

3 TROOPER, LEGION OF FRONTIERSMEN

HENRY FROWDE

TORONTO: 25-27 RICHMOND STREET WEST

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## GENERAL PREFACE

THE Legion of Frontiersmen is a civilian, self-supporting, and self-governing Association, officially recognised in the United Kingdom, Canada, Australia, South and East Africa, and Bombay, as a means of securing for the service of the State men of good character, who have been trained in wild countries, at sea, or in war. The Council registers such men in view of their individual usefulness to a field force, as guides, scouts, craftsmen, and irregular mounted rifles. In each country throughout the British Empire, so far as the authorities permit, units are being raised for home defence, and, where men can be spared, for service in Imperial defence in time of war.

Communications should be addressed to the Chief Executive Officer, L.F., 6, Adam Street, Strand, London, Telephone 6145, Gerrard. Cable messages should be in the Service Code (James Brown & Son, Glasgow).

The Council issues this book in order to assist members and commands in adding to their usefulness to the State; but it is hoped that the work may be found useful by all Associations which are raising men for Imperial defence, and by Frontiersmen who are not members of the Legion. It is felt, moreover, that any notes on practical methods of camp and travel may be

convenient to those who, either afloat or ashore, take their holidays with a view to outdoor life and healthy exercise.

"If you save from some disaster half-a-dozen explorers, I feel sure that you will think yourself well rewarded for all the trouble your volume must have cost you." So wrote Charles Darwin, in a private note to the author of "The Art of Travel"; and Francis Galton forwards the message to the Council. There is inspiration in any word of encouragement from these great men.

Blank pages are inset so that readers may make their own entries, and, with a view to the improvement of future editions, all suggestions and corrections will be welcomed by the Editor, at 6, Adam Street, Strand, London. A note is valued for the purposes of this volume if it applies to more than one continent; or to several trades; but no attempt can be made to advise men as to methods only applicable in a limited district, or in trades wherein they themselves are craftsmen.

The construction of the book represents a period during which Frontiersmen who had business at the Legion headquarters supplied notes and criticisms. Apart, therefore, from signed contributions, each page represents a number of workers whose experience was gained in many lands. To all these gentlemen the Council tenders most hearty thanks, and especially to Dr. French and Mr. Harold Ingersoll, whose work has been of exceptional difficulty.

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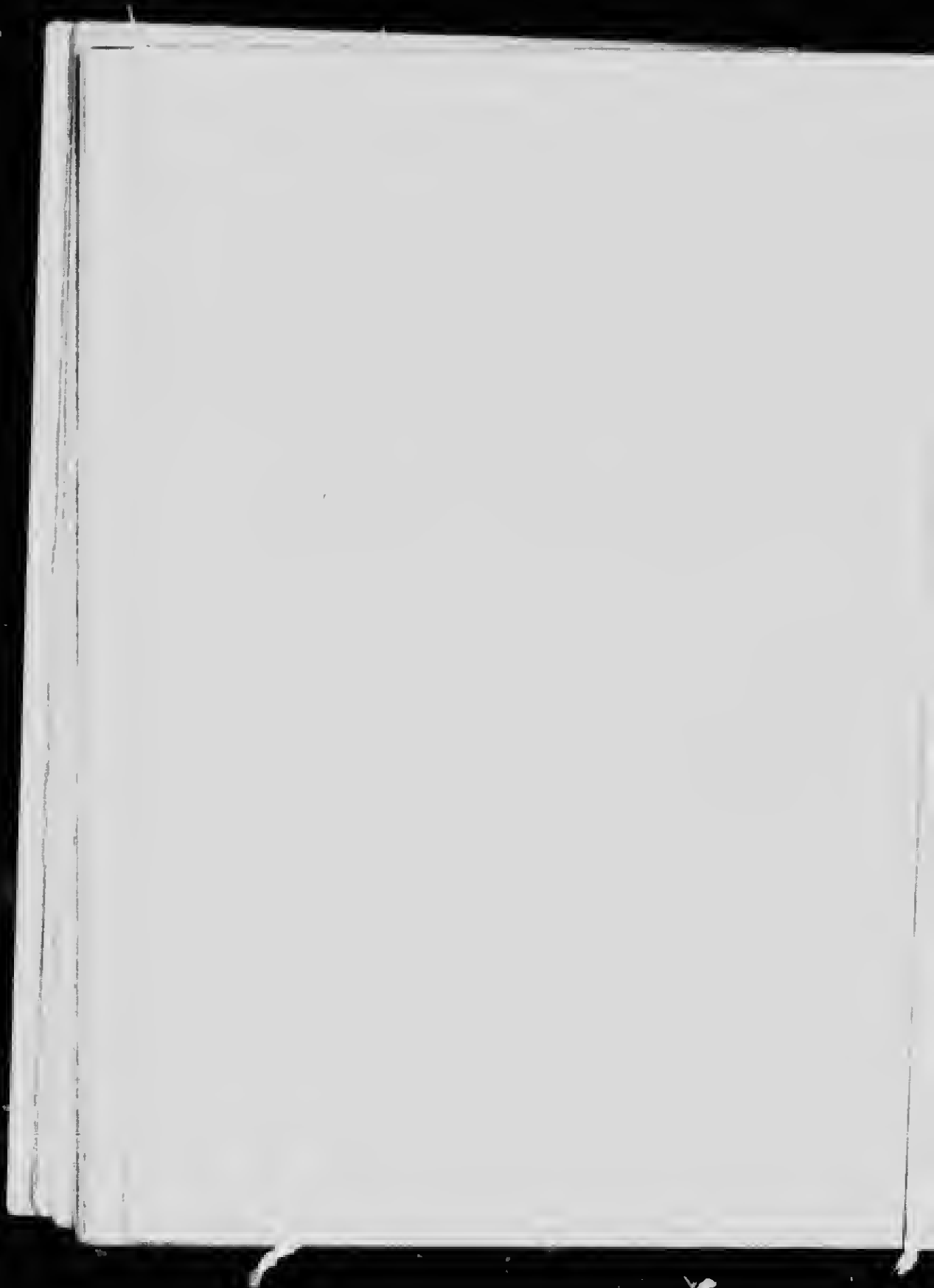
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- HEMORRHAGE (By the courtesy of the Union of Fire Brigades, and of Dr. W. J. Ettles).
- ENTERIC DISEASES (By H. H. Tooth, C.M.G., M.A., M.D., F.R.C.P.).
- TROPICAL MEDICINE (By the courtesy of the Liverpool School of Tropical Medicine, by J. W. W. Stephens, M.D., M.A., D.P.H. Cantab.).
- INFECTIOUS DISEASES (By J. Bart Rous, M.B., B.S. Lond., M.R.C.S. Eng.).
- NURSING NOTES (By Miss H. F. Pocock, Q.A.I.M.N.S.).
- NOTES (By Major E. E. Craster, L.R.C.P. & S., L.F.P.S.G., L.F., and Major P. W. Forbes, L.F.).

*INDEX. Pages 457-63.*



## 2 THE TRAINING OF FRONTIERSMEN

the individuality of a man, to deprive him of that self-reliance and self-help which in reality is, and should always be, part of his very nature. Even the training of European armies has for centuries tended to eliminate these characteristics, which in warfare are, in truth, such essential factors in the strength and effectiveness of a regiment, a battalion, and an army corps. No better object-lesson in the evils and defects of our present mode of life could possibly have been afforded than in the Boer war, where our own helplessness and the ease with which our opponents skipped away from us were for the first year or two of that long campaign so painfully apparent.

Civilised man in a wild country at first finds himself at an immense disadvantage. This fact the Boers took many opportunities of rubbing into us; and not until we had been fighting in South Africa for a year or two, learning the painful, primitive, yet necessary lessons of how to find the way, how to scout, to travel, to save horseflesh, and innumerable other details, were we able fairly to cope with our wily adversaries and wear them down. The South African Dutch, accustomed to life in the wilderness during 250 years, were at a huge advantage; and not until we had mastered our preliminary difficulties and learnt our lessons in veldt warfare, were we able to cope with them successfully. Mere courage, of which the British soldier has always possessed an ample share, was not enough; and our commanders, as well as our men, had to ride or to tramp many a weary hundred leagues under burning suns before they mastered that simple yet elementary fact. Individuality must, in warfare, always count, and it is the duty of every man of British blood to cultivate this most valuable

characteristic, a characteristic which, unfortunately, the conditions of modern life in this crowded country of ours tend to discourage and even to destroy.

## I.—PATHFINDING

*Finding the Way.*—Most men have a natural sense of direction, which can be developed. The training is a life-habit of observation. To begin training, swear never again to ask for directions. Use a local map, and find the way for yourself. On each trip in town or country commit to memory the direction, distances, and features of the journey, looking back at intervals to see how the route will appear on your return.

*Guide Signs.*—Churches where they have room to grow, point their chancels east. Dominant wind, especially near sea, is shown by leaning away of trees, visible to practised eyes. In England dominant wind is WSW. If there is moss or lichen on lone tree or rock, it grows on shadowed side farthest from noon sun, giving north for northern, south for southern hemisphere.

Hold your watch with hour hand pointed at the sun, and (for northern hemisphere) the point midway between the hour hand and XII is south (in southern hemisphere it is the north). Carry a pocket compass with floating card, coated with luminous paint for night work. Learn to know the Pole Star and Great Bear, Orion, which is visible from all latitudes, and the Southern Cross. It is important in travelling always to take a departure from some land mark which will correct your bearings later on.

The sun at noon is due north for southern, due south

for northern hemisphere. (The compass points to magnetic, not true north.) Remembering the points at which sun rises and sets, and the length of the day, divide the distance to noon by the number of morning or evening hours. A glance at position of sun will then give the time within an hour.

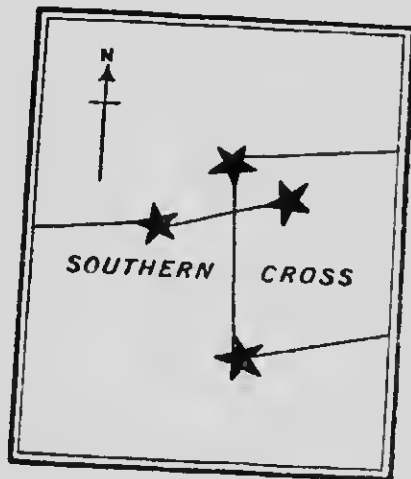
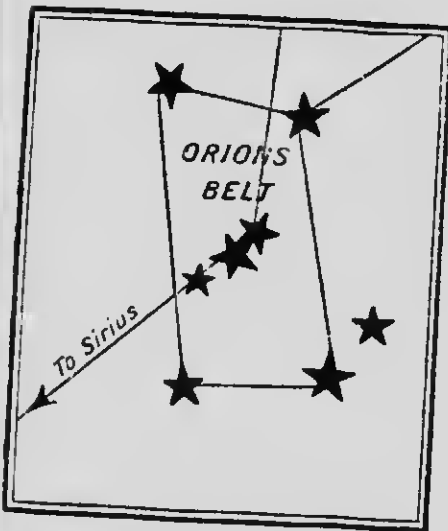
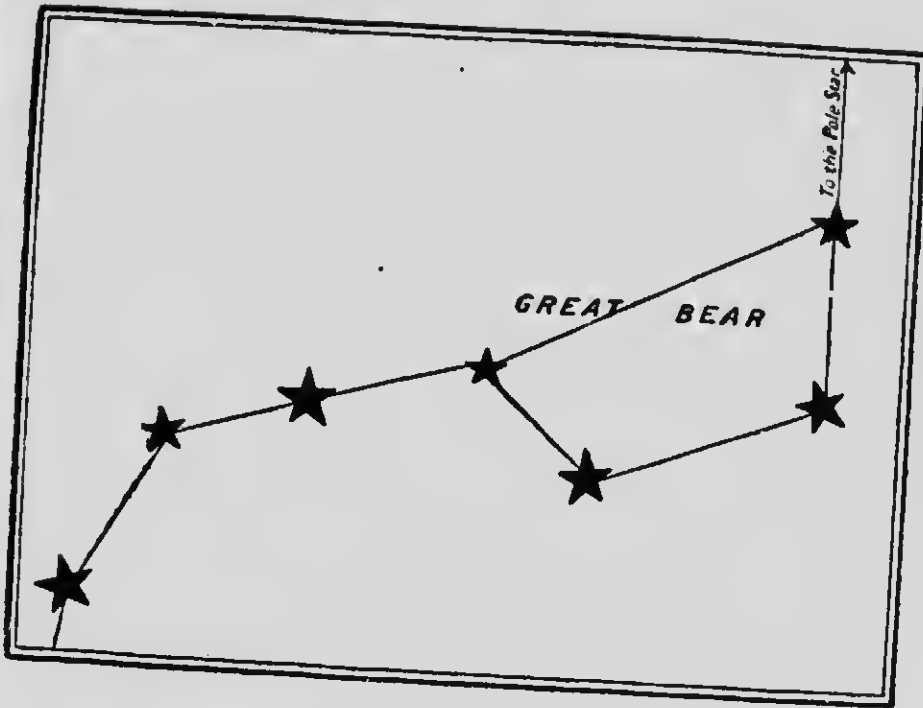
At night the circling of Great Bear for northern, and Southern Cross for southern hemisphere, like the hand on a clock, gives correct time.

*Reading Country.*—A country is like a book for those who learn to read. The core of the land is usually high and broken, of speckled rocks glittering with mica. Resting against this core are the water-made bedded rocks, usually without speckles. This tract may be crumpled into new folds like the Himalaya, or broken by volcanoes. Below the main rock-tracts lie the alluvial valleys and plains. Table-topped hills indicate tracts of rock hardened by mineral springs, the surrounding country having been torn away by running water or driving sand. Springs mark the lines of division between beds or kinds of rock. Search for them above clay, or below limestone, coral, or lava. At normal stages of flow, a white muddy river may read "glaciers up stream." A clear green either reads "sandy bed" or "snowfields up stream." A grey sandy river has been undercutting rock, so reads "gorges or canyons up stream." Clear blue reads "filtered by lakes." Brown reads "wet country up stream, forests or peat moors." If soap won't lather, there are limestone rocks up stream. If pebbles are speckled and sand has glittering flakes, look for hills or mountains up stream. In malarial country a swift river says "Look for higher and healthier ground within reach." The farther the hills, the smaller

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## 6 THE TRAINING OF FRONTIERSMEN

the gravel or sand grains. Line of driftwood on bank of river or side of valley marks annual flood level. Camp above line.

In lava, limestone, and coral, most of the water flows underground, so when water is scarce prefer other formations. When two streams meet at foot of hills, the main stream below is often smaller than either tributary, most of the water flowing under gravel on the bed-rock. In dry countries the whole of the water may be absorbed by the ground, or evaporated by sun.

The main swell of sand or snow drift runs at right angles to dominant wind, with the long slopes to windward, short slopes to leeward. The surface ripples on sand or snow are at right angles to the last wind which was strong enough to lift the grains.

As streams flow towards the sea, their course and the general slope of the landscape give rough bearings, and on a watershed the way down stream usually leads to nearest settlement. If a land dips sharp to the sea it is most frequently on western side. Each rock formation has its special soil and plants. Height above sea is marked by successive belts of vegetation, in some cases reaching on one slope from tropic to arctic. Of cone-bearing trees the pine, fir, hemlock, spruce, of light, sandy, or rocky land, indicate hungry country, whereas cedar needs richer soil. Size of trees indicates depth of subsoils. Thorny or aromatic plants mean little rainfall, eucalyptus (not plantations) healthy ground, mangrove and bamboo, wet ground, the mopani tree (South Central Africa), with leaves paired like swallow tail, is danger sign for malaria.

There is no trail of men or beasts without a definite objective, and tracks which gather on pasturage con-

verging to water become the roads which lead to men's homes. Except in mountains, old main trails, for the sake of drainage, follow the ridges, and towns grow to supply goods at their junctions, ferries, and terminals.

*Trail Study. Example.*—In prehistoric time (Stone Age) Cheshire supplied salt to Europe. Later, the Romans planted a military camp (*castra* = Chester) at the trail head, and paved the trail as Watling Street (Edgware Road, Park Lane, Old Kent Road, etc.). The camp on Thorn Island in the Thames became the City of Westminster. Cornwall supplied the bronze of the Bronze Age in Europe, causing the bronze trail which crossed the Thames at Oxen-ford, cut the salt trail at Marble Arch, and started a seaport at the terminal called London. The two trades civilised savage England.

*The Long Continuous Line.*—To find the way back to camp. By Captain H. P. Hilton, D.C.O., Middlesex Regiment.

Work out following problems with matches, making rough maps on a table.

Before setting out, find a long continuous line visible from starting-point, such as seashore, range of mountains, river, road, railway, or telegraph. This forms base-line. Learn a few miles of it if possible, and use it in making your "departure." For example, railway runs north and south, and you are taking easterly course therefrom (Plate 1). So long as you don't cross railway, you are eastward of it. When returning, strike west till you find it. If you don't recognise the portion of base-line reached, and don't know whether you have been working north-easterly or north-westerly, go along base-line until you find a station, culvert, or mile-post, which will show whether you are

## 8 THE TRAINING OF FRONTIERSMEN

north or south of starting-point. If railway crosses a stream, and you have not seen one during the day, you are following base-line in wrong direction. A range of hills makes a similar base-line. Its appearance should be remembered, and any discrepancy in its appearance caused by distance checked by looking back at intervals. If base-line is a river (Plate II) running north-east

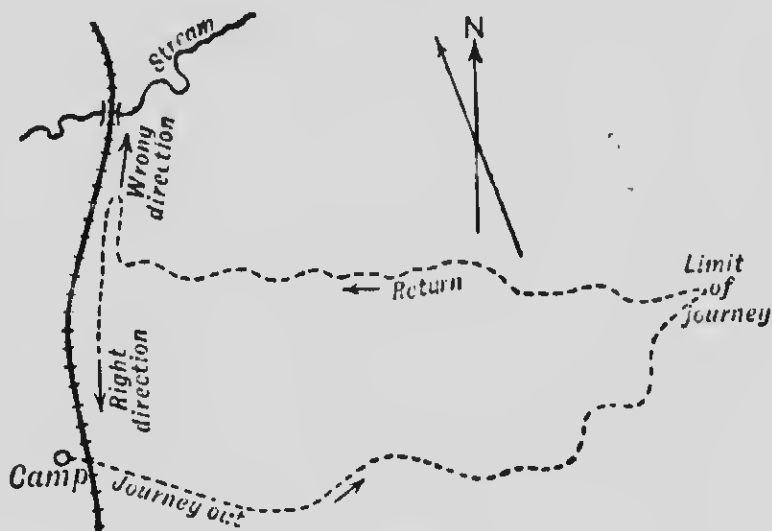


PLATE I.

and south-west, and your course easterly; when you start to return, if you think you have made rather to the southward, strike to right of west. If you strike a stream or other continuous line not crossed before, don't cross, but follow (probably down stream) until it leads westerly. An easterly tendency is obviously leading you astray. So long as it leads west you are going right, but if stream heads north strike west, across country. On reaching the river base-line, if you don't recognise it, note if stream

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is bigger or smaller than at camp. If bigger, go up, if smaller, go down, following the river until you strike camp, or a converging continuous line such as a tributary, which shows your course to be wrong. If you camp on a road, while travelling, say, north-west, and you use road as base-line, on your return when you again hit the road, if the tracks of your own party are visible, or you remember the ground, go north-west. Otherwise go south-east.

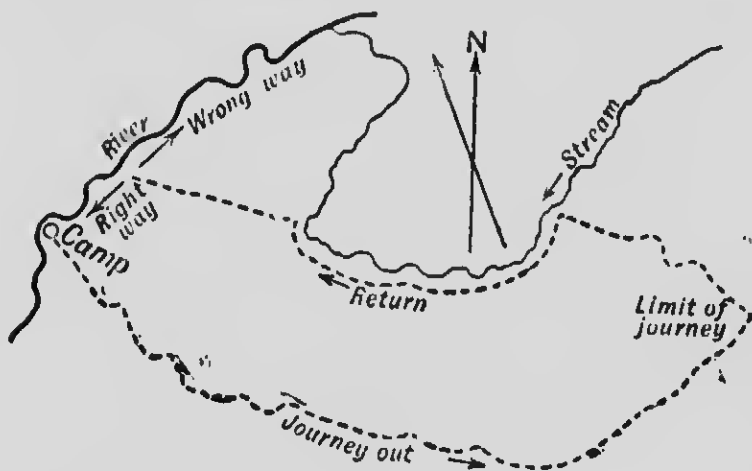


PLATE II.

*Cut-offs.*—Always the time multiplied by pace gives distance travelled, from which a percentage can be deducted for deviations from a straight course, giving you some estimate of your direct distance from base-line. If base-line is a hill range, running north-east by south-west, and the day's course has been easterly, with more southing than you think, and if known distance from base is, say, 12 miles; after returning due west for, say, 10 miles, without striking base-line, you are obviously south of where

10 THE TRAINING OF FRONTIERSMEN

you should be. So strike north-west or even north for camp. You are near enough for signal shots (Plate III).

*Unknown Wilderness.*—Without features, in bush. *Dangerous.*—You know general direction of your journey to present camp, say, south-east from outfitting point (Plate IV), you leave camp on an easterly course all day, being specially careful of directions by sun or compass. On wishing to return, due west may possibly miss the camp, so keep well north of west, for some time. Knowing



PLATE III.

approximate day's mileage, you can judge how long to keep north-west before striking west. You should then strike the trail of your party to camp. If you strike it a mile or two to north-west that is better than passing a few yards to south of camp, as, once west of camp you are lost. Starting from same camp, it is always safer to go north, east, or west, but if it is absolutely necessary to go south come back the full distance of your day's journey before you cast east and west for the trail of your party.—(H.P.H.)

*Walking pace, man or horse.*—At 30-inch pace, in

a period of 17 seconds, each 10 paces represents a mile per hour. Thus, 40 paces of 30 inches in 17 seconds represents four miles per hour.

*Lost.*—If lost from a party, hoist some sort of flag, or signal, sit tight, and don't wander. Your friends will come for you. If within possible range of friends, make smoke signals by day, fire signals by night, except in hostile country. In hills, fire rifle. Don't exhaust

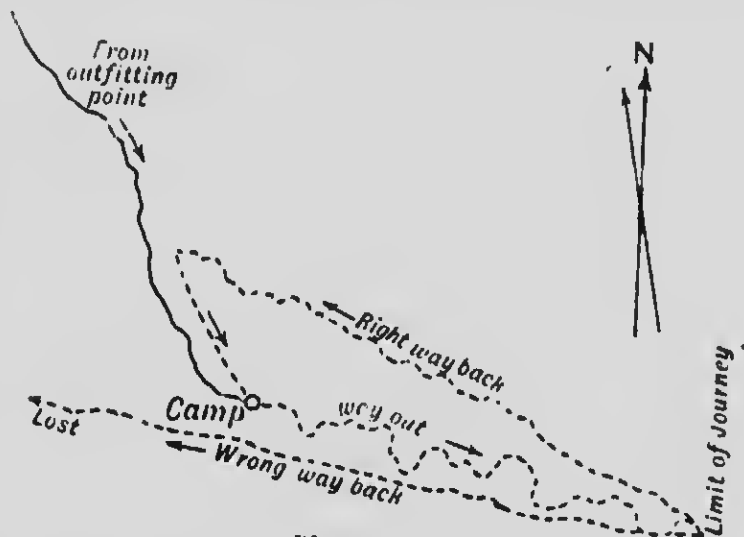


PLATE IV.

yourself with shouting. If a lone traveller, not likely to be missed, break for highest outlook within reach. Recall position of last camp, whence a fresh start may be useful. You may have cut a trail with fresh tracks worth following. Otherwise make cool, deliberate study of all guiding signs. Having decided on course, stick to it, checking course by landmarks both in front and behind. Mounted, or afoot, a man circles, unless he checks his course by definite bearings. Only an ambi-

dextrous man goes straight naturally. Travel on soft ground, which will record your track. In timber, blaze trees (both sides of trunk), tear down strips of bark, or turn branches down, showing light underside of leaves. In loose soils, trail a stick. On hard ground, drop scraps of paper, leather, or clothing. If you cut your marked trail, you're circling—take fresh bearings. Anyway, a marked trail may advise travellers of a man in danger, and notes to record hour, date, and intentions should be set up at conspicuous landmarks.

*Guiding Transport.*—To find easiest course for transport down steep places, get to the bottom and climb back, blazing best route.

*Mirage.*—To test difference between a standing object and a living man or animal, take sight with rifle.

*Selecting Ground.*—Avoid closely following a water course, as the ground is less cumbered and broken on the ridges of plains, or on the slopes in hills, besides giving wider outlook.

*Artificial Guide Signs.*—Convenient routes are marked by travellers in otherwise trackless country as follows:

*Circles of small stones* which have held down edges of Red Indian tepees: North American plains.

*Piles of stones*: Arabian Desert. Russian steppes.

*Blazed trees*: North American forests.

*Blazed trees branded or stamped*: Australian bush, Swiss forest.

*Lop Sticks.*—Trees with all branches lopped off, except tuft at top, mark Canadian waterways, or in B.C. native burial trees.

*Planted branches*: route across lake or river ice. Canada. Russian Empire.

## PATHFINDING

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*Cairns or monuments* mark nearly all international land boundaries.

*Text-books of Pathfinding*.—"Religion and Chemistry," J. J. Cooke; "Town Geology" C. Kingsley; "Outlines of the Earth's History," Shaler; "Recognition of Minerals," Meor.

### WEATHER SIGNS. By D. H. Bernard, L.F. :

#### FINE

A red sky at sunset  
A grey sky in the morning  
A low dawn  
Delicate clouds  
A light blue sky  
Undefined forms of clouds  
A clear moon three days old  
A rainbow at night  
A silvery moon  
When the moon looks down  
Sea-birds flying high  
Sea-birds flying to seaward  
A high barometer  
Barometer rising  
A clear moon (dry and frosty)

#### BAD

A red sky at sunrise  
A dark gloomy sky in the morning  
A high dawn  
Hard oily-looking clouds  
A bright yellow sky at sunset  
White mottled clouds  
A dull-looking moon  
A rainbow in the morning  
A haloed moon  
When the moon looks up  
Sea-birds flying low  
Sea-birds flying towards shore  
A low barometer  
A falling barometer [stars  
More than usual twinkling of

When wind shifts against the sun,  
Back again it's sure to run.

Long foretold long last,  
Short notice soon past.

First rise after very low  
Indicates a stronger blow.

#### Mariners' Creed—

When birds go high,  
Let all your kites fly.  
When birds go low,  
Prepare for a blow.  
Mackerel-skies and mares' tails,  
Make lofty ships carry low sails.



WEATHER SIGNS. By Evelyn French, L.F. :

*Rain coming.*—Sounds heard clearly, birds fly low, smoke hangs low, hills very clear, salt becomes damp; old wounds, rheumatism, and corns, give extra twinge; frogs hold concerts, and crows have public meetings; flies become lazy and sticky; fish jump. Muster of clouds. On approach of a summer storm: cattle uneasy; distant thunder; earthy smell in the air; wind puffy.

*Heavy weather coming.*—Sea-birds fly inland, grazing animals leave open lands for shelter of hills and timber.

*Flood coming.*—Working ants carry their cow ants up trees. In Australia flood-birds appear and natives hold corroboree to "make fish."

*Drought coming.*—Heat lightning, brassy clouds with flat bottom and rough top.

Hang a button on a string against marked wall. Approach of wet weather will shorten string, dry weather lengthen it.

## II.—WATER

A man requires from two to three pints of water daily to keep in good health. It is possible to train oneself to manage on less for limited periods, but it is not advisable to make a habit of doing so, for fear of causing the internal deposit of salts that are normally voided in the urine.

Many men have died, and many have injured themselves, by neglecting to provide themselves with proper supplies, or by drinking impure water. The following notes are partly the work of various observers and partly my own.

The principal point is to obtain a sufficient supply which shall be free from disease germs, intestinal parasites, and excessive saline matters.

It is best and safest to boil all water before drinking. This kills the germs of typhoid, cholera, and dysentery, and all intestinal parasites. Where it is known that it will be necessary to use a saline water, a still should be carried. Or it may be improvised by boiling water in a kettle, and catching the steam in a tin can partly immersed in cold water.

If it is desired to use a filter, the Pasteur-Chamberland should be carried. This filter consists of a strong tube of unglazed porcelain, and is an absolute preventive of water-borne disease.

C. G. MOOR, M.A., F.I.C.

*Author of "The Analysis of Water," etc.*

*To train* for thirst endurance, gradually reduce daily ration of water. Make a wooden pin through cork of water bottle, to be pulled out when you need a few drops of water. A few drops moistening your mouth enable you to do without gulping water.

*Thirst.*—Who drinks least, thirsts least. A stone or leaf in the mouth prevents tongue from swelling. In early stages of thirst, do not use spirits, and put away tobacco.

Fat or oil on irritated skin of mouth and throat slightly relieves torture of thirst. A cloth over mouth checks evaporation of saliva.

Liquor, urine, salt-water, or blood brings on delirium. In extremity kill your horse, and travel with a load of raw meat to chew. On reaching water, excessive drinking will produce vomiting or diarrhœa, or both.

Sip a little at a time, but lie in water, letting it soak through the skin. For thirst at sea, keep wet. Your skin rejects salt, but absorbs enough water to sustain life.

A thirsty horse will smell water at—in American desert— $4\frac{1}{2}$  miles ; in South Africa, 3 miles ; in Australia, at much greater distance ; and if given free rein, will run straight to it. Free your pack animal, and follow him if he runs.

In studying landscape, where bees hover dig for water. Any water is shown by taller and greener vegetation. Certain trees have suckers which, cut in lengths and placed standing in a vessel, will leak small quantities of water. The acacia *tree* generally has fresh water within fifteen feet, usually close below surface. To get water from the baobab tree drive in pegs, and climb to the main fork, where there is a cavity, and 2ft. 6in. of pipe with suction will draw supply of water. In North America cacti carry water in leaves and trunk. Watch for soaks in creek which may be worth digging. Screw damp sand in a kerchief, and suck the kerchief.

*Putrid Water.*—Put charcoal in pot for boiling. To clear green or muddy water, suck through handkerchief. Or take handful of rushes or grass and tie together at one end, making a cone ; set base of cone in the mud, then invert cone, point down over your cup, and water dripping to cup will be cleared.

*Digging for Water.*—Failing spade, use pointed stick. Kneel and thrust stick into ground like a crowbar, then pull towards you, scratching up earth. If you have a bamboo, make lower joint into a brush and thrust into sand, brush downwards. As brush spreads, sand rises through tube of bamboo. Shake out and fill until hole reaches damp. If you have wooden box, knock out

lid and floor, lay box on sand, dig out inside, and let box sink as a retaining wall to keep sand steady.

If no better chance offers, follow the drift of birds and animals in sight, as they go, sooner or later, generally in early morning and late afternoon, to their drinking place. Birds, pig and cat animals, range nearest to water, antelope and gazelle farthest away, except South Africa, where biggest game range nearest to water. Trampled ground, grass and shrubs eaten away, indicate that livestock are within range of water. As tracks gather into a trail and dung droppings increase, the direction points to water.

*Mirage.*—When water is in sight, don't hurry, as exertion increases thirst, and may lead to disappointment. Take care not to knock out horse, and if inclined to throw off clothing, sit down and take a spell. Don't travel in afternoon heat, and in a dewy country night is worth waiting for.

*Dew.*—Away from trees the dew will soak a blanket, which can be wrung out; or take a bunch of grass, handkerchief, or sponge, brush it through dewy grass until soaked, and wring out into pot.

*Outfits crossing Desert.*—From last good water hole send on water carts and establish depôts. If no carts, sew up oxhide water-bags, carried on pack animals.

*Thirst at Sea.*—Boil salt water, covering pot with blanket, which condenses steam into fresh water. Wring out. Water may be distilled by boiling it in a kettle, so placed that the steam issuing from the spout goes into a tin can (a tomato can, for example), which is kept cool by being immersed in cold water.

*Carrying Water.*—Porous vessels, whether of clay or canvas, keep water cool. An Australian water-bag is

made of No. 1 canvas, sewn with a small needle, and no wax on the thread. It fits against horse's breast, with strap round neck, and a leather flap to keep off sweat; upper edge leather-bound, and curved to fit under neck. The neck of a bottle is sewn in as a mouthpiece. (To cut neck from bottle, soak a string in petroleum, tie it round at place to be cut, and set string on fire, and when glass is hot plunge in water.) Size of water-bag  $1\frac{1}{2}$  gallons. An African water-bag for men afoot, same construction, but cut square. The upper edge is made fast to a stick, with handle like that of a valise. American enamelled iron cantinas (gallon or half gallon), blanket covered, hang from pommel of saddle. Very weak cold tea is the best fluid to carry. With pack transport, carry emergency water rations—peas, French beans, or tomatoes tinned; with waggon transport, melons, water barrels. For permanent camps, white earthen water-jar, slung in the wind and shade.

*To avoid Disease.*—Water not taken direct from a spring may be foul. When in doubt, boil. Tea or coffee, hot or cold, relieves thirst better than water, and is safer. Eating snow causes thirst, and is bad for kidneys. Hot water gives strong stimulus in weakness or exhaustion.

*Water Purification.* (Note by Col. G. O'Sullivan, R.E.).—Boiling is often difficult, owing to fires not being permissible, or the weather being unfavourable for fires, or no fuel being available, or the time inadequate. Under these circumstances, *on the march* use Nesfield's water-sterilising tablets, made up for various quantities of water, from contents of a water-bottle upwards. There are three tablets in different-coloured tubes, with full directions.

For sterilisation of water on a large scale, Nesfield's cylinders of liquid compressed chlorine are used: the cost of process is one penny for 500 gallons. The excess of chlorine can be removed by hyposulphite of soda; but if water is not required at once for drinking purposes, this is not necessary, as the excess of chlorine is quickly given off by the water. Sterilisation occupies five minutes. Three pounds of liquid chlorine purifies 60,000 to 70,000 gallons.

If rivers are in flood, a lump or tabloid of alum held in the hand, and stirred round in a pail of the water, will cause the mud to settle.

When none of the above are available, permanganate of potash is useful. First make a strong solution in a water bottle, and with this treat the water in the buckets, adding about a teaspoonful at a time. If water remains slightly pink after half an hour, it is fit to drink. As long as it remains brown, put in more of the solution. For salt or brackish water distillation is the only plan.

*Bathing.*—Failing water, run till you sweat, strip, and bathe in dry sand. This cleanses and refreshes the skin. A sponge makes a big bath with little water. In tropics, baths should be brief, and taken before meals. Take care to dry hollows of the body where parasites may lodge and breed if afforded moisture.

*Washing Clothes.*—Soap is made readily by boiling a strong solution of wood-ashes with any kind of fat. The mixture can be boiled in a frying-pan or a tomato-can and stirred with a stick. The soap made in this way is soft soap. To make hard soap use soda instead of wood-ashes.

If clothing is infected with lice, boil it, or if this is

inconvenient, turn it inside out and "iron" the affected part with any iron instrument made hot, or with a hot stone. This bursts both lice and their eggs, and is thoroughly effective.

*Repairs.*—Grease and ashes make a cement for leaking troughs, canvas water-bags, etc.

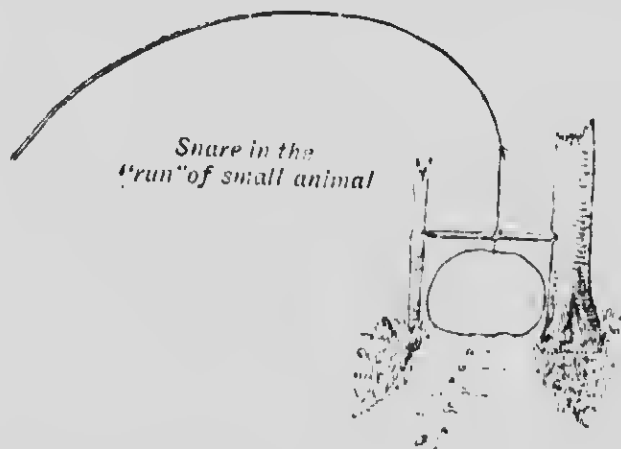
### III.—GETTING FOOD

*Hunger.*—Don't overexert yourself except for certainty of reaching supplies. The vital organs will live on your fat and muscle for weeks if the body rests. Drink freely. An ounce of intelligence is worth a ton of hurry, so study how the birds and animals around you get their provisions. The stones of a desert may hide eatable lizards and insects, the barnacles on a lost boat may contain a little meat. Useless-looking plants may be the tops of ground vegetables. The rotting bark of trees conceals a meal of fat grubs.

Stewing and boiling are the least wasteful ways of cooking. Bones, however stale, skins, leather, seaweed, fern shoots, and the sprouts and young growth of a vast number of plants are worth pounding and boiling.

SNARES AND TRAPS. By Evelyn French, L.F.—*Snare* for large animal or running bird. Select point on a game track, near a bend, or where it is narrow, so that animals will not see a snare while they have time to stop. Take a sapling, solid and upright, beside trail. At foot lay a second sapling, fixed against base of the upright, slightly off the ground, and at right angles across track. Take cord or rope a little shorter than the upright

sapling, and make fast to top, pulling sapling over and down across the track to form a springe. Where its point touches the second sapling, make a notch just deep enough to hold the tip of the springe. The second sapling may need pegging slightly. Take end of the line which is fast to the tip of the springe, and lay it down as a wide noose across the game track. Lay a few twigs within, but not touching the loop, across the second sapling, so that an animal, in touching one of them, disturbs the

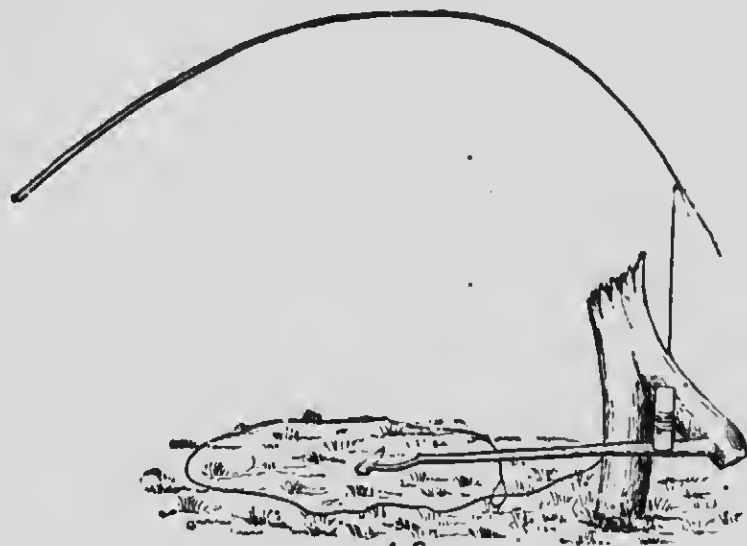


second sapling. Make sure that noose is clear of twigs. Size of snare varies with size of animal required.

In desert, if you take possession of a water-hole, the birds frequenting it get desperate and are easily caught; fish for them with string, hook and worm, or with bait and noose. In latter case see that bird is looking away when you pull, so that string slides up over his toes. A Chinese method is to draw string taut, between two sticks, with little baited hooks hanging down. Birds have to jump for bait, and so bite hard instead of nibbling.



If you can catch a bird alive, tether him, and prod him to make him squawk, attracting his friends to within stoning distance. Birds fed with grains fermented or soaked in alcohol are easily caught.



A Snare

*Pit Trap.*—On curve or narrows of game trail, dig pit, wide at bottom, narrow at top, like a bottle, sides clean, and for animals that can jump, sharp stakes set on floor. Lay roofing of boughs, twigs, and bark, very frail, and cover to imitate surrounding ground. Do not trample on the trail, or disturb its surface, but work from the sides, removing all earth to a distance, and carry materials, lest dragging disturb the ground.

*Balance Trap* for small animals.—Make an ordinary pit on very narrow part of track. Track can be narrowed by brushwood. Make solid roof to pit, except for a little hole in middle of track. Fix board on fulcrum, with

## GETTING FOOD

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short end over pit, and cover to imitate surroundings. An animal running along board, reaches almost the far end, when the board tips him into the pit, and rights itself.

*'Possum Trap.*—Find tree frequented ; lean a sapling at 45 degrees against it, and two-thirds of the way up, make fast a wire or sinew noose, so that 'possum walking through draws the loop tight.

*Folar Bear Trap.*—A doubled-up whalebone hidden in bait will spring straight when swallowed, and incommode the bear. Springs of this kind, of cane, might kill any flesh-eating animal disturbing one's camp.

*Bird Lime.*—Middle bark of mistletoe, holly, or elder shoots, boiled seven hours to soften, then drained, heaped in a pit of earth, covered with stones, and left two or three weeks until fermented ; then pounded into paste, washed in running water, kneaded, freed from dirt, then left five days in earthen pot, until greenish, sour, gluey, stringy, and sticky.

*Water Fowl.*—When they sit on running water, send down a few boughs, until birds get used to them, then swim very slowly, head concealed by a bush. Australian blacks make a tussock of grass, built upon a collar, and enclosing the head. They use a spear with a throwing stick, but sometimes catch a bird by the legs, pulling him under before he sounds an alarm. Ducks like bacon for bait.

*FISH.*—See "Making Weapons." A rod with charred and sharpened point, to spear where fish are plentiful.

*Fish. Dynamiting.*—The heavy fish don't float up. Send diver for meat.

*Fish (in tidal waters).*—Make semicircular dam, enclosing little bay or inlet, leaving door open for fish

to enter with tide. At high tide, fill door with brushwood, and with ebb tide the fish enclosed will be stranded.

*Walking up Fish.*—In any muddy pool or bay. The beaters wade or ride, or drive cattle across. The driven eels and other fish come to surface, and are clubbed. (Beaters splashing can often drive fish into an extended net.) In Arctic tundra, fish can often be shot. Aim very low. North-West Canada—beat down stream with bushes into a weir enclosure.

*Skating Fish* (British Columbia).—Settlers gather at a lake when ice is new, cut out an acre of ice, let down seines, then from wide circle beaters skate inwards to the hole, driving fish into seine.

*Spearing Fish.*—Use pole in position of a bowsprit to boat. Tarred rope is wound round pole and lighted at end. Or make platform on bow, or on bowsprit—a sheet of bark plastered with wet mud to carry bright fire. Light should be above spearman's head. Weapon for small fish has many points like rake; for larger fish use trident or spear.

*Poisoning Fish.*—Lime thrown on pool or dam will bring fish helpless to surface. Many poisons are used by savages.

*Dip Net*, or large basket.—Sling from end of long pole, mount pole on forked stake for a fulcrum, immerse net, cast bait, and as fish gather raise net under them. Where small fish run in heavy shoals, rippling water, a basket dipped by hand will catch plenty. In heavy runs of salmon as on North Pacific they can be gaffed with a boat-hook, or at head of a rapid taken by hand with a quick snatch behind gills.

*To see bottom*, make open box with glass floor, and float it beside boat.

*Fish hooks* can be made of bone or shell. For the latter, keep shell under water while cutting. Make lines of sinew and string. Needles make good hooks. Tie end of string to eye, and two-thirds down towards point make a half hitch round needle, then thrust needle, butt end first, into middle of bait.

*Wire Fish Hooks.*—Cut length of straight iron (not steel) wire, lay it in slight groove on hardwood block, and barb it with slanting stroke of chisel. File the barb sharp. Hammer other end flat or roughen to hold whipping. Bend wire to shape, make it red hot, and dip in oil. Lash on sinew or horsehair. For fine line unravel silk kerchief and make threads into a string.

*Fish Traps* of wicker or wood.—A funnel points into the trap, or a bag may be used with narrow mouth, held open by sticks. Such traps are baited, and set in stream.

*Yukon.*—The best English flies and gut kill infinitely better than coarse tackle, but in North Pacific salmon do not rise to a fly.

*Drives.* (By the Editor.)—It is the custom of all races in all ages to trap and handle animals in a circular enclosure (yard, kraal, corral, pound, keddah, amphitheatre). Splaying out from the gate are wing fences. The beaters often dress as wolves, driving the large game of the district between the wings, where sometimes the women break from cover, waving blankets. The game are driven into the yard or over a cliff for slaughter. Young animals saved as pets were the ancestors of our grazing livestock, horses, cattle, reindeer, elephants, asses, camels, guanaco. Kittens and puppies saved by hunters begat our cats and dogs.

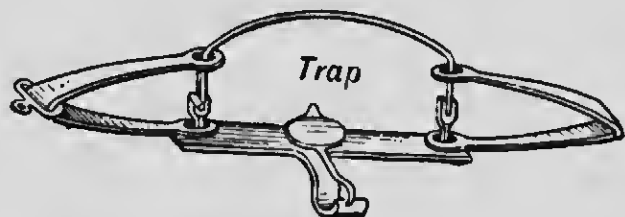
Tamed wolf dogs employed as herders gave us our controlled herds of sheep and goats.

*Deadfall and Steel Traps.* By S. A. White, L.F. (Peace River).—The deadfall: A small pen, made to entice victim into entrance, the bait being at end of a pole, farthest away from entry, so that the animal has to reach into the pen to touch the bait. This pole or trigger is like that of the boy's bird-trap made of bricks. Lay the killing log across entry of pen, like the sill of a door. Above it, parallel, one end resting on ground, is the falling log, which runs between two upright logs so that it falls straight and swift. The high end of falling log rests on point of a short upright pole. The foot of upright pole is pointed, and rests on killing log. Then the upright pole is slightly lifted and the tip of the bait pole is inserted. The tip of bait pole rests on killing log and supports upright pole. The bait pole points into the pen, with bait fixed to its inner end. An animal reaching for bait disturbs bait pole, which dislodges upright, so that the falling log drops on animal's back.

*Mashona Practice.*—A stake forked at top stands on a track balancing a poised log. The run is fenced, and mealies laid for bait. An animal touching forked stake brings down log.

*Baits.*—The deadfall is not always reliable, and, unlike the steel trap, requires a separate bait for each. Small deadfalls are liable to be snowed over, and all are liable to catch animals of less value than those arranged for. The deadfall never, like the steel trap, gets frozen up, and is the best way of catching bears. It has the advantage of killing instantly, where the steel trap inflicts a lingering death.

Steel traps are used for beaver, otter, wolf, lynx, mink, wolverine, marten, fisher, skunk, musk-rat, fox, coyote, and bear. The sizes mostly used are: No. 0 for marten and musk rat; No. 1 for fisher and skunk; No. 2 for foxes and coyote; No. 3 for beaver, lynx, and mink; No. 4 for beaver, otter, wolverine, and wolf. Larger trap for bear cannot be set without thumbscrews and clamps.



*To set a Trap.*—There are two springs, one on either side of the jaws. Place trap on hard ground, standing with one foot on each of the springs, close up to the jaws. Seize the jaws with both hands, and gradually draw the springs down, until the jaws fall out, then set the trigger, keeping the feet steady and firm all the while. Release the feet slowly, and carry the trap by the extreme end of the spring. Use great caution, as No. 4 will break a man's wrist, making it impossible for him to extract the broken limb single-handed. Steel traps can be set from under side by raising the loose jaw, and setting the trigger without getting hands into the business side of the instrument.

Fur is best when thick snow is on ground, and trapping does not begin before snow flies. Traps, regardless of weather, must be visited daily, lest crows or wild animals injure furs. In the trade, the trapper needs one or two wise, experienced dogs. The best trapping

locations are on the edge of forests, where if tree furs play out, one can trap fox and coyote on prairie. Marten migrate without apparent reason, and cannot be relied on to stay in district. In trapping for furs, remember that the back of the animal fetches the money, so do not tear this portion of hide while skinning.

*Fox and Wolf Bait.*—The side leg corns of a horse (splints) soaked in oil for a few days can be removed without hurting animal, and will grow again. Lay in a stock during summer. An aged horse, taken to packing ground and killed, can be cut up into a season's bait. Other baits—squirrel, animal meat, and fish. In setting all traps, cover with dust, leaves, or snow, in exact mimicry of surroundings. Don't pat with hand. A foot of all animals caught should be preserved, and used to make impressions on dust or snow all round a trap, especially in dealing with foxes. To catch foxes or coyotes without bait, drive in a stake a little distance from trail, and surround it with concealed traps. Animals will leave the trail to visit any isolated stick like this. Where mice are running—and a fox loves mice—foxes will spring about in the effort to catch them, and concealed traps are effective. Fox traps should be burned or rubbed with aniseed every short while, and should always be set with gloved hands, lest they retain man-scent.

Musk rats are easily trapped near their holes. Lynx and mink like overripe fish or piece of bird. Otters like fish, but rarely land to be trapped. Traps should be well secured in their landing places. Beaver, when located, is easily caught: a small log  $2\frac{1}{2}$  inches high is placed across his run with trap on far side, so that in stepping over log he places foot in trap.

In trapping bears, always have a rifle fully loaded

before nearing trap or deadfall. If you catch a cub, look out for Mrs. Bear.

*Porcupines*.—Caught near running water. No. 1 trap; bait, squirrel or fish. Skunk easily killed with club; but stand in the next county.

In North-West Canada districts near settlements are trapped out, but country east and north of Great Slave Lake, Nelson, and Liard Valleys, are still fairly good ground.

MAKING HUNTING WEAPONS. By Capt. Graham Hope, late R.A., L.F.—*Tools: naval jackknife with marlin-spike.*

*Javelin*.—Stout heavy shoot (willow best) thick as thumb. Straight and stiff for a cubit length (finger tip to elbow), with whippy end of same length. On the smooth, stiff end leave bark. Whippy part untouched, with leaves and twigs left on to serve as feathers. Can be thrown accurately 20 to 30 yards. Stiff end is point of weapon.

*Spear*.—Stiff, solid sapling, slightly tapered, a little taller than man using it. Smooth, but leave bark, unless easily removable. Size, to fill the hand well at grip.

*Three-pronged Fishing Spear*.—Trident, as above, but lighter. Split small end in three prongs, span long. Splay like three middle fingers. Wedge apart by stones or baked clay, to give weight forward. Lash at fork, to secure wedges and to strengthen.

*Club*.—Grub up young, slightly whippy sapling by root, to fill hand at height of one cubit above ground. Trim root and handle, but leave bark. Bake club in the bark. Harden head in ashes. Handle cubit long from head. Notch or drill hole for thong wrist-loop.

*Bow*.—Strong, solid, flexible sapling, height of man,



even thickness. Remove bark, pare down to easy grip centre, taper to ends. Arrow mark exact centre. Make grip of hide below arrow mark. Diagonal notches burned, at thumb-joint length from each end, leaving the string side smooth.

*String.*—Twisted and plaited hind-leg tendons. Keep greased.

*Arrows.*—Straight, light, stiff shoots, finger thick, two cubits long, even, or tapering very slightly. Remove bark and trim carefully. Feather thinner end. Three feathers finger long, side, top, and bottom, one side clear. Depth of notch, double thickness of string. Grease heads.

*Grooves and Notches.*—Less likely to cause splitting if made with red-hot stone or iron.

*Archer's Left-arm Guard.*—(Essential). A hide mitten and gauntlet, stiff on arm. Sew with thin sinews.

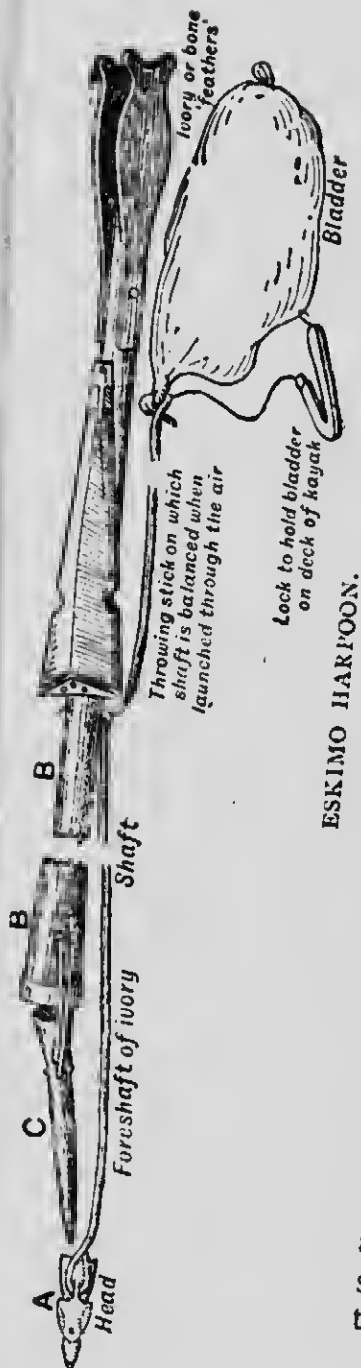
*Sling.*—Avoid unless previously skilled in manufacture and use.

*Spear and Arrow Heads.* Bone or ivory, or straight tusk or tine of antler.—Split bone, grind to leaf shape.

*Stone Heads.*—Flint, glass, or any silicate. Split to thickness, then press with tine of an antler as it rests on an anvil stone to chip off flakes in shaping. Shape, that of a bay leaf with stalk. When roughly shaped, finish on grindstone. Notches on stalk (for bone, burn them out), lash to shallow groove in arrow or spear, with sinews or thin strips of raw hide. If arrow shafts are hollow, fix stalk of head into central space.

*Bone Hunting Knife.*—Split shank-bone of large animal. Grind flat, giving edges and long point. Polish with sand or bone dust. Grind tang half thickness of blade,  $\frac{3}{4}$  span long, leaving knob for pommel. Wind





ESKIMO HARPOON.

thin strips of hide round the tang for grip, lashing in bone cross-bar  $\frac{1}{2}$  span long, and  $\frac{1}{2}$  as thumb.

*Lashing.*—Thin strips of raw hide, sinews, or tendons. Grease before using.

*To season and straighten Shafts.*—Hang in smoke, or in air out of the sun, with stone attached to lower end. In absence of stone or bone, sharpen and harden points of weapons in hot ashes. (G. H.)

*Eskimo Harpoon.*—Weapon in three parts. (A) A barbed head. The harpoon line is secured to shank behind the barbs, the other end of line being secured to a large bladder or float. In the butt of the barbed head is a hollow socket. (B) The shaft is squared off level at the business end, and close behind it there is a groove to hold a lashing. (C) A short stick of ivory or wood tapering to a blunt point, fitting into socket of the barbed head, and at other end broad surface against head of shaft. The short stick is pierced at middle to take a lashing. The lashing

passes from this groove on the short stick, taut on each side, to the hole in the shaft, where it is made fast. The three parts are so adjusted that when the head strikes into an animal, the wrench brings the short stick over sideways, detaching the shaft and short stick from the head, so that they float off. The head and harpoon line remain in the animal, and when he dives the float reveals his position. When animal is exhausted, he is despatched with a lance.

**OTHER FOODS.**—Most savages rely on vegetables, fruits, small animals and reptiles, and such insects as grubs and locusts, which are worth observing against times of scarcity. Valuable foods are rejected by natives of all countries through ignorance or bias: Rice is "strike-me-blind" among seamen; and maize grain is little used in England, these being the two great food staples of mankind. Among common foods only known to educated people in England are fern sprouts (a delicate vegetable), red- and green-leaf seaweeds (used as salad or boiled as vegetables on North Pacific), skin of smaller whales, especially white whale (known in Greenland, raw, as an exquisite hors d'œuvre, also grilled, fried in breadcrumbs, stewed, soup, etc.), nettle top, thistle head, pignut, melon and sunflower seeds, mussels, truffles, smoked sturgeon (lax), sturgeon roe (caviare), garfish, cuttlefish, potted liver, blood dishes, woodland red-top mushroom (Russians seem afraid of field mushroom), tops of the root vegetables.

*Cassava or Manioc.* By A. Poingdestre, L.F. (Equatorial Africa).—Owing to this plant, starvation from crop failures nearly impossible, as it grows in any soil, producing the year round. Used raw or dried and

pounded (tapioca). A twig broken from plant and inserted in ground will propagate.

*Bee Hunting.*—Where wild bees are plentiful, scatter sugar, and when bees gather, sprinkle them with flour. Trace white bees to hive. If a few can be captured and sprinkled, turn them loose, one at a time, from different places, and note how their lines of flight converge. On finding hive, smoke out the bees, and chop out comb.

NOTE by A. Poingdestre, L.F. Honey guides (Central Africa).—Natives depend on these birds, of which there are several types, for guidance to bees' nests. Hives often found in derelict ant-heaps. Honey can be found made by one class of insect or another, for more than two-thirds of the year, and the chance of suffering from hunger would be thereby minimised if this fact were more generally known.

*Testing Safety of Food.*—Generally the grains, seeds, etc., found in crops of birds are of varieties safe to eat. If fish or flesh is doubtful, and contact with it tarnishes a silver coin overnight, throw meat away. If tins of food bulge at the ends, destroy. In any remaining doubt, try it on the dog.

*Poisoning.*—Murder by poisoning is generally attempted in liquids which, like coffee, are of strong flavour. Powdered glass in food grinds the teeth, and in liquids drops to the bottom, but if swallowed is very dangerous.

NOTES FOR THE HUNTER. By Sir Henry Seton-Karr, C.M.G., L.F.

1. *Weapons.*—The best all-round shooting weapons for the poor man are a single-barrel rifle and a double

shot-gun. If one weapon only is essential, rifled shot-guns, or choke-bored rifles, capable of being used both as shot-guns and rifles, are obtainable at moderate prices from all leading gunmakers.

The choked 12-bore rifle in particular, with modern shallow grooving (Greener's patent), is a handy all-round weapon, both for shot and ball, where large game is occasionally to be met with. It shoots well as a rifle up to 100 yards, and weighs under 8 lb. There is also the combined rifle and shot-gun in one double-barrelled weapon. The usual proportions are: '450 rifle barrel and 16 bore-shot barrel, or '500 and 12 bore. This weapon is not specially recommended, being heavy for a shot-gun, and badly balanced for a rifle. Where practicable, the single rifle and double shot-gun, as separate weapons, are always to be preferred.

*Black Powder Cartridges.*—Solid drawn metal rifle cartridges loaded with black powder are best for out-of-the-way countries where ammunition is not easily obtainable. They can be reloaded by the amateur, who can provide himself with spare powder, wads, balls, and caps. The reloading outfit is a simple one, and can be obtained from any gunmaker.

*H. V. Rifles.*—Where sufficient cartridges can be carried for the purpose in hand or are within reach, and where there is no use for a shot-gun, the best cheap weapon for all-round use is a military H. V. small-bore magazine rifle, such as a British '303, or a German Mauser, or an Austrian Mannlicher, or a U.S. Krag Jorgensen, or a Canadian Ross straight-pull rifle. All these are cheap and good long-range rifles of precision, firing smokeless cordite powder and nickel-covered bullet; with a point-blank or fixed sight range of at

least 200 yards, and are capable of killing all kinds of big game. For hair or fur-covered animals, use the soft-nosed bullet; for pachyderms the solid bullet.

The ordinary Government ammunition of the respective countries can be used in all these rifles for hunting purposes, and can be turned into soft-nosed by slitting the point of the bullet with a thin file or saw, or by filing the point of the bullet or rubbing it on a stone till the soft lead core is exposed.

(The importation into India of the '303 rifle, also of any rifle of '450 bore, and their ammunition, is forbidden. No rifle can be imported into India that is sighted to over 300 yards. The '303 rifle can only be imported into the South African Colonies south of Rhodesia by special permission.)

*Sporting Military Rifles.*—A slightly more expensive single rifle is the sporting variety of any of the above military rifles, supplied by all leading English gun-makers, with better fitting stock, finer sights, and generally a lighter, handier, and better finished rifle than the military weapon.

*Sporting H. V. Rifles of larger bores.*—These H. V. sporting magazine rifles firing cordite-powder cartridges are also made of larger bores, from '360 upwards to '600, both single-barrel and double-barrel. The '450 bore is the largest size recommended for use with cordite powder. The single-barrel H. V. rifles of '370 up to '450 bore are useful all-round weapons for all varieties of large or dangerous game, and with solid bullet for pachyderms.

*Double Rifles.*—The double cordite-powder rifle and the double black-powder express rifles are comparatively heavy and expensive weapons; but are best for hunting

dangerous game in jungle or thick cover, when a quick second shot may be required.

**NOTE.**—Cordite-powder cartridges cannot be loaded or reloaded by amateurs, but must always be obtained from good gunmakers.

**Sights.**—Sights for a sporting rifle are to some extent a matter of individual taste and idiosyncrasy. Generally an open V backsight and a bright bead foresight are recommended. A small ivory inverted  $\Lambda$  at the base of the open V in the backsight improves the sighting. The writer recommends that no flaps or elevated sights be used on a sporting rifle. For all ordinary hunting purposes they are unnecessary. Good telescopic sights are now made, attachable to any rifle, for use in shooting game at long range in open country, and for short-sighted riflemen. The peep backsight is also recommended for improving definition.

2. *Hints on Use of Rifle.*—There is no royal road to skill in the use of the rifle. Practice, constant practice, is the golden rule. If possible, have the rifle carefully fitted in length and bend of stock to the shoulder of the user. See that the pull of trigger is right, say 3 lb., neither less, for this is dangerous, nor more, for this may affect the shooting. Always, if possible, use the same weapon and get to know it. Practice at unmeasured distances up to 200 yards. Never fire at game over 200 yards if this can be avoided. Learn the right amount of foresight to take, particularly in varying lights and shades, up and down hill, in open and in wooded country, so that the operation can be done rapidly and instinctively. More game is missed by taking too much or too little foresight, and so firing either over or under, generally too

much and over, than by firing to right or left. Always sight fine, for choice. Practise two kinds of shooting: (a) the quick shot, standing, from the shoulder, at a moving object up to 100 yards; and (b) the quiet shot, at 100 to 200 yards, sitting or lying. Learn to take a sitting or lying position quickly, the former when shooting on the flat or down hill, and the latter up hill. Sitting with an elbow on each knee is a good position, except when shooting straight up hill, and is easily and quickly taken. Grasp the rifle firmly, pull the trigger by a steady pressure and not with a jerk. Do not flinch or shut the eyes when firing.

*Judging Distance.*—This is best learnt by taking note of what the particular wild animal that is being hunted looks like at varying distances; how much, for example, of the eye and the ear can be seen. Up to a certain distance, for example, the eye can be seen. Farther away, the ear, but not the eye. Accurate judgment of distance can only be acquired by practice in the field. With the H.V. rifle judging distance is not so important; the trajectory of the weapon being so flat, with, practically, a 200-yards point-blank range.

*Care of the Rifle.*—Always clean the rifle on returning to camp. Use plenty of oil. Once or twice a week wash the barrel out with hot water. Get an old tin can, fill with hot water from the camp kettle, put sufficient tow on cleaning-rod to go easily into breach end of barrel. Then wet tow in the hot water, insert muzzle of rifle into the hot water (having first removed the bolt of rifle), and push the rod with tow down the barrel, and then draw up. Repeat two or three times, drawing the hot water by suction up barrel. Wipe out thoroughly with dry tow; then oil barrel slightly inside,



thoroughly outside. Examine sights, and try pull of trigger occasionally when rifle is in use.

3. *Some general Hunting Rules. Wind.*—Always note the direction of wind at four points of compass before leaving camp. In default of a compass, take note at night of the north star, and fix the north from camp by some landmark—the point of a hill or some tree or rock. Take note all day of the general direction of travel, so that, if caught out at night, and the north star is visible, the direction of camp is always known, even without a compass. Try and arrange the direction of the day's hunting so that the best is made of the wind. No wild animal can be approached down wind.

*In a Game Country.*—Never, when hunting, appear on the sky-line, if it can be avoided. For choice, always move along the leeward side of the hill; and when crossing hills or ridges, take a hollow, or go round a shoulder, and not over. Spy new ground carefully as it comes into sight. Binoculars are better for the eyesight and more handy than a telescope. Take note of what wild animals look like at a distance. Learn what shape and colour to look for. This only comes by observation.

*Tracks.*—Always have an eye on the ground for tracks. Learn, by observation, the difference between old tracks and fresh; the size and sex therefrom of the animal; and whether it has been moving fast or slow. Note if trees and vegetation have been marked by wild animals, and how. Deer rub trees with their horns. All animals must feed and lie down at times. Learn to note all these signs, and their age or freshness.

*On Sighting Game.*—If the game is quiet and undisturbed, note the ground carefully, and lay your plans for approach according to cover and wind. It is much

easier to approach wild game when feeding than when lying down.

Do not try to get too near. Take any fair chance within 100 or 120 yards. Approach quietly and without hurry. It is difficult to shoot when out of breath. Always wait, if possible, for a broadside chance. Remember, for all ordinary big game, that the bull's eye is a hand's breadth behind the shoulder. Always take sight on the fine side. The most common mistake is firing too high and over. When hunting special kinds of big game, such as buffalo, rhino, elephant, giraffe, hippo, for example, ascertain from experts beforehand the right spot to shoot at. Learn something of their anatomy. In all ordinary cases never shoot at the head or neck if the shoulder is visible. If an animal is wounded, go on shooting at him till he falls. If he gets up to him as quickly as possible, and do not lay the rifle aside till it is certain he is dead. Avoid by all means in your power wounding and losing game.

In the case of undisturbed dangerous game, do not take the shot until a vital spot is covered by the rifle. Do not hunt dangerous game in thick cover on foot.

*Wounded Game.* — Wounded game are the most difficult to find and approach. They usually travel down wind. If time permits it is best to wait an hour or two before following the track, or the direction. If late in the day, it is better to return to camp and come out the following day. If the animal is lying dead, birds of prey will often indicate the spot at sunrise. Wounded game, as a rule, should always be carefully and slowly followed. If hastily followed and again disturbed, they may travel long distances and be lost.

Hunting wounded dangerous game always requires

the utmost care. They should not be followed on foot into thick cover. More hunters have been killed by game in this way than in any other. No man should hunt dangerous game without a good rifle to which he is thoroughly accustomed, and in which he has complete confidence.

*After the Kill.*—Game is hunted either for trophies or food. The hunter should therefore know how to clean, skin, and butcher his quarry.

To kill merely for the sake of killing, and then waste meat and hide, is bad *shikar*.

When killed within reach of camp or where possible to utilise all the meat, clean, and, if possible, bring carcass back to camp. Otherwise skin and quarter and hang quarters to trees till taken to camp.

Where only a portion of meat can be used, take the hams (of all kinds of deer and antelope) and tenderloins (meat along each side of backbone). Cut hams with skin of legs below hocks, including small hoofs. These can be tied together and hams slung across saddle of riding horse.

To save head and scalp for stuffing: cut skin from between horns along back of neck to between shoulders; then round neck to centre of breast. Skin neck forward to head; then take off head at first joint of vertebræ next to skull. Head and scalp skin can then be taken back to camp; scalp then skinned off over nose, turned inside out and hung on tree to dry. Skull cleaned. All fat should be removed from scalp-skin. Dry with wood-ashes, or apply arsenical soap. Preserve body skin by stretching, hair downwards, on ground by means of wooden pegs. Dry with wood-ashes from camp fire. When travelling fold up hair inside.

## GETTING FOOD

41

A little knowledge of cookery goes far to maintain health and cheerfulness in a hunter's camp. A good camp cook will keep hunters fat and merry where the novice may waste or misuse good venison, and so grow lean and hungry.

**HUNTING IN EQUATORIAL AFRICA.** By A. J. Poingdestre, L.F.—I have found that a cheap rifle (6 lb. 10 oz. or thereabouts)—the .405 smokeless Winchester, carrying five cartridges—has given me more satisfaction and clean kills of elephant, rhino, and buffalo than the 70-guinea rifles that I had hitherto used. The small-bore (.303 Mauser and other) rifles have much in their favour, more particularly the .303, as its ammunition can be readily obtained in most parts of Africa. As to small-bore rifles, in regard to game shooting, I have very strong ideas, and would nearly feel inclined, had I my way, to make it penal to use any smaller weapon than that of .350 calibre. The indiscriminate wounding of game that I have seen makes me shudder. For my own part, I cannot feel comfortable for twenty-four hours after, if I wound and lose a buck.

*Books on Hunting.*—Works of F. C. Selous, Sir Henry Selous-Kerr, H. A. Bryden, W. A. Baillic Grohman; "My Life as an Indian," Schultz; "Fifty Years on the Trail," Nelson; "North Kenya," Arkell-Hardwick.

## IV.—FIRE

*Making Fire.*—Carry matches, to keep dry, in little corked bottle. Failing matches, pour contents of cartridge into fuel, put empty cartridge in gun, fire it into fuel, and the detonation spark will kindle it. To

keep a flame alight, close the hands under, not around it.

*Burning Glass.*—A lens, or clear glass vessel, such as watch-glass, full of water, will focus sunlight to burning point on tinder.

*Flint and Steel.*—Carry box with tinder and a flint; strike flint sharply on knife or file, catch spark in tinder, and blow. If spark secured in nest of kindling, whirl it round your head to get flame.

*Tinder.*—Saturate rough-surfaced paper in paste of gunpowder or tobacco ash (saltpetre), then dry the paper.

*Fire Stick.*—The drilling stick is a tough, hard, dry wand. The block is of ivy-wood or walnut (gunstock). Cut a notch in block, and fill with tinder. Then with bight of a 4-ft. string take a turn round drilling stick, and mount the string on a bow, so that working the bow from side to side twirls the point of the stick in the notch. One man keeps stick upright, while another twirls it. Work as long as the friction continues to increase heat of the point. If friction not sufficient to make spark, try again, and try for hours. Two minutes will kindle point if friction strong enough.

*Camp Fire.*—Fire requires a current of air pouring upward through kindled fuel. The star fire has ends of sticks pointing to centre, and shoved farther in as they char. The back log-fire has sticks laid parallel against a green log, which chars all night. For economy, a trench-fire best preserves heat.

*Fire on Wet Ground.*—Start fire in fry-pan, which can be cleaned when hot with a few drops of cold water.

*Fire on Snow.*—Make floor of green boughs.

*Fire in a Boat.*—Make clay floor.

*Fuels.*—Dry cattle droppings, bones, peat, seaweed, failing supply of wood.

*Concerning Fire.*—After lighting your own tobacco, offer match to others present before putting it out, and draw it through the fingers to make sure it is safe before dropping it. If grass is dry, clear a small patch of ground round camp-fire, lest fire spread suddenly when not watched. Lest the country be burned, quench all fires with water or earth before leaving them. There are grave dangers and heavy penalties attached to carelessness. Where wild animals are dangerous, have folding candle-lantern with mica panes, and don't go away from the fire unless you carry a light. Also use canvas bucket for watering horses, to quench fire before marching, and to avert need of visiting water-hole at night.

*Range Fires.*—Where there are mounted police, the duty of a patrol, on finding country alight, is to turn out the whole population in the King's name, to fight fire. In absence of police, nearest landowner takes charge. A square of hide with wooden handle, size and shape of a shovel, puts out grass fires with less fanning than sacks. If fire is advancing rapidly, and there is danger, kindle the grass, and take shelter in the wake of the burning, to escape main conflagration. If fire can be mastered, get wet hide or wet sacks, and drag along line of fire, one horseman on each side. When this is impossible, line out all available beaters with sacks or cloths to beat out flames. In forest, utilise any break, trail, or road, and hold the line with bucket trains, and by clearing a swath of timber.

*Fire Defence.* Permanent Camps.—Dig two furrows, or cut two swaths and burn between them. Settlers

should make a fireguard round haystacks, buildings, or villages. In pasture, plough two furrows a few yards apart, and burn the grass between. In forest, cut two swaths and burn woods between. A water-cart, with pump and fire-hose, is used by some ranchers.

### V.—PREPARING FOOD

The food must contain certain quantities of fat, albumenoids, and carbohydrates. Albumenoids are represented chiefly by meat, but are also contained largely in beans and peas, and to a lesser extent in oatmeal and bread. Carbohydrates constitute the principal value of potatoes, rice, and cereals generally. In order to keep in good health, it is necessary first that the diet shall contain not less than a certain proportion of the above-named constituents, and that they shall be in a condition capable of being digested. It is for the purpose of making food digestible that cooking is undertaken, and a working knowledge of bush-cookery is of the highest importance. A point that is most frequently overlooked is the necessity of green vegetable and fruit. Where it is possible these should be carried, either fresh, tinned, or dried, and in all permanent or semi-permanent camps, vegetables such as lettuce, radishes, mustard and cress, peas and beans, cabbage, etc., should be regularly grown. In many parts of the world there are wild plants which can be cooked and eaten with great advantage. The green vegetables enable one to maintain a regular action of the bowels and to keep the blood in good order without a continual resort to the use of medicine.

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*Food Value.*—Sugar, butter, fat, 100 per cent. ; wheat flour, 87.5 ; oatmeal, pearl barley, 82 ; peas, 80 ; bacon, 70.86 ; cheese, 65 ; bread, 62 ; average meat, 35.25 ; potatoes, 27 ; fish, 21.

*Butchering.* By S. S. M. Lyon, L.F.—Shoot beast in centre of forehead. If shooting is not admissible, sever the spinal column in cavity just behind the poll. Cut a piece of skin off the throat just in front of breast. Insert knife as if trying to reach the heart, turning blade so as to sever all arteries, until blood gushes freely. Punch beast in flank with foot, lifting tail and foreleg until blood stops flowing. Then turn the beast on its back, rip skin from throat down breast to tail. Joint legs just below knee and hock, take the foreleg between your knees, rip skin from knee to throat, clear skin off the breast, and repeat the process on the other side. Rip hind legs from hock to just behind cod or udder, clear rumps and legs and belly. Finish one side, then the other side, pull the skin well out, and roll the carcass over to clear the back. Turn on to back again. Open the belly, and saw breast and ising (joint between hind legs). Take out all entrails, keeping clean the usable parts. Take off head, chop down backbone, and quarter at tenth rib.

*To Kill Sheep.* By Evelyn French, L.F.—Lay on side, hold down, head out and back ; jamb knife in below jaw in front of spinal column, edge of blade pointing forwards ; rip the blade out through the jugular vein, and grabbing muzzle, force the head back, breaking the neck. Let the carcass bleed ; dress legs and belly same as above. Then hoist on gambels, open belly and take out inside, and skin body with thrust of fist, not with knife.



*Salting Down.*—The hotter the climate the smaller the pieces. For *dry-salting*, work on clean table, so that juice drains away. In camp, drain on a bed of boughs, covering with boughs against birds and animals. Turn meat daily while salting. For *salting in brine*, use brine strong enough to float a potato or egg. Skim the brine occasionally. The hide makes good trough for salting if set in hollow of earth or with edges pegged high. Keep the barrel covered with four thicknesses of mosquito netting, tied down against flies. In curing meat for a short time, a proportion of sugar and salt used as brine improves the flavour, the sugar-cured and spiced bacon being a delicacy.

*Drying Meat. Hot dry climates.*—Cut meat or fish thin, up to one inch thick, and hang in shade if there is sufficient wind to dry, otherwise in hot sun. This dries out moisture, so that food can, with all its nourishment, be carried light. Eat raw, or cook by steaming to restore moisture. If this "biltong" is preferred salty, sprinkle salt on lightly, leave in a heap for one hour only, wash, and dry as before. *Damp climates.*—Cut meat thin, or split fish of fat varieties, and hang in confined space over damp fuel to smoke. Avoid coal or wood containing gum. The best fuels are maize cobs or dry cedar-wood or beech- or oak-wood. Toast over fire or cook by steaming. Meat biscuit is meat boiled down to thick juice, kneaded with flour, flattened thin, dried, and then baked.

*Tasajo, Mexican.* By C. J. Cutcliffe Hyne, L.F.—Cut the meat into rectangles (so far as may be),  $3\frac{1}{2}$  in. by 10 in. Pin one corner by a thorn to a line, so that it hangs free. Expose to hot sun till the colour deepens to black-brown. Cut down and store. To cook, fry if

possible, and add water. Otherwise, grill over hot, smokeless embers.

*Pemican.*—Dried, pounded, or grated lean meat, with dried fruit or seeds and currants, and forced down into clean skin or canvas bag. Pour in hot rendered fat, as much as meat will absorb, and tie up for carriage. To cook, mix with flour and water, then boil. Frozen food should be thawed slowly before cooking.

*Carrying Meat.*—Meat carried on pack animals should be last loaded, first unloaded.

**COOKING WITHOUT PANS.**—Cooking, with or without pans, needs practice.

*Meat or Dough.*—Small pieces grilled on pointed stick.

*Kabobs.*—String lumps of meat or small birds, alternate with bacon or fat, on a cleaning rod, to roast.

*Joints.*—Swing on a string from a planted stake. Scorch first, to keep in juices, then roast. A stick half up the string will wind it to spin the meat slowly over hot coals.

*To bake fish, flesh, or fowl,* wrap in thin well-puddled clay, and sink in banked charcoal, with fire on top. When the clay is cracked all over, the meat is ready, and skin, feathers, etc., come off clean on breaking away the clay. The entrails may be replaced with boiled rice or other stuffing. To clean fish, split back, and remove spine, ribs, and viscera with one wrench.

*Bread, Leavening.*—Carry baking powder; or carbonate of soda and tartaric acid, in separate tins. As either of these chemicals constantly used is nauseating and bad for the health, replace them if possible with sour dough. Put thin dough in an open bottle to ferment for yeast. A mixture with hops quickens the process. If you have

no leavening, kneed the dough very thoroughly before baking.

*Bread.*—On ground-sheet make pile of flour, and hole in middle for water, stirring as you pour. In kneading dough, keep a sprinkle of dry flour on sheet, which will brush off afterwards. To bake, clean away fire, fan off ashes, and cook on hot earth or hot stone. For damper, mix baking-powder (or soda and tartaric acid) with flour. Add salt, and bake in plenty of hot ashes, both under and over. Or, place the flat damper on a few hot ashes, cover with a gold-pan, and place hot ashes all over pan.

*Sand Cooking.*—Dig pit, fill with fire and stones. When stones are very hot, remove the fire, replace the stones, cover with fresh leaves, then the vegetables, and the meat on top, so that the juices will reach the vegetables; cover with leaves or a damp towel, cover with wet sack, pile on hot coals, cover with earth to complete the oven, probe short hole in middle, and pour in water to make steam. The African ant-hill is a first-class oven. In old ant-hills, ware snakes. In Maori practice water is poured on the food direct. The leaf covering, sack, and earth covering are then laid on quickly.

Sand cooking is perhaps the cleanest and most economical method of feeding large numbers of people. For big camps and expeditions, cooks trained to the process can supply a variety of really palatable food, instead of monotonous stews and hard rations.

*Cooking-Pots.* To make.—The art of pottery is derived from basketry. When close-woven water-carrying baskets leaked, they were daubed with clay. It was found that clay-covered baskets would stand fire, and gradually the clay pot replaced the basket. Daub your baskets with

clay, and bake very slowly. To glaze a clay pot make it red hot, and throw on salt. If nowhere else, there is clay in ant hills.

**COOKING WITH POTS.**—Although a cup, can, and knife suffice for all absolutely needful cooking, a better diet adds greatly to a man's endurance. So for elaborate cookery carry a tea billy and stewpot (block copper), fry-pan (steel), sheath knife in belt, a cup broad at base, a deep plate to fit fry-pan, saucer, spoon and fork of white metal, a hatchet or axe of finest steel, canvas basin. A gold-pan is best basin, excellent for cooking, washing, baking, but must be burned out before it is used for prospecting.

**Baking.**—Leaven the flour, add salt, stir in water. If in a hurry, stir to thickness of treacle, and pour dabs into hot greased pan for slapjacks. If time permits, stir thick dough, place in hot greased fry-pan, and set pan on edge, facing fire, with hot coals behind. For large camps, a reflector oven is quicker, of aluminium or tinned iron, but wear gloves when handling.

**Pastry.**—Mix dough with  $\frac{1}{8}$  part grease, knead well, roll out with a bottle. Little flat cakes dusted with flour, cook on dry pan or an iron plate. A thicker layer will bake in fry-pan like bread. A thin layer wrapping up meat or fish to be baked makes the best of all camp dishes.

**Jam.**—Stew equal weights of wild fruit and sugar, and bottle. To find out when sufficiently boiled pour a few drops on a cold plate, and if they stiffen quickly the jam is ready.

**Cakes and Puddings.**—Add egg-powder and sugar to pastry dough, with any kind of flavouring.

**Steamed Food.**—Fresh vegetables; pastry dough, mixed

with any chopped dried fruit, and tied up in a bag ; or a small pot of meat with pastry cover. Put the food into a covered pan with sufficient water to keep the pan from melting. Put in more water when needed. The steam will cook the food.

*Welsh Dish.*—Grease a stew-pot, line with potatoes and onion, cover them with fat bacon. See that lid lifts. Roast.

*Rhodesian joint* in camp kettle.— $\frac{2}{3}$  water, boil till water nearly gone. Then removing meat, line pot with pumpkin, yams, or other absorbent vegetables, replace meat, and fill up with vegetables and lump of fat. Cover, pile coals on lid, and bank coals 1 ft. distant round pot. Cook 20 minutes.

*Stewing.*—To break up tough tissues for soup or stew, put in *cold* water, and stew. If you want to preserve shape and flavour of pieces of food, immerse in *boiling* water, and stew. Stewed foods include porridge of any cereal (don't forget the salt), vegetables, beans, dried or wild fruits, or meat cut small. In German cookery the savoury dishes contain fruit for contrast of flavour. The best curry dishes have half meat, half fruit, in the stew. Spanish-American stews are flavoured with a sauce of chili. Rice  $\frac{1}{4}$ , cold water  $\frac{3}{4}$ , and boil.

*Bacon.*—Especially in thirsty lands, always parboil bacon before frying, to remove salt and rankness. Add pepper.

*Venison.* By Sir Henry Seton-Karr, C.M.G., L.F.—Slice *tenderloins and hams*, and fry with sliced onions and venison fat. *Ribs* : hang 3 to 7 days according to temperature, and roast on point of green twig in embers, or in camp oven. *Neck and shoulders*, boil for soup and hash. *Tongue* : boil, and eat cold. *Brains* : fry.

## PREPARING FOOD

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*Marrowbones* : plug ends with dough, and boil. *Kidney fat* : keep for frying purposes.

*Sea Birds*. By C. J. Cutcliffe Hyne, L.F.—Bleed thoroughly, skin, gut, make cuts in flesh. Soak well in sea water. Rub grease in the cuts if you have any. If vegetables are procurable, make into a stew with these. If not, fry the meat in thin slices until crisp.

*Seal*, sea birds and other fishy or rank meat treated as above make good curry.

In outdoor cooking these simple dishes are good enough, but indoor life gives a much wider range of methods. Don't depend on recipes, but invent the contrasts of flavour which make good cooking.

On the average, 20 minutes per pound of meat is the time required for cooking joints.

The various proprietary meat-extracts have a great value on account of their stimulating and flavouring properties. A food of the greatest value in ill-health abroad is Brand's Fever Food. This is put up in small tins convenient for travel, and keeps good in all climates. It requires no cooking, and can be taken when even milk cannot be tolerated.

*For Washing Up*.—After scouring the dirtier dishes and plates with grass, wet earth, or sand, use very hot soapy water, and a clout tied on to the end of a short stick.

*Soap*.—Sunlight soap is strongest, but keep it away from your eyes. For toilet, Wright's coal-tar and Cyllin soap are the two best either for tropics or for home use. Both of these soaps have a marked antiseptic action,

and are hence valuable for wounds, sores, and bruises, and they both give great relief from the bites of mosquitos and other insect pests.

## VI.—APPLIANCES

**BENT WOOD.**—To bend wood or bamboo to moderate curve, warm gently over slow fire, and set to cool between stakes on ground, arranged in desired curve. To bend to extreme curves, steam or boil for half an hour upwards according to size (Linton Hope).

**BOLAS.**—Take egg, size of plover's egg, suck it, ease it in mud or clay, and pour molten lead through the hole. Take small wire fence staple, turn up points slightly, and before lead hardens stick it in, points first, leaving  $\frac{1}{4}$  in. sticking out. Take three lengths of twisted horse hide 3 ft. long, and splice together, leaving  $2\frac{1}{2}$  feet of each free. To the three ends attach the three lead balls. N.B.—One length should be slightly longer than the others. Taking one ball, swing the weapon round your head in circles, then throw, and the bolas locking round any animal will disable him for capture.

**BEESWAX.**—Boil comb in water all night, and when melted put into an old kerchief or rag, and squeeze through into cold water.

**BRIDLE.** By J. H. Eaton (Texas).—Take 26 ft. of any rope available, preferring  $\frac{7}{16}$  in. cotton, and cut it up thus: check strap 7 ft. 6 in., brow band 2 ft., throat strap 4 ft., reins 12 ft. These measurements will vary somewhat according to size of horse, but are a good average.

*Cheek Strap and Throat Strap.*—Make a 2-in. loop in one end of each, and a knot in the other ends.

*Brow Band.*—Make a 2-in. loop in each end.

*Reins.*—Make knots in ends, and tie on to bit rings.

*To assemble.*—Take the brow band, and pass the knot of the cheek strap through the off side loop in the brow band, passing it through the ring of the bit, then up through the same loop of the brow band. Then pass knot of cheek strap through the near-side loop of brow band, and through near bit ring up to the brow band again. Tie to the off-side of cheek strap by passing knot through loop, and fastening with a half hitch.

Take the knot end of throat strap, and pass upwards through the near loop in brow band, then through off loop of brow band, and fasten same as cheek strap.

This bridle is very strong, and easily adjusted to size. The loops may be spliced or knotted.

Failing metal bit, use raw hide or cotton candle-wick tied round lower jaw.

**CANDLE.**—Fat rendered over slow fire, and poured into any mould surrounding a cotton wick. One thread of wick should be pulled tighter than the rest, so that it will curl over in burning. Equal parts sheep and ox fat, with a little melted beeswax, make best candles. The mould may be a cylinder of thin paper or pine bark (or joint of bamboo), to be torn away after setting, or retained as in a night-light, if shallow. If no mould available, hang the wick from a cross bar with weight at lower end to keep it taut, and slowly pour hot fat down the wick; as it solidifies pour again until candle is formed. A rush or wick dipped repeatedly, or a wick dipped and bound spirally round a stick, make simplest camp candles. A spine bone of any large animal makes good socket.



**CANDLE LANTERN.**—Fill an old bottle  $\frac{1}{4}$  with water, and set on hot ashes till bottom breaks off. Bottle is apt to split unless heat is evenly distributed. Turning bottle upside down, insert butt of candle in neck. Plant in sand or earth when alight.

**CANOE.** By A. Poingdestre.—(See Part II. section vii.) A cylinder of bark, wedged off carefully so as not to crack it, makes at a pinch a capital canoe to cross rivers where the dug-out is not to be had.

The ends are held over a fire until pliant, when they can be turned up and pegged; and pointed stakes are then driven in transversely at intervals to keep the canoe open. It is always sunk when not in use. (Central Africa.)

**CHARCOAL.**—Dig pit, fill with wood, so spaced that air circulates freely; leave chimney hole through middle, and cover the rest of pit with mound of earth. Drop lighted torch through chimney to kindling wood at bottom, and keep chimney covered, with just enough air to allow wood to smoulder without flaming. Burn 3 to 7 days. Or, build wood into pile, cover with earth, leaving airholes to get fire started. Fill these airholes when fire has got hold.

**CINCHA.**—See Girth.

**FELT.**—According to legend, St. Clement, wearing carded wool between his feet and the soles of his sandals, found at the end of a pilgrimage the wool converted to cloth. Almost any hair or fibre entirely freed from natural grease can, by beating with wooden mallet, moisture, and heat, be felted, the process being simpler than weaving.

**FIREPROOFING.**—Steep any fabric in solution of 20 parts water to 1 part phosphate of ammonia, or in a

strong solution of alum. To enter burning building use a well-soaked blanket loose round your head.

**HORSEHAIR.**—Always keep horse's mane and tail long. He needs them as fly-whisks, and the tail for steering, while you need the hair for emergencies. If hair gets matted, comb with knife, and keep combings in folds of saddle-cloth towards withers. To curl hair into stuffing for saddle panels, take a brace and bit, or improvised tool of that shape, the turning of which, while you draw hair away, will twist it into rope. This is the instrument for making strands of hair rope. (E. ff.)

**GIRTH, Queensland.**—English leather, 8 in. wide, folded in three lengthwise. Put mutton fat in folds to soften leather. Iron ring at each end, with pad to protect horse.

**GLUE.**—Hoof and horn boiled down for many hours until water thickens, and when cooled sets solid. To use, insert small pot of glue in larger pot of water, and warm until it melts. The oil skimmed from pot in making glue is known as neatsfoot, an excellent dressing for leather.

**GALL.** Of any large animal.—Let it settle over-night in water, then pour off liquid into small pot. Put small pot in pan of water, and boil until gall solidifies. Used as a size to make ink or paint lie on paper or parchment; to remove stains on clothes.

**GUNPOWDER.**—Charcoal must be very porous. Best woods are dogwood, mahobohobo, willow, poplar, black alder, spindle tree, lime, horse-chestnut, elder, hazel-nut. Use quickly after making: keep it clean and pound it to powder.

**Nitre.**—Is obtained as an efflorescence in salt pans, or old mortar, or old mud huts, or from ashes of

tobacco, sunflower, or maize. If from salt pan, should it taste of common salt wash it until it tastes of gunpowder.

Put on hot water, and mix with equal weight of boiling water. Strain the solution, and evaporate down into white crystals.

*Sulphur*.—Melt slowly in pan, remove the scum, and pour off to get rid of dregs. Pound into a powder.

Mix thoroughly 6 parts nitre, 1 part sulphur, 1 part charcoal. To 10 parts powder stir in 1 part water, making stiff dough, and knead thoroughly between two stones. Wrap in canvas, and press very hard until it forms a cake. Burn with red-hot wire holes in old dressed skin, and rub cake against this sieve, so that grains are sifted through. Shake grains in a box until clean and bright, and fan away all dust. Dry the grains.

NOTE by A. Poingdestre, L.F.—Ordinary gunpowder: 75 parts nitre, 12 to 13 parts charcoal, 10 to 12½ parts sulphur. Powder made for the Khalifa (Soudan): nitre 75·6, sulphur 10·5, charcoal 13·9.

NOTE by C. J. Cutcliffe Hyne, L.F.—If plumbago, commonly called black lead, is available, shake the grains up with this, and it will partly waterproof them.

*GUT*.—Turn an intestine inside out, scrape away soft lining, twist, and dry for lashings, sewing, etc. Keep supple with grease.

*HOBBLER*.—Make straps of green hide, doubled with woolly side in, of length to fasten round your clenched fist, with loop and toggle. An equal length of raw hide or chain with swivel connects the two hobble straps. One strand from a large rope makes good hobble.

**HORN**, turtle and tortoise-shell.—If time permits, soak for a few days; then, carefully preserving it from contact with sweat or anything oily, boil until soft enough to mould into handles, hafts, spoons, cups, or to split for window-panes.

**HUT: For Dry Cold.**—Cut dug-out cabin in hillside. Roof and face with wood, and bank over with earth, leaving opening for door, and for window glazed with oilskin. If wool, cotton, moss, or sawdust available, make an intermediate skin of one of these.

**For Cold Damp Climate.**—Build with logs. Cut on each log a broad notch, near each end, and on both sides. The logs cross each other, half checked, at corners of building, "saddle-and-rider" fashion, and the narrow slits between logs are stuffed with moss, and clayed over. A ridge roof, steep to shed rain, is framed of lighter poles, and covered with thin tiles (shingles of cedar), or bundles of thatch, beginning first line at eaves, and working up to comb. For dug-out or log cabin, build a chimney of stones set in clay, with hearth high enough for upright 4-ft. sticks of fuel. For cold, chimney should close in very small at top, and may be covered with a slab at night.

**Bark for Huts.**—Cut two notches round large trees, 6 ft. to 10 ft. apart, cut groove between, and chop or with wedges tear away cylinder of bark. Lay out to dry, face down, with weights to keep flat. Birch or gum-tree bark makes good roofing and wall panels for huts.

**For Hot Climate.**—Walls of small poles planted in ground, selecting wood not attacked by white ants. If none available char ends of poles. Fill between poles with wattling of withies, plaster inside and out with

clay (from white ant-hills if obtainable), or mix up clay and water into "swish," and throw on to withy walls by hand. Floor of same clay rammed hard. A mixture of blood and cowdung makes a clean permanent plaster for walls and floor. Roof with lighter poles, and thatch chimney of vertical poles same as walls, but with extra coat of clay, and cover the thatch with clay round the chimney. If you have "trade" cotton, use for windows. If time, labour, and materials available, build hut of hand-made, sun-dried *adobe* bricks.

**INK.**—Soot and water, with a little gum or glue. Charcoal rubbed down in milk. Coffee extract boiled down. Solution of gall-nuts from oak-tree, and an iron salt. Add gum.

*Secret Writing.*—Sit facing the light, with lined paper, and a clean pen if possible. Write in the ordinary way, but use the saliva in your mouth instead of ink. Then between the lines of hidden script write with ink to disarm suspicion. Correspondent, knowing the trick, will on receipt pour a bottle of ink over the paper, and promptly wash off under a tap of water. Where saliva has been, the ink will stick, disclosing concealed message. Milk (instead of saliva) held to hot fire turns brown.

**IRON.** *Smelting from Ore.* By Linton Hope.—Lay wood fire, layer of broken ore, layer of wood, alternate layers to, say, 2 ft. thick, if possible in old ant-hill or rough covered clay furnace, to induce good draught. If impossible to create induced draught furnace, make bellows of goat or other skin with clay nozzle at end of furnace. Get fierce heat. If only open fire, greatly increase proportion of wood. Result: Charcoal iron, which can be forged, and, if hammered sufficiently, produces finest quality tough iron, like that

of horseshoe nails. Same process smelts other free ores not requiring intense heat.

*Case-hardening.*—Enclose object packed tightly with bone dust, hoof or horn shavings, in iron box, which will stand red heat. Keep at this temperature for some time, then immerse in cold water.

*A second method for small articles.*—Polish and heat to bright red, rub surface with yellow prussiate of potash, cool to dull red, and immerse in water.

*Tempering picks and drills* needs great skill.—Heat to clear cherry-red, dip in water, brighten, and re-heat to dark straw-colour, turning to blue, according to hardness of rock for which tool is required. Sometimes done by thrusting red-hot steel into tallow.

**KYACKS** to carry load on pack-animal.—Take a pair of packing boxes, and wrap each in soaked cowhide (hair outward), cut to shape, and lace with reim, making narrow side as a lid. When hide dries, remove the wood, and attach to back of each skin trunk a pair of loops to hang it on side of pack-saddle. See that when packed they are of equal weight.

**LASSO.**—Lariat, la riata, see Rope.

**LAMP.** By C. J. Cutcliffe Hyne.—In a tin, iron, or stone dish place blubber or oil. Make wick of cotton or rush. Make wick-trimming tweezers of wire, wood, or bone. Trim till light ceases to smoke. If possible, use square dish, with wicks leaning over spouts at four corners.

**LIME.**—Burned limestone, chalk, coral, or shell. To slake, pour on water.

**MAT-MAKING.**—Plant two forked stakes, say 1 ft. high, at width of proposed mat, apart. Lash down a pole across the forks, horizontal. Make fast about a dozen

strings at equal distances apart along pole. Numbering off the strings, take odd numbers to length of proposed mat, and lash each to top of a 2-ft. stake, so that all strings are parallel and on same plane. Next take even-numbered strings in same direction, 4 ft. beyond the stakes of the odd-number strings, and make them fast at equal distances apart to a loose pole, parallel with the first pole, and held horizontally in the hands. Raise the loose pole, while assistant lays bundle of reeds or fibres across the odd-number strings, and forces it well home to where all the strings are lashed to first pole. Lower the loose pole to ground, while assistant lays second bundle of fibres against the first between upper and lower strings. Alternately raise and lower the loose pole as fresh bundles are added, so that the strings weave under and over, until mat is completed.

On same frame, with heavier strings, slats of split cane or wood replacing bundles of fibre, make a panel like Venetian blind, good for wall panel in huts for tropics.

PACK-BAGS.—Panniers, see Kyacks.

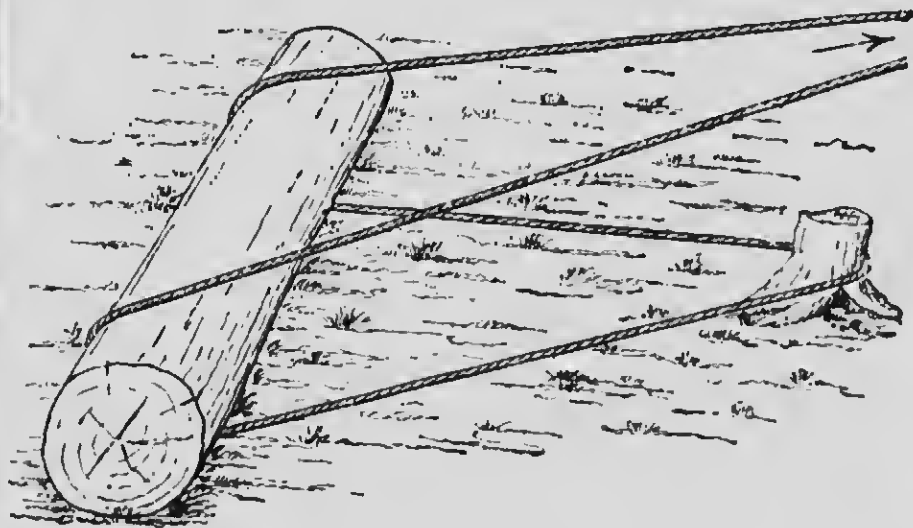
PACK-SADDLE.—Make two hardwood slats, 4 in. by from 14 in. to 18 in., and cut with draw-knife until they fit on either side of horse's spine. Set them firmly into well-stuffed panels. Cut four squared sticks of hardwood, 2 in. by 2 in. by 14 in. Taking each stick, shave away (on one side only) the last 4 in. down to a thickness of, say,  $\frac{1}{2}$  in. Fit the shaved surface of each stick to one of the slats, in such a way that when the slats are laid on the horse's back, a pair of the sticks crosses high above the spine at either end of the proposed saddle. The two crosses should be 12 in. to 15 in. apart, according to size of saddle. Mark on the sticks the exact angle at which they cross each other, and at that angle cut them down

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until they fit immovably together, passing a strong rivet through at that junction. Then shave away underneath the forward pair of sticks to make the largest possible arch above the withers. Dispensing with the *corona* and *souvan helmo*, the other gear is that of *aparejo* packing (see Pack-Train), the weight, with breeching and crupper, being 7 lb. for an average sawbuck pack-saddle. Although far inferior to the adjustable Morgan pack-saddle, this rigging is light, cheap, and easily made anywhere.



SABBUCKLE.

**PEN.**—Flat fish-bone, or quill of a large feather.  
**RAWHIDE, REIM, OR BABICHE.**—A soaked lashing shrinks in drying, and binds woodwork with great strength for repairs. Bind over with rope. When rope slackens with heat, rawhide is tight. When rawhide is slack with wet, rope is tight.



THE ROPE, la riata, lasso, is 35 feet long. The hondo, a light bone or metal ring, makes noose run easy.

Failing  $\frac{7}{8}$  in. manila, boiled soft, use rawhide, linen rope, or hair. Attached, in the Argentine to the girth, in North America to the saddle horn, the Rope, apart from its use in catching and throwing range stock, is good for hauling mired guns or waggons, firewood, or prisoners. When attached to a hackamore (halter low on face) the rope, passed round a rock or tree, gives leverage to persuade a horse over obstacles in climbing. A lash rope is 40 feet, a picket rope 50 feet of  $\frac{1}{2}$ -in. manila.

ROPE-MAKING.—A whirl is a fixed upright wheel turned by a handle. On the side facing the rope-walk the wheel has one hook in middle, and twelve round the rim. The spinner, with a loose bundle round his waist of any combed fibre, faces the whirl, and makes a few strands of fibre fast to middle hook, holding on to the ends, to which he adds more fibres, while his assistant turns the whirl to twist the fibre supply into a yarn. Walking slowly backward, the spinner so regulates the supply of fibre that the lengthening yarn is of even thickness. When he reaches end of the rope-walk, the second spinner takes the yarn from the hook on the whirl, and fixes it to a reel to wind up. He then attaches fibres from his own supply to middle hook, and makes a second yarn. Meanwhile, the first spinner walks up to whirl, regulating the winding of his yarn. When second spinner's length is completed, first spinner takes it off hook, and fastens it to his reeled yarn, so that the reel receives the second yarn, continuous with the first. More lengths of yarn are added until reel is completed.

*Warping.*—Take the number of yarns required for a rope, in unreeling each add an extra twist, and stretch all

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to an equal length. For tarred rope, draw each yarn through hot tar, and then through a hole lined with fibre to remove surplus mess.

*Laying*.—Attach ends of two or more yarns to hooks on the whirl, and turn handle in reverse way to that which twisted the fibre into yarn. The result is a strand.

*To make strands* into a rope, take number required, and attach each to a hook on the whirl, with one strand on middle hook. Then make all the strands fast at the other end to one hook, in middle of a second whirl. Turn whirls in reverse directions, and all the outer strands will be laid evenly round the middle strand. Hide rope must be plaited.

*SADDLE*.—*To make Recado Saddle*. By J. Russell, L.F. (Argentine).—Make two pads of dry grass or curled horse-hair, each 15 to 17 inches round, 18 inches long. Roll each pad in a sheepskin with wool out, or in canvas, cloth, or a shirt; lace the two pads together, front and back, with 2-inch straps of canvas or rawhide, the pads being 7 inches apart in front, 8 inches apart behind. This fulfils the first object of a saddle, securing that the horse's spine shall be well ventilated and dry under the rider.

Make a rawhide girth to fold lengthwise in three, filled with grease, with a padded ring at each end (horse-hair webbing is still better), lace this across the pads, and make a similar girth or cincha, to pass under the horse. If rawhide cannot be had for cinchas, use broad plaited bands of grass or rope, making a ring at each end, both of upper and lower girth. To each ring of the upper girth, make fast the end of a 6-foot leather or rawhide strap, or rope, which must be supple. On the off-side of saddle make a permanent lashing. On the near-side,

the passing of the lashing between the upper and lower rings will give a strong purchase in girthing or cinching a horse.

Make stirrup leathers of rawhide, rope, or plaited horsehair, or folded canvas straps. Stirrups: steam a strip of tough wood until it will bend into a hollow triangle, the two ends of the strip being overlapped and bound together. Or sling a strip of tough wood with a cord at each end from the stirrup leather. An improvement on Reado saddle is as follows: Take two small branches with a natural bend, and cut them to size required, each 6 inches high when ends rest on ground, and  $1\frac{1}{2}$  inches wide, with ends 9 inches apart at two ends of the curve. Then cut two lengths of wood, each 16 inches long, and shape on under side to fit horse's back. Rivet the arches on, thus connecting these two pads. Cover the whole with horse hide put on wet. (Commandant Orde.)

**SALT.**—Failing salt, make lye by pouring boiling water on gunpowder or wood-ashes from pine, poplar, beech, oak, or any solid wood. Strain the lye, and let it evaporate, leaving a white alkali. On grass plains the white alkali of the sloughs is a substitute for salt.

**SKINS.**—Introductory Note by A. J. Poingdestre, L.F. An ideal composition, which has been found capital in dealing with lion, leopard, and buck skins and heads (skins), is made of  $\frac{1}{3}$  powdered alum to  $\frac{2}{3}$  boric acid; it is inexpensive and non-poisonous. I have saved skins during the height of the rains when the sun was nearly invisible for days, by rubbing the above composition in freely while the pelt was quite green. It dries quite hard, and odourless. As to bringing out trophies from Central Africa, there is but one way, to my mind, that

ensures absolute safety. The plan is to soak the specimen in turpentine or paraffin, drain it, then wrap it up entirely in a coarse calico or thin jute cover. This must now be tarred completely over, and when dry, packed for shipment.

The natives soften the skins of the smaller antelopes and goats by rubbing and rumpling vigorously for a long time, so as to break down the fibre of the hides. See "Instructions for Collectors" (British Museum of Natural History, London, S.W.).

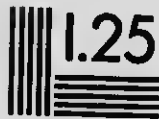
**DRESSING SKINS.**—Strip from carcass, stretch on ground, peg down edges, cut away fat, cover with ashes, or other alkali, and scrape with feet until ashes absorb all grease. Small fur pelts are drawn off inside out like a glove, incision being along inner seam of trousers; mount on stretcher—a long triangle of wood, sides slightly convex. A strong agent for rubbing out grease is dog dung. Pepper and salt preserve a skin, but the latter hardens it for dressing or tanning. Every trace of salt must be removed before dressing. Animals with hair covering fur grow the hair on the inner, the fur on the outer layer of skin. To remove hair, scrape away inner skin with an edge of glass or flint very carefully until hair can be plucked with ease. *To strip a skin*, immerse in lye of ashes and water or "cream of lime" (quicklime 4, water 1), or soak in a stream until hair rots, then scrape it off. The Eskimos, who have no ashes, use stale urine, and the skin can be cleaned and dry-soaped afterwards. Then with a sharp edge of bone (a shoulder blade) used like an adze, with the whole weight of your body scrape skin until it is dry and soft.

*Buckskin Dressing.*—Stretch stripped hide on a frame, or on ground with pegs. Cover with rancid animal



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brains, and leave for a week. Then soften and dry with hard rubbing, and smoke the skin.

*To Smoke.*—Dig small hole in ground, and make fire in it of rotten or green wood to smoke. Plant stakes all round the fire, and draw them in at the tops to form a cone. Cover cone with canvas or skins, laced so that smoke cannot escape, and within this tent place the skins to be smoked for a day or two. Smoked skins do not shrink after wetting, and make excellent clothing.

*Currying.*—To drive out all moisture and replace it with oil, soak in clean water, scrape, rub over with animal oil, dry, and as the moisture leaves the oil penetrates. Rub hard to make pliable. This is spongy wash-leather.

*Oil Dressing.*—Soak in hot animal grease and rub hard. This process repeated again and again makes the hard, transparent rawhide for canoes, sjambok, etc.

*Sewing.*—The strongest sinew is from hind legs of large animals and tails of monkeys, but that beside the spine is also useful. To make holes in skin for sinew-sewing, use awl or thorn. For fine sinew-sewing and for silk use three-cornered (glover's) needle. For surface-sewing use two-edged curved needle. For canvas, but not for skins, use sail needle and palm. For leather use bristle from whiskers of large animals, with "waxed end." For lacing use awl and rawhide strings. For buttons use claws, small tusks, or Turk's-head knot of leather string. For waterproofing use bladders. Fine underclothing is made of dressed bird skins.

*Repair Kit.*—Needles, plain, three-cornered, and curved, of several sizes, oiled; awl, wax, palm thimble, small marlin spike, bristles, threads of sinew, silk, and flax; cat-gut, kangaroo or buckskin strings, or strips of oiled hide (babiche or reim), according to continent;

copper rivets and burrs with a punch; tweezers, three-cornered file, buttons; very sharp knife.<sup>1</sup>

**LYE.**—Pour hot water on wood-ashes, and strain, and add ox gall to fluid. Use succulent plants for wood-ashes, bean or maize stalks, rushes, cane, twigs, straw.

**SOAP.**—Keep fat simmering in lye (solution of ashes) for days, adding lye as water boils away. When fat has taken up sufficient alkali from the lye, it is soap.

**Failing Soap.**—Beat and rub clothes in snow. To kill fauna lay clothes on ant heap.

**To Dry Clothes.**—Make dome of bent saplings, and cover with wet clothing, keeping damped fire underneath.

**STOCK WHIP.** By Fred Lindsay.

**Handle.**—18 inches of wood, tapering to a fairly fine point of, say,  $\frac{1}{4}$  of an inch in diameter.

**Keeper.**—Of best kangaroo hide, with just enough play to clear the keeper of the whip from the handle.

**Thong.**—10 feet long of kangaroo hide, of either 12- or 16-plait, not too thick in the belly, tapering to a fine point.

**Failing kangaroo hide,** a very useful whip of 8-plait green hide.

**Tail.**—Of thin strip of green hide, say 18 inches long.

**Cracker.**—No. 40 sewing cotton, plaited up.

**TAR.**—If charcoal fuel is being made from cone-bearing trees, a pan at bottom of pit collects tar, which can then be boiled down to thickness of pitch.

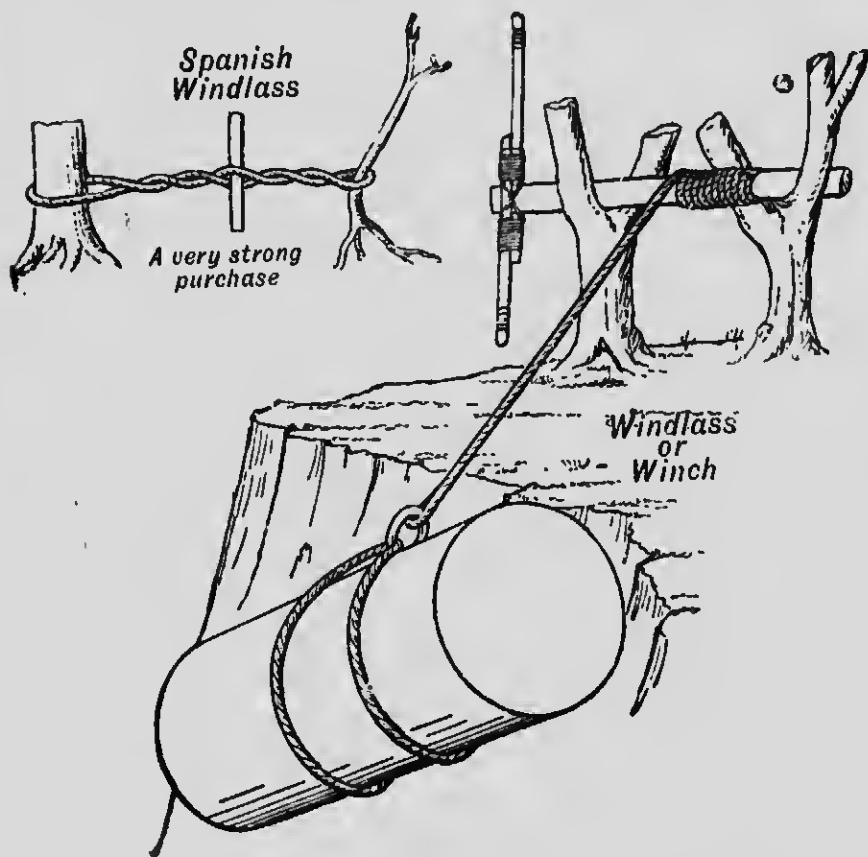
**TOBACCO.**—Failing tobacco, fray the *inner* lark of young twigs of red willow, dry over fire, and smoke. Chewing tea-leaves is bad for nerves.

**TURPENTINE.**—Is the gum of cone-bearing trees. It boils down to resin; turpentine being the spirit distilled from boiling.

<sup>1</sup> (A Frontiersman's Repair Kit is supplied by Messrs. Piggott of Bishopgate, E.C.)



TARPAULIN.—Steep canvas in salt water, and while wet cover it with a mixture of 2 parts tar, 1 part fat, boiled together. When dry on one side, wet other side, and apply mixture.



TIMBER FELLING.—Failing axe, make a bandage round tree, of clay, grass, and anything else which can be kept sodden. Keep circle of fire round tree below bandage. At intervals rake fire away, and chop off charred wood, exposing new surface. Towards finish keep all fire on

the side to which tree is to fall. When tree falls, bandage at length of trunk required, and burn off top and branches. Each worker can tend several trees.

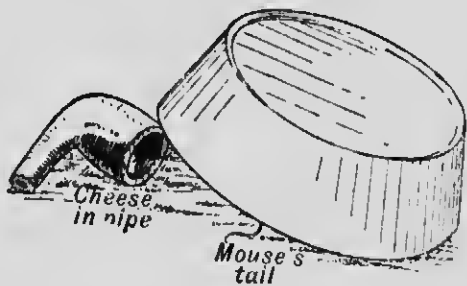
**WATERPROOFING.** Rub soap-suds into any fabric, and when dry, rub in strong alum solution.

**WAX, Cobbler's.**— $\frac{1}{2}$  resin,  $\frac{1}{2}$  grease (free from salt) boiled together (if possible with one-seventh part pitch), stir while boiling, immerse in cold water, and then with wet hands pull it, again and again until tough, dipping in slightly warmed water at intervals.

**WHITEWASH.**—Slaked lime and water. To make it waterproof, heat, stir in grease, and apply hot.

**WINDLASS.** By C. J. Cutcliffe Hyne, and J. St. A. Jewell. —Choose two trees 4 feet apart, or drive in two stakes, diagonally. Cut round log or spar 7 inches diameter for barrel, stripping bark at last moment, so that sap is still slippery. Bore two holes through end at right angles to one another, to carry handspikes, or lash on handspike. Lay this drum of the winch across forks of the two trees, make fast end of hauling rope round barrel and heave with hand-spikes.

**WOOD-ASH and charcoal** mixed with salt.—Small doses used in Mashonaland to avert swine-fever or cholera in pigs, also to keep horses in condition.



KNOTS AND SPLICES.<sup>1</sup> By Linton Hope, L.F.

*The Reef Knot.*—The reef knot (Fig. 1) is a very simple knot to make; the illustrations show the distinction between it and the granny (Fig. 2), the difference



FIG. 1.—REEF KNOT.

being that both ends of each rope come out together on the loop of the other, whereas in the granny the ends come out upon different sides of the loop. There

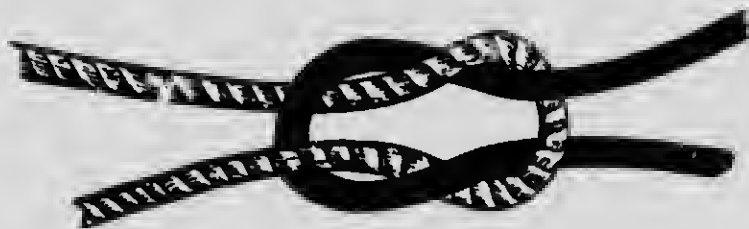


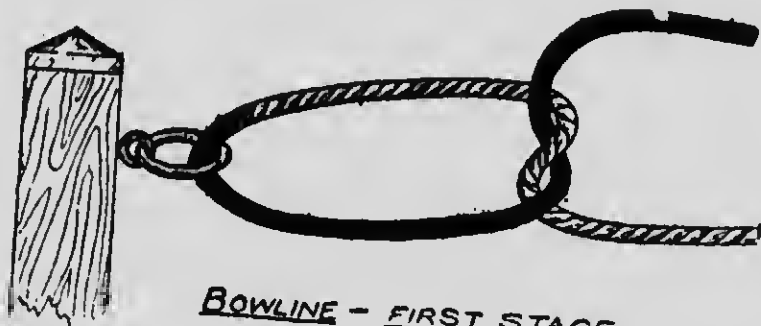
FIG. 2.—GRANNY KNOT.

are two knots in common use, either of which will do to make a rope fast to a ring or a post: these are the bowline, and two half-hitches; the former is the more seamanlike method, as it is not so likely to jam as the two half-hitches, while it is even more secure.

*The Bowline.*—This knot is made in the following manner: Pass the end of the rope through the ring

<sup>1</sup> Reprinted by kind permission of the Proprietors of "The Motor-Boat."

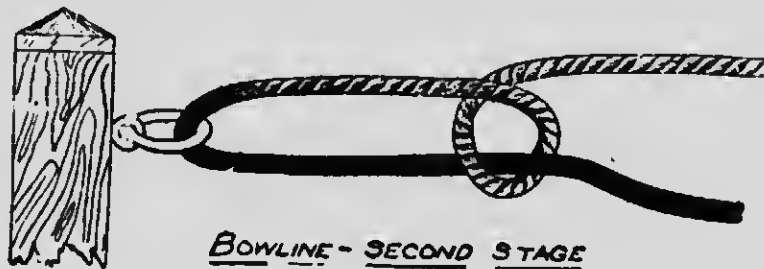
or round the post, then take the standing part of the rope in your left hand, the ring or post being next to



BOWLINE - FIRST STAGE.

FIG. 3.

you, and the end of the rope in your *right* hand ; lay the end over the standing part and make an overhand knot as if you were going to make a reef knot (Fig. 3).



BOWLINE - SECOND STAGE

FIG. 4.

Now capsize the knot until it becomes a half-hitch in the standing part on the striped end (Fig. 4) The end must now be passed behind and around the standing

part away from the ring, and back *down* through the same half-hitch. The knot may then be pulled tight into the form shown in Fig. 5. Another and slower,

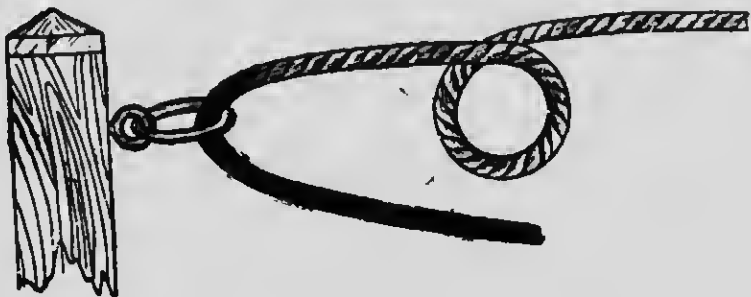


FIG. 5.

but perhaps simpler method of making a bowline, is to make a loop (Fig. 6) in the standing part, pass the end through the ring *up* through the loop (Fig. 4) behind

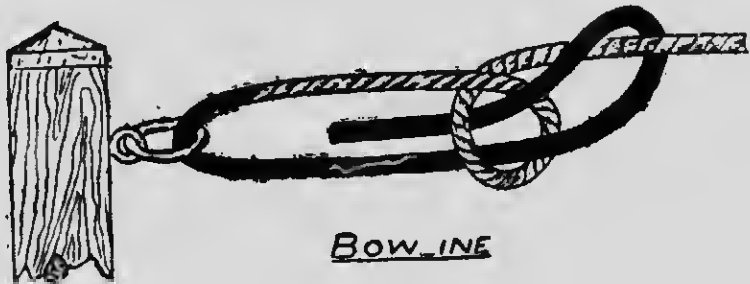
BOWLINE

FIG. 6.—BOWLINE.

and round the standing part and down through the loop again as before, but care must be taken that the loop on the standing part is made so that the part which

goes through the ring comes above the standing part. Should the loop be made with this part underneath the standing part on top, then the end after passing through the ring must pass *down* through the loop, over and in front of the standing part and back underneath, coming *up* through the loop again; in fact, it is exactly the same as before, but the other way up. In most cases the standing part has been shown white and the end black, to distinguish them.

*Two Half-Hitches.*—This is undoubtedly the quickest

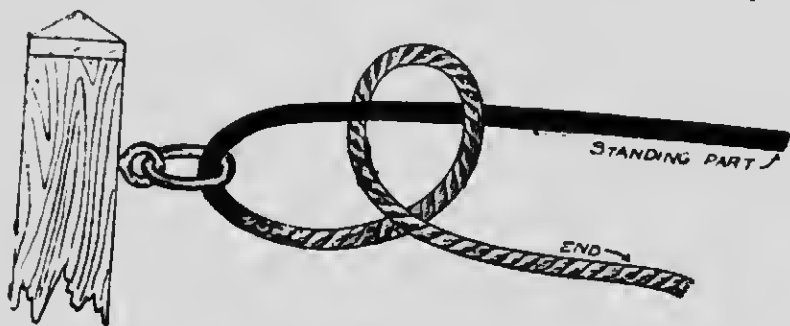


FIG. 7.—TWO HALF-HITCHES: FIRST STAGE.

and simplest way of making a rope fast, and it is quite secure if properly done, but if too much strain be put on it, it may jam and cause a lot of trouble before it can be undone. To make this knot, pass the end of the rope through the ring as before, then round the standing part and up through its own bight or loop (Fig. 7). Now pass the end round the standing part once more and up through the second loop (Fig. 8). In this knot the standing part always remains straight from the boat to the ring, while both the turns are taken entirely with the end.



FIG. 8.

*Round Turn and Two Half-Hitches.*—A better knot for attaching a rope to a ring than the two half-hitches described is made by taking the rope *twice* through the ring instead of once before making the two half-hitches



FIG. 9.—ROUND TURN AND TWO HALF-HITCHES.

(Fig. 9). This is not so likely to jam, and permits of a good strain being put on the rope in the act of making it fast, which cannot be done with the bowline, and it is liable to jam the two half-hitches.

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*Fisherman's Bend.*—The fisherman's bend (Fig. 10) is usually employed for attaching a rope cable to an anchor in small boats; it is made by passing the rope twice through the ring, and then passing the end through both loops. The knot therefore is complete at A, but for extra security the end is either seized (or lashed with small line) to the standing part, or a half-hitch is made round it as shown at B. The latter is the quickest



FIG. 10.—FISHERMAN'S BEND.

method and most secure, but it is not quite so neat as the seizing.

*Cow Hitch.*—There is one other way of attaching a rope to a ring, which is frequently employed by landmen, and that is the "cow" hitch (Fig. 11). In this case the end is simply tied to an overhand knot round the standing part; it is a most unseamanlike knot, as it is liable to jam and also to slip, while it is at all times difficult to unfasten.

*Fastening Ropes to Spars or Larger Ropes.*—Most of the previous knots have been made for the purpose of



attaching the end of a rope to a ring or round a vertical post to make the boat fast, etc.; but in the next series the knots are designed for making a rope fast to a spar, rail, or larger rope, which may be horizontal or in any other position, and on which the strain may come in the direction of the length of the spar, etc., in such a manner that it is important that the knot should not be able to slip sideways along it.



FIG. 11.—COW HITCH.

*Timber Hitch.*—The simplest of these knots is the timber hitch (Fig. 12), which is formed by taking a half-hitch round the spar, and twisting the end once more round its own part, instead of taking another half-hitch round the standing part. This knot is only satisfactory when it is made round a spar of considerably greater diameter than the rope, and so long as the strain is steady on the rope after the knot is made, as it is liable to come adrift if the rope is new and the strain intermittent. Another objection is that it cannot be made while there is a strain on the rope. It is,

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however, equally good for either side or direct strains, and it is very easy to cast-off. The timber hitch is usually employed to attach a rope to the end of a spar or baulk of timber which has to be hauled over the ground, especially in the direction of its length, and for towing purposes. In this latter case, unless the tow is only for a short distance, a half-hitch might be used



FIG. 12.—TIMBER HITCH.

on the spar, in addition to the timber hitch as an extra security.

*Blackwall Hitch.*—This is the simplest of all hitches, and is used to attach the end of a rope to a hook where the load is steady and fairly heavy. It is formed by passing the end of the rope over the middle of the hook, round it, and back over the hook, but under its own part; the weight on the first turn will then jam the end between it and the hook, so that it will never slip so long as there is a continuous strain.

*Clove Hitch.*—Where the strain is only sideways, or where both ends of the rope have to take equal strains, the clove hitch (Fig. 13) is one of the simplest and best knots. The illustration shows it so plainly that we need not describe how it is made, but we must warn beginners against a somewhat similar knot in which the two ends come out on the same side, instead of on opposite sides, as shown in the sketch. Remember that in making a clove hitch, the end must always pass round the spar in the

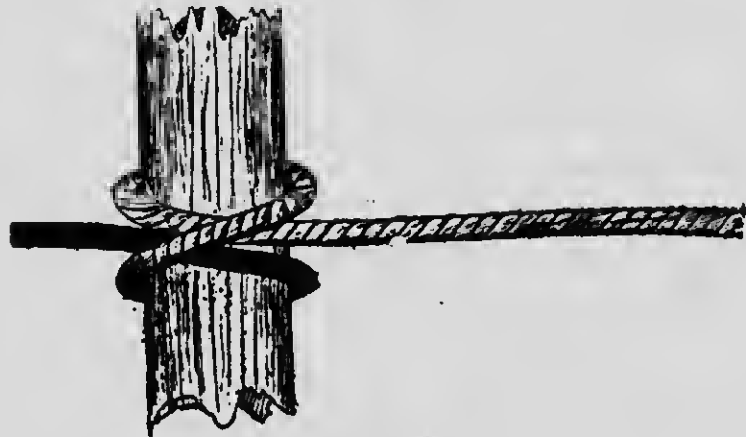


FIG. 13.—CLOVE HITCH.

same direction, say, from left to right, in both turns, the first time passing under the standing part and the second time above the standing part, but under the last turn of its own part. This knot can be made under strain and will not slip, no matter in what direction or on which end the strain may come. With a little practice a clove hitch can be made by giving the rope a couple of twists, forming a pair of loops, which are then dropped over the end of the spar and hauled taut.

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*Rolling Hitch.*—Where a rope has to be made fast under a considerable strain to a spar or to another rope, and where it is desirable to increase rather than diminish the strain in the act of making it fast, the rolling

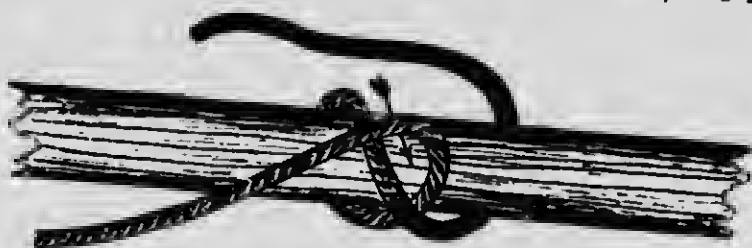


FIG. 14.—ROLLING HITCH: FIRST TURN.

hitch (Fig. 15) is the only suitable knot. To make this knot, take a single half-hitch round the spar or rope, as in Fig. 14, keeping as much strain as possible on the rope (it is shown slack in the sketch to make the method clear); now take the end round the spar again and pass



FIG. 15.—ROLLING HITCH.

it up and under the standing part in the direction of the arrow, taking care that the second turn is between the first turn and the standing part, or, as sailors term it, a riding turn; now take a third turn round the spar and pass the end up through its own bight or loop,

making a half-hitch outside the first two turns, as shown in Fig. 15. It will be found in passing the second or riding turn, and pulling it tight away from the direction of the strain on the standing part, that the latter is hauled bodily along the spar, etc., for the distance required to let the riding turn lie alongside the first turn, thus tightening the rope by that amount. The half-hitch then secures the whole knot. If a rope is passed through a ring and a rolling hitch made with the end on the main part of the rope it can not only be made fast under strain, but the hitch can be made to slide along the rope by removing the strain to a slight extent and

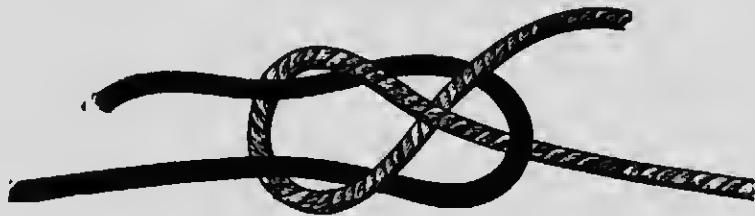


FIG. 16.—COMMON BEND.

pushing it along with the hand. This will allow the rope to be tightened or slacked at will, as in the case of tent ropes or boats' mooring warps when alongside a wharf or dock.

*Joining the Ends of two Ropes.*—The common bend (Fig. 16) is the simplest method of joining two ropes. The end of one rope is doubled back on itself, and the other rope is brought up through the loop, round and under both parts and back over both parts of the loop, but under its own standing part. In making this bend be careful to hold the two parts of the (black) loop together until the knot is jammed tightly, as if any strain were to

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come on this black rope before the knot was secure it would unreeve itself through the other parts. To make an absolutely secure bend it is safer to make a bowline on the black rope, instead of simply doubling the ends together.

*Topsail Sheet Bend.*—When the end of a rope has to be made fast to the bight (or middle) of another rope or to the cringle (or eyelet) in the clew of a sail, and the strain is intermittent, it is possible that the common bend might shake loose unless it be very carefully jammed.

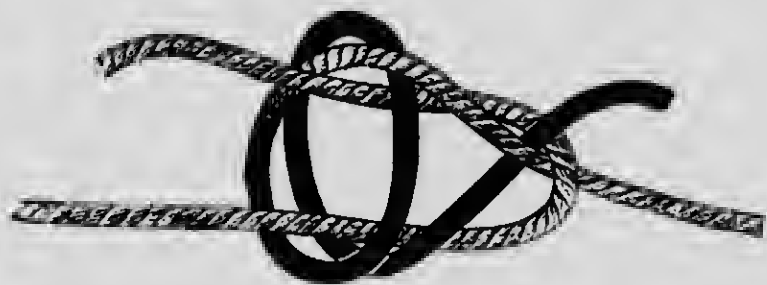


FIG. 17.—TOPSAIL SHEET BEND.

In this case, a second turn is taken round the two parts of the loop and under the standing part, forming a topsail sheet bend (Fig. 17). This is particularly useful where the two parts of the loop to which the other rope is bent are liable to be pulled apart, as in this case the common bend would be capsized and come adrift.

*Splicing and Whipping.*—An eye in the end of a rope is frequently required on all sorts of boats, and on motor boats it is useful for the ends of head and stern mooring lines which are usually attached to the mooring bollards or to rings on the bow and stern of the boat. We would never advise splicing a painter or headfast into the ring

in the bow of a boat ; it is far better to make a long eye-splice in the rope and pass both parts of the eye through the ring, and then pass the end of the rope through its own eye. This allows the rope to be detached from the ring at any time without cutting the eye.

*The Eye-splice.*—To make an eye-splice, unlay (or untwist) the strands for about five inches at the end of the rope in which it is intended to splice an eye. Double the end over to form an eye of the required size, so that



FIG. 18.—EYE-SPlice: FIRST STAGE.

the large portion overlaps the standing part of the rope at the point where the splice is to start (Fig. 18).

Now open the lay (or twist) of the standing part of the rope by raising the middle strand (shown white) with a marline-spike. Then lay the untwisted ends over it, so that the under end (shaded) lies across the standing part and away from you, and the third or middle strand (black) right on top of the standing part. This centre (black) strand must now be tucked under the raised (white) strand and pulled closely into place, as shown in the first sketch.

The under and farther (shaded) strand must now be

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passed over the white strand under which the centre strand has already been tucked, and it must then be tucked under the next (shaded) strand of the standing part (Fig. 19). The nearest and upper (white) strand of the end being tucked under the third (black) strand of the standing part, so that all three strands of the end are under different strands of the standing part and all pointing away from you and towards the right if it is ordinary right-handed rope, or away from you but towards the left if the rope is left-handed. All the three



FIG. 19.—EYE-SPLICE : SECOND STAGE.

strands should now be pulled gently towards the right until the two parts of the rope are closely united (Fig. 19). Once you have the three strands of the end passed under three different strands of the standing part, all you have to do to complete the splice is to continue passing each strand over the next strand to that which it has last been tucked under (always going over a strand) and under the next strand until each strand has been tucked under three times. No two strands must be tucked under the same part unless there is another strand going over it between them. A splice may be



tapered so that the extra thickness caused by the interlacing ends will die away into the same thickness as the rest of the rope. To do this, after the strands have been tucked twice, they must be unravelled into yarns (six to each strand as a rule in small rope), these yarns must then be divided, say, into three parts, and only two-thirds of the yarns tucked under the next strand, half the remainder being again tucked: making two tucks with whole strands, a third tuck with two-thirds strands, and a fourth and final tuck with one-third

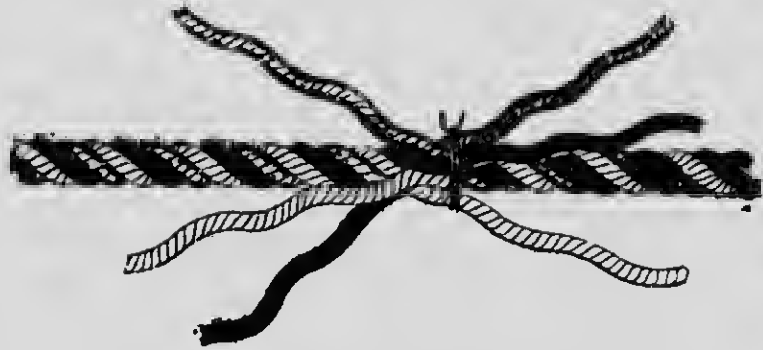


FIG. 20.—SHORT SPLICE: FIRST STAGE.

strands. When the splice is complete and all strands hauled close, it should be placed on the floor and rolled under the foot, or lightly beaten with a mallet until all parts are forced down as smooth as possible; the ends may be then cut off about half an inch clear of the rope.

*The Short Splice.*—Although the eye-splice already described is the simplest form for the beginner to learn, the short splice is really the one which best fulfils the true object of a splice in the ordinary sense of the word, *i.e.* joining two ropes together so that each becomes part

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of the other without a knot being used. In a short splice both ends must be unlaid: they are then interlaced so that there is always one end of each rope between two ends of the other. When they have been pushed closely together they should be prevented from altering their position by a tight lashing over the three ends of one rope, and the standing part of the other (Fig. 20). This portion should be firmly held in the left hand, and a strand (shaded) of the rope on the right being raised with the spike; an end of the rope on the left (white) should

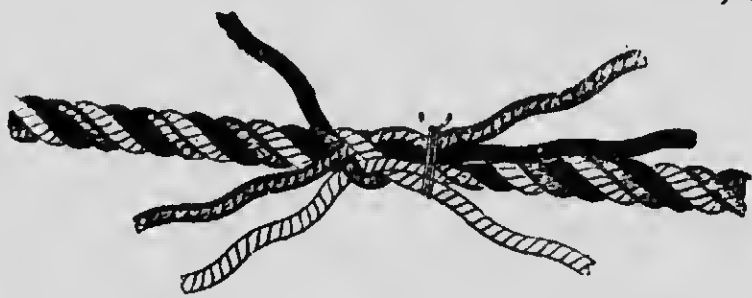


FIG. 21.—SHORT SPLICE: SECOND STAGE.

be taken over the (white) strand before, and under the raised (shaded) strand. The next strand of the rope (shaded) must now pass over a strand of the rope (black) and under the strand (white) over which the first strand passed. The third strand (black) of the rope will then pass over the strand (shaded) of the rope under which the first strand (white) of the same rope passed. The result will now be that each strand is over one and under one of the other rope, all three strands of the rope coming out from under different strands of the rope (white under shaded, grey under white, and black under black, Fig. 21). The next thing is to turn the rope round, so that

what was originally the rope on the right now becomes the one on the left; cut the lashing and tuck the new ends as before (white over white and under shaded, shaded over black and under white, and black over shaded and under black, Fig. 22). Each rope will now have its ends tucked once under the lay of the other rope, and the process should be repeated, with both sets of ends making two sets of tucks, or four in all. The ends can then be tapered as already described for the eye-splice if desired.

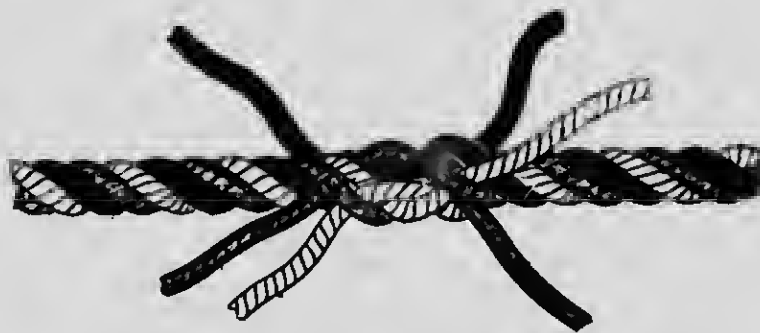


FIG. 22.—SHORT SPLICE : THIRD STAGE.

*Whipping and Servicing.*—To prevent the end of a rope from unravelling, it is usual to bind it tightly with fine twine, which is called whipping the end. To do this, take a piece of waxed or tarred whipping or sewing twine, and, holding the end of the rope in the left hand, nip the end of the twine under the left thumb on the rope, while a turn of the twine is taken round the rope over the end to jam it in place. The twine is now wound as tightly as possible round the rope and over its own end for five or six turns. The end is then turned back over these turns towards the right, and the rope is transferred to the right

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hand, which again nips the end under the thumb. The other end of the twine is now laid across the turns parallel

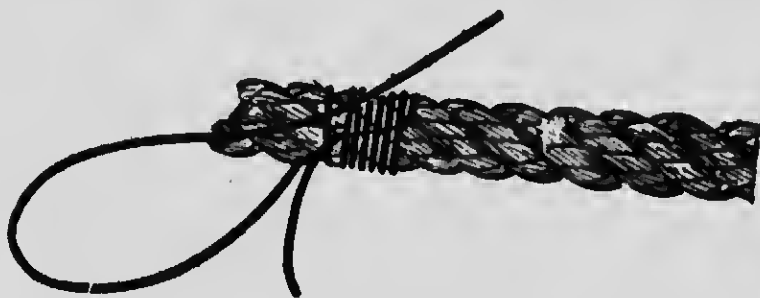


FIG. 23.—WHIPPING : FIRST STAGE.

to the first end, and the loop so formed is then wound over the rope's end and over its own end (Fig. 23) for another five or six turns, the end being then pulled tight,

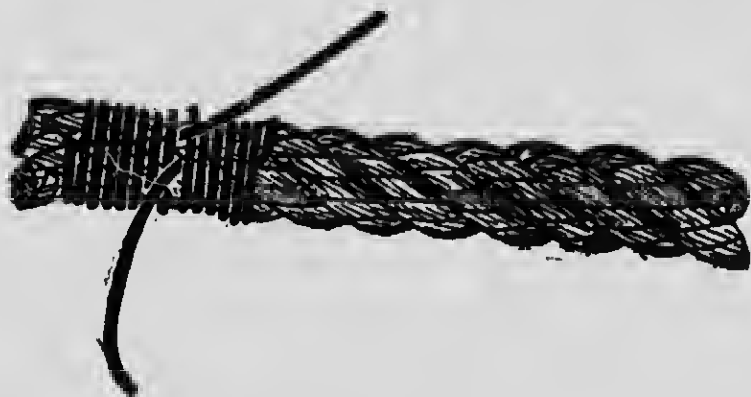


FIG. 24.—WHIPPING : SECOND STAGE.

the two ends coming out in the centre, but in opposite directions (Fig. 24). For greater security these ends may be tied together in a reef-knot if required.

*Serving.*—It is usual to cover a splice with "marline" or small tarred line, which is put on in a similar manner to whipping, except that it is hove on taut with a serving mallet, if one is obtainable. To serve an eye-splice, serve the rope for a distance equal to the circumference of the eye before the splice is made, then complete the splice



FIG. 25.—SPANISH WHIPPING : FIRST STAGE.

and serve over it, starting from the eye and finishing at the end of the splice. Of course, in serving, the two ends of the marline or twine do not come out at the same place as with a whipping, but the commencement and finish are done in just the same manner by passing half a dozen turns over the end, which is then pulled tight. If it is in the centre of a rope, so that in finishing the

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loop cannot be passed over the end, the final turns must be taken over the finger or a marline-spike, and the end passed under them before the spike or finger is withdrawn, these turns being afterwards hauled taut one at a time.

*The Spanish Whipping.*—It is frequently necessary to



FIG. 26.—SPANISH WHIPPING: SECOND STAGE.

secure the end of a rope from unlaying, when no whipping twine is available, and this may be done by working a Spanish whipping on the end, which is practically splicing the unlayed end into itself, forming a sort of club end, with the strands pointing back along the rope. The ends are first unlayed as for an eye-splice, but instead of

making an eye, one strand (shaded) is bent back on itself, forming a loop, the next strand (black) is passed over the end of the first strand, and also doubled back on the rope (Fig. 25). The third (white) strand is then passed over the end of the second (black) strand and back



FIG. 27.—SPANISH WHIPPING : THIRD STAGE.

through the loop of the first (shaded) strand, all three strands being turned back along the rope, and each under a different strand (Fig. 26). The three strands are now hauled taut and passed over and under the strands of the standing part (white under shaded, over black and under

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white ; shaded under black, over white and under shaded, and black under white, over shaded and under black), Fig. 27. This is repeated until each end is tucked three times. A sort of taper may be made of this whipping and of a splice by omitting to tuck one of the strands each time after the first two tucks until one strand only is tucked the last time.

*The Single Wall.*—Among many knots which are ornamental rather than useful is the man-rope knot used on



FIG. 28.—SINGLE WALL.

the ends of the white cotton man-ropes at the gangway of large yachts, or for any purpose where an ornamental knot is wanted.

The first stage of the man-rope is shown in Fig. 28, and is termed a single wall. It is formed in much the same way as the first part of the Spanish whipping already described ; but instead of each end passing over another end down alongside the rope, they are taken round another end and up away from the rope as shown in Fig. 28. Grey is first formed into a loop with the end up between black and white. Black is then taken round



grey and up between white and grey, while white is taken round black and up through the loop of grey, the whole being then pulled gently into place until all the turns are even but not tight.

*The Wall and Crown.*—The next stage is precisely the same as the commencement of the Spanish whipping. Grey is formed into a loop, with the end down along the rope between black and white. Black is taken over grey and down between white and grey, and white is taken



FIG. 29.—WALL AND CROWN: FIRST STAGE.

over black and through the loop of grey down along the rope, as with the others. The three ends now come out at the sides of the knot between the two parts, which together are called a wall and crown (Fig. 29). This in itself is a pretty knot, but it has the great disadvantage of easily working loose and coming to pieces unless it is made of tarred rope and hove up tight as shown in Fig. 30.

*The Man-rope Knot.*—To make the wall and crown into a man-rope knot, all that is necessary is to keep the

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FIG. 30.—WALL AND CROWN : SECOND STAGE.

first knot slack, and follow the strands round, under and over, until each strand has gone round the knot twice. The ends finally go down the centre of the knot and come out between the strands of the rope underneath the knot (Fig. 31), where they are cut off after the knot



FIG. 31.—MAN-ROPE KNOT.

is finished. As the knot has been made loosely it must be hauled taut before it is finished and the ends cut off. This is easily done by inserting the point of the marlin-spike, under, say, the black strand at the root of the knot (the lower of the two black strands) and pulling it tight away from the standing part; the do the same thing where this strand next appears, following it round the knot until all the slack can be pulled out by the end of the strand under the knot. The other two strands must also be tightened in the same way, and, if necessary, all three should be gone over again to get the knot tight and symmetrical, with an equal strain on every part of all the three strands, which may then be cut off as close as possible.

This knot can be made equally easily in either three- or four-stranded rope, and is a very ornamental knot.

*Spliced Four-stranded Rope.*—All the directions for making a short splice, or an eye-splice, have been for the common three-stranded rope, with the exception of the short note on splicing an eye in six-stranded wire rope, which can be treated as three-stranded rope, with slight modifications. There is, however, another make of rope in the best qualities of yacht manilla which has four strands. In making a short splice it is of no consequence whether the rope has three, four, six, or any number of strands, provided both parts are the same, but for an eye-splice four-stranded rope is tucked for the first time in a different manner from three-stranded. Instead of having one centre strand to start with, we have two, the farther one of which is tucked as in three-stranded rope, under a strand of the standing part, so that it comes out away from the hand, while the nearer of the two is tucked in at the same place, but down under the next strand

nearer to the operator, and comes out towards him, instead of away from him, as all the others do. The farthest and nearest strands are tucked exactly the same as if the rope was three-stranded, so that the nearest strand passes under the same strand of the standing part as the nearer of the two middle strands, but away from you, while the other is towards you. They are then tucked over one and under one as usual, and tapered until the splice is complete.

All wire rope must be served over for a distance equal to the circumference of the eye, and all ends must be whipped before attempting to start an eye-splice, otherwise the whole piece will instantly unlay itself into a wild tangle of exceedingly prickly wire, as a friend of mine found out to his great annoyance the other day; you could hear him splicing wire all

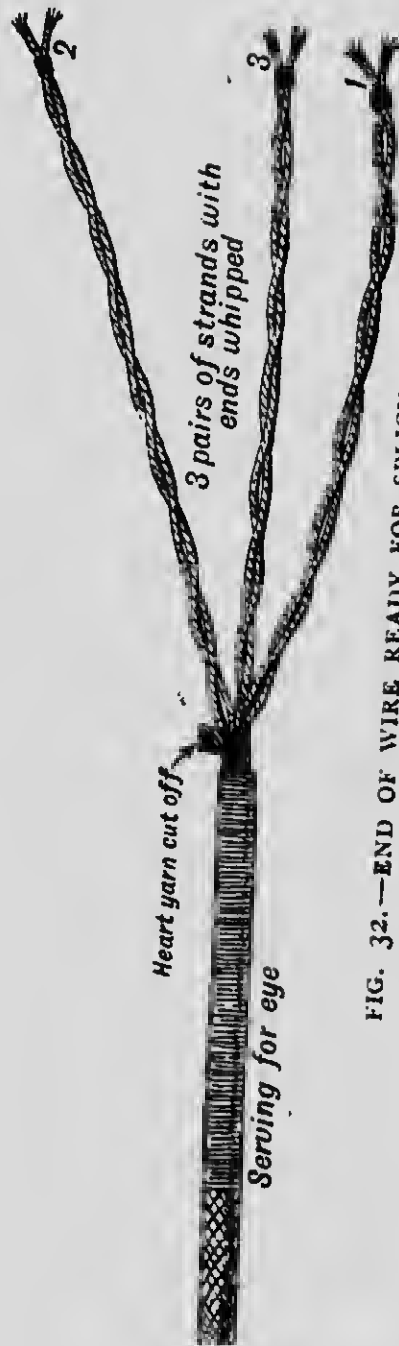


FIG. 32.—END OF WIRE READY FOR SPLICING.

over the boathouse. When all ends are whipped, unlay the strands in pairs as far as the serving, and cut out the heart yarn (Fig. 32). Now tuck the three pairs of strands, each pair under two strands of the standing part, starting with the centre pair (No. 1 shaded dark), as in an ordinary three-strand splice (Fig. 33). Then split the pair into single strands and tuck one *over* 2 and *under* 1, and its fellow *over* 2 and *under* 2. This will bring each strand out under a separate strand

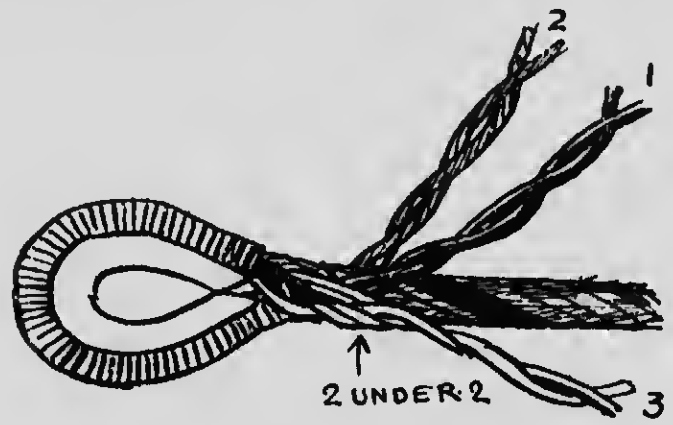


FIG. 33.—FIRST TUCK.

of the standing part (Fig. 34), after which they should be tucked one over 1 and under 1. The slice may now be tapered by cutting out two of the six strands, tucking the other four over 1 and under 1, then cut out two more and finish by tucking the remaining strands once more, and serve over the whole splice after squeezing it into shape with the pliers. This splice holds perfectly: in fact I think it is locked even more firmly than the regular method, in which all six strands are tucked separately, and is easier to learn.

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*Joining Wire Rope.*—Joining the ends of two pieces of similar wire rope. There are three distinct ways of doing this, viz.: (a) Tying the two ends together with various forms of knots termed “bends,” the act of tying being termed “bending”; (b) interlacing the strands of the two ends together and then working a knot round the rope with the strands of the opposite part, termed a “shroud knot,” and (c) splicing the ends together with either a short or long splice.

*A Wire Bend.*—There are several bends suitable for hemp or manilla rope, but most of them will slip if made

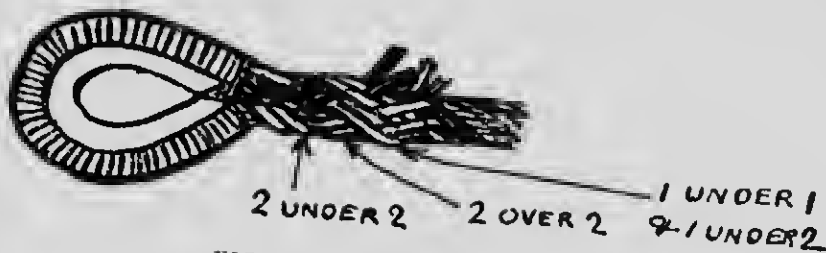


FIG. 34.—SECOND TUCK.

on wire unless the ends are seized down afterwards. Of this form of bend probably the simplest and most efficient is to take a half-hitch round the standing part with one rope and stop the end securely down, and pass the end of the other through the eye thus made and treat the second end the same as the first. This is probably the best form of bend if it is to be cast off soon, and the ends of the wire are to be kept as free from kinks as possible, but for a more or less permanent bend the one illustrated in Fig. 35 is both simpler, neater, and is probably the best to hold. It is very easy to make, as it consists merely of an overhand knot taken in each end

round the standing part of the other end. These will jam up close together, forming a very snug knot. If it is to be permanent it will be perhaps as well to seize the two ends down before cutting off short.

*The Wall Knot.*—Before dealing with the shroud-knot method of joining two wire ropes, it will be well to understand the manner in which the strands are secured. This consists in making a series of loops with all the strands, each forming a loop round the end of its neighbour and

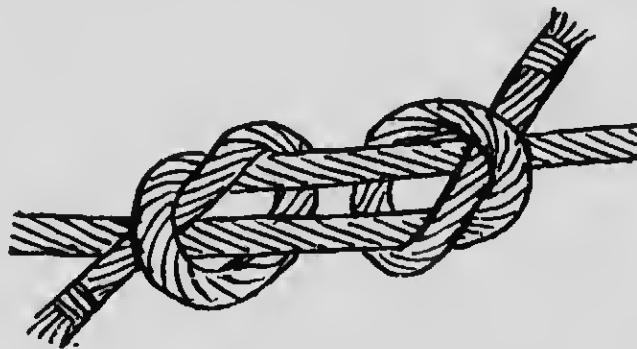


FIG. 35.—WIRE BEND.

passing up through the loop of the next strand on the other side. Walling may be done round a rope with the strands of another piece as in the shroud knot, or it may be worked on the end of a single part as in Figs. 36 and 37. When the three-strand wall (Fig. 36) has been mastered it should be quite easy to make the six-strand wall in wire (Fig. 37), or, in fact, to make a wall on a rope having any number of strands.

*Five- and Seven-stranded Wire.*—Wire rope generally has six strands, but in some cases five or seven. This will not affect any of the knots and splices which

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I am now describing, but it would render an eye-splice impossible in the principle previously described, the only alternative being a splice in which every strand comes out separately at the first tuck. This is done by tucking the centre strand (five strand) under three strands, the next strand above it under two, and the third on top under one, all entering the standing part of the rope the same place. Of the two remaining lower strands, the one next to the centre also goes down between the same

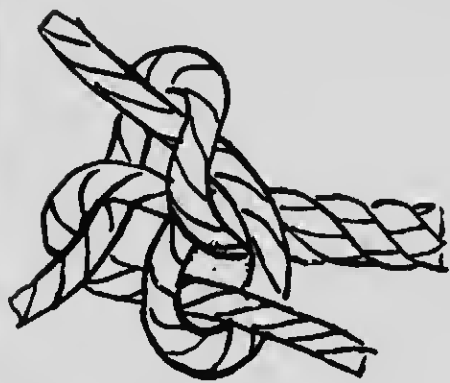


FIG. 36.

THREE-STRAND WALL.

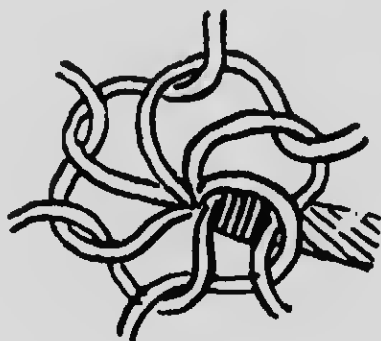


FIG. 37.

SIX-STRAND WALL.

strands as the others and the lowest comes up under the strand next below where the others enter and out where the others go in. After the first tuck they all follow in the others go in. After the first tuck they all follow in over one and under one, for each succeeding tuck. In the case of seven-strand wire rope, the procedure is exactly the same except that the centre strand goes up under four, and the three lower strands are tucked, two under two and one under one, while the last strand is tucked as in the five-strand rope.

*The Shroud Knot (Wire).*—The two ends of the



pieces of rope to be joined are carefully whipped at a sufficient distance back to allow plenty of end for working (say 6 in. in  $\frac{1}{2}$ -in. circumference wire), and the end of each strand is also whipped as in the eye-splice. All the strands are then unlayed as far as the inner whipping and "married" together (Fig. 38), that is, each strand of the right-hand rope lies between two strands of

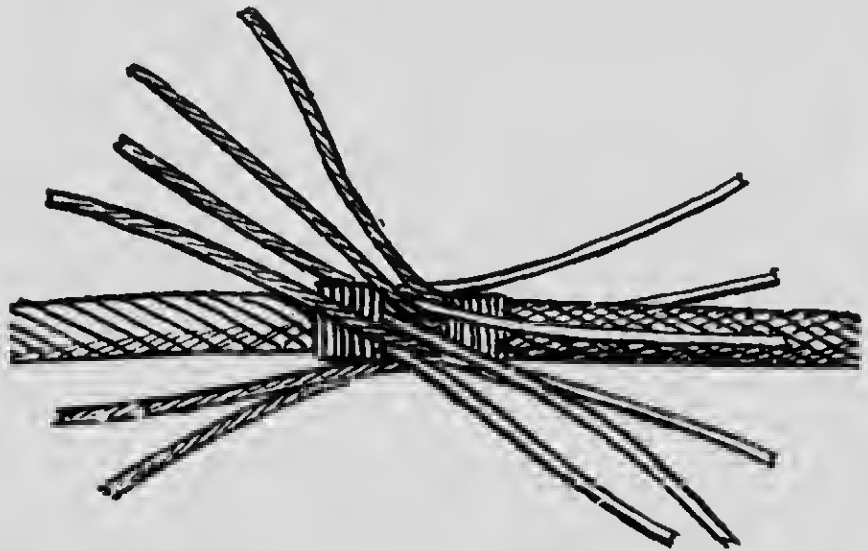


FIG. 38.—ENDS MARRIED FOR SPLICE OR SHROUD KNOT.

the left-hand rope and *vice versa*. The ends so married are ready either for making a shroud knot or for a short splice. To make the shroud knot, grasp the left-hand standing part, together with all the strands of the right-hand end, close to the point where they interlace. Now make a wall knot round the *right*-hand standing part with the strands of the *left*-hand end and heave the knot taut. Turn the wire over so that you grasp what was the

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right-hand end in your left hand and the strands of the end which were previously in your left hand are now to the right. Make a wall knot with these as before (Fig. 39) and heave taut, and then pull the two parts of the rope



FIG. 39.—SHROUD KNOT, SLACK.

apart as hard as possible to close up the two wallings. The ends may now be seized down and the finished knot will appear as in Fig. 40. I have shown this knot with two wallings slack as in Fig. 39 to give a better idea of its construction, but each wall must be hove up



FIG. 40.—SHROUD KNOT, FINISHED.

as it is made, or the knot will not lie close and snug. This is a very strong knot, and looks neat. It is much easier to make than a splice and takes up less room, and if properly made cannot draw, and it is, in my opinion, quite as neat in appearance.

*The Short Splice (Wire).*—Marry the ends as for a shroud knot, then seize down the strands of the right-hand rope over the left-hand rope and cut away the back whipping on the right-hand rope. Take each loose strand over the one next above it belonging to the standing part of the other rope and tuck under the next (Fig. 41), and follow on over one and under one until three tucks have been made and hove taut. Now put a seizing over

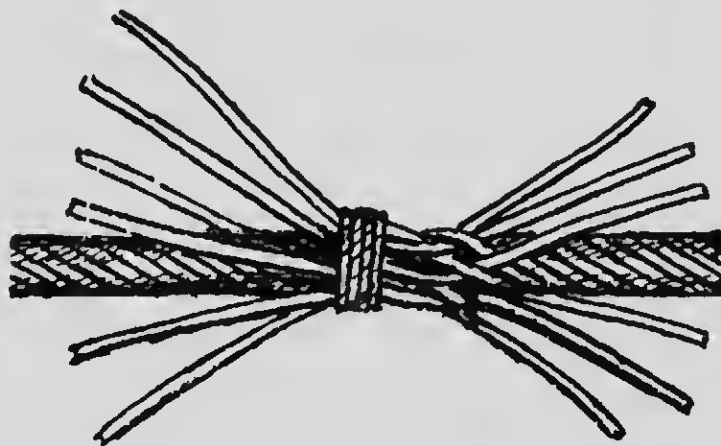


FIG. 41.—WIRE SPLICE: FIRST TUCK.

the first tuck to hold it in place and cut away the seizing on the other set of strands, turn the whole splice over so that the former right-hand rope now becomes the left and tuck the new set of strands over one and under one of the other standing part as before. Two tucks should be sufficient this time, and the splice may be tapered by cutting out one or more strands in each succeeding tuck. I have shown the first tuck (Fig. 41) fairly slack to show how the strands lie, and in Fig. 42 I have

shown the ends cut off after three tucks a side without tapering, as the latter would not show clearly and might cause confusion. All splices should be carefully served over when finished.



SEIZING OVER  
FIRST TUCK

FIG. 42.—WIRE SPLICE, FINISHED.

## VII.—COLD

Well-defined mock suns are a sure sign of intense cold coming on rapidly. Near the sea, or in any damp climate, cold may cause extreme hardship. In dry climates, however, the air becomes chemically dry at  $-10^{\circ}$  Fahr., and cold, however great, is as exhilarating as champagne. In northerly latitudes wind is unusual during extreme cold, but there may be local airs from lake or sea ice, and these are dangerous. When in danger from extreme cold, if there is fuel make three fires in triangle, base to windward, and camp in centre. If in the stillness you observe the sky becoming pale, and horizon turning misty, these are signs of blizzard. Blizzard is a wind under clear sky, lifting the snow from the ground, and making a dense fog, which obliterates trails, and seems to blow from all directions at once. Hence its extreme peril. Break for cover, or make a

windbreak with fire in front. It may be necessary to kill a horse, and get inside the carcass. Make no attempt to travel. Because cold air sinks, valley bottoms are 10 degrees colder than higher land, while hills are exposed to wind. So for travel and quarters avoid both hills and valley bottoms.

The Polar regions are not colder than the Siberian and Canadian steppes, hut housing and clothing are better understood in the Arctic. The Eskimo *igloo* is warmed by an oil lamp. The Danish Greenland, and the Russian houses are warmed by a handful of fuel, which keeps a mass of masonry diffusing heat for hours. The Canadian sheet-iron stove, even with water steaming on top, parches the air, whilst overheating makes men soft. Men from damp climates stand cold best, but within three years the stoves lower their endurance. Inland Canadians, although hard men, do not bear cold well.

*Cleanliness.*—Nearly all Russian peasants take a weekly bath, pour water on hot stones, and steam body in a confined space, while the hardiest follow this with a roll in the snow before dressing. Despite their cleanliness of body, they neglect their outer clothing, which becomes verminous. Great care is needed to keep heavy clothing clean. A verminous man will infect a whole camp. Where there is risk, look closely for eggs at seams of clothing. Boiling (with chewing tobacco in water), or dry heat of  $450^{\circ}$ , will kill all vermin.

*The Problem of Cold.*—Two ordinary candles, burn 22 oz. fuel in 24 hours. One man eating 22 oz. carbon burns 22 oz. fuel in 24 hours. The heat evolved by a man equals that of two candles. (Galton.)

*Warmth* is not in housing or clothing, but in diet, as an adult needs 23 oz. of fat and sugar in the day's rations—carbon fuel for the body. Warm the blood, keep away from the fire, but don't sweat out of doors; keep the pores of the skin open by cleanliness, and have the bowels open at all costs.

*Scurvy (Black-leg)* is an accumulation of ptomaine poisoning in the body, which may be averted, delayed, or cured by sunlight, ventilation, warmth, or eased by steam baths, tea of willow, or fruit acids, failing fresh provisions. Warm blood of a newly killed animal is good medicine.

*Tent for Damp Cold (Patagonia).*—Make cone of boughs tied at top. Cover with skins or leaves to shut out air. Make fire to burn the inside and dry the ground. Remove fire, and make camp inside.

*Travel.*—In spring travelling on rivers or lakes, only march between midnight and daybreak, when ice is strongest. Use long snow-shoes, testing ice ahead with small axe, and keeping away from the swift-running part of a river, where ice is very thin.

*Deep Snow.*—Spread blankets in front of transport animals to give foothold. *Weak ice* cover with reeds or boughs, and pour on water to freeze until a bridge is formed for crossing.

*Mal de Racquette* (pain from snowshoes and cracked heels).—Keep back tendons of heels well rubbed with grease, and if symptoms increase, steep feet in very hot water.

*Clothing.*—Thickness being equal, the order of warmth is: warmest, hare's fur, eider down, beaver fur, raw silk, sheep wool, cotton wool, lint, twisted silk. The tremendous strain of Polar land travel requires

woollen clothing. As the air will not absorb moisture, the sweat, unable to escape through skin clothes, changes to ice. For ordinary life, fur and skin clothing keep one warm at less exertion than any woollens. A shirt and breeches of any closely woven texture will retain the bodily warmth lost through open cuffs and split front of coat, and wide ankle openings of trousers. Furs can be put on when at rest. A loin cloth, triangle of blanket, is a useful addition to underclothing. The sleeping bag, No. 1 canvas, oiled, lined with wolf, goat, or blanket, difficult to keep clean, if wide at feet, takes long to warm: make narrow at feet. Lying down under blankets, throw up legs, flirt bedding close round them, then hold down. Thickness of bedding above and below should be equal.

*Mitts.*—The four fingers in one bag keep each other warm. Have wrists long against shrinkage, and tied together, string passing loose behind neck. Gloves are most dangerous.

*Foot Gear.*—For cold, the vital necessity is suppleness of the foot. The sole must be supple skin or leather, turned up over heel and toe, then turned up at sides, and puckered in to fit the tongue and top. *Mocassins* are shoes of moose skin, the top being folded across front of foot, and made fast with a buckskin string. The outer sock is rolled down hard over the upper to keep out snow.

*Shoepacks* (Canada Woodlands) and *Kamik*s (Eskimo). *Mud Mocassins* (Hudson's Bay country, for damp weather) are of oil-dressed skin, with the top reaching the calf, and one seam at back. Argentine practice uses the seamless leg of a horse or deer, hair outwards, sewn down to the sole leather, and reaching to knee-cap.

Russians use a felt top, but their stiff leather foot is bad in real cold. Felt boots are good for riding, but hard to keep dry, and make the feet tender. All foot gear for cold are large in feet to hold extra socks, or a pad of dry grass for insole. Keep socks clean. Long boots are good for spring thaws, but have mocassins in pockets ready in case of a frost, as many men lose their feet by neglecting this precaution.

YUKON CONDITIONS OF COLD. By E. M. Bruce, L.F.

*Dress (Man's). Feet.*—Two pairs medium thick woollen socks, or one strip of 7-lb. blanket, 18 in. by 6 in.; 1 pair good "German" socks. Mocassins. On the trail, keep duplicate set ready to put on at once in case of wet feet.

*Legs.*—One pair thick lamb's wool drawers. Overalls, or canvas trousers, with braces. These should be loose in the body, leg, and at the knee.

*Body.*—Thick undervest with long sleeves. Ordinary flannel shirt and light coat or waistcoat (for pockets). Over all a parkie (or parka): A loose smock-frock, of light white canvas or drill, reaching to top of knee-cap when tied round waist, and fitting very loosely round chest, shoulders, and waist; loose hood for the head, edged with wolverine skin; puckering strings run round neck, end of sleeves, and edge of hood underneath the fur. The outer coverings must be as nearly windproof as possible. Sash or belt with sheath knife (belt may be cartridge-belt).

*Head.*—Fur cap with ear flaps. Keep the face clean-shaved; if a long time on the trail, cut moustache, beard, and whiskers as close as possible with scissors. Don't shave if face has to be exposed at once for any



long time to severe cold ( $-30^{\circ}$  F.), as one is liable to freeze the shaved parts.

*Hands.*—Indian mittens, blanket lined: if very cold, light woollen knitted mittens as well. Mittens (fingerless gloves) suspended from neck by string from top of back of each mitten.

*Sleeping Outfit.*—Fur robe, not less than 8 ft. by 7 ft. lined with 7-lb. blanket, and a Hudson Bay 2-point blanket to lie on. Fox makes the best robe, then wolf. Don't wash the face unless in a civilised place. Petroleum is best to thaw any frozen limb or joint, but see that it is not too cold. It should be about  $32^{\circ}$  F.

*Sweating.*—If the weather is below  $0^{\circ}$  F. all sweating must be avoided. Keep cool by removing cap, parka, and jacket. If necessary, open shirt and vest. If one sweats, as soon as one stops one chills through, and that may mean pneumonia, or worse.

*Lice.*—Never allow any stranger to use or sit on your robe or blanket. Sabadilla powder will kill them. A little mercurial ointment rubbed on the ends of vest, and drawers, down the middle of the chest of vest, and in armpits and fork of underclothes, will destroy and keep them off. A piece of tape 30 in. long, rubbed in mercurial ointment and hung round the neck, is good for a month, when it should be renewed. It will keep them off.

*Diet.*—Fat meat (beef is best), pork and beans, pemmican, bacon, tea, sugar. Rice, corn-meal, butter, a small quantity of flour, and a few dried vegetables may be carried, but are not necessary. A man's allowance is 3 lb. per day, per man, inclusive. Dog's allowance, 2 lb. per day.

If men can only get fresh meat, the allowance

must be largely increased. Some men require 7 lb. per day.

*Camp.*—Tent and Yukon stove are useless, except in case of a prolonged halt, a camp without shelter, or fixed stopping place.

*To make Camp.*—Get into timber—the heaviest is best. With a snow-shoe dig out the snow till ground is reached; clear and flatten as much as possible. Throw snow to back and sides as a break-wind.

For one-man	camp clear	8 ft. by 4 ft.
„ two-men	„	10 ft. by 6 ft.
„ three-men	„	10 ft. by 9 ft.
„ more allow	3 ft. extra width	per man.

Carpet from front to back with green spruce boughs, smallest on top, at least 1 ft. deep, back to front of boughs 6 ft. long. Cover snow-banks with big spruce boughs to prevent reflection melting them. See that plenty of dry and green wood is cut ready for night and morning. Place sled on back or side walls, and put all stores and freight on walls: place dog-harness and all leather or rawhide goods in camp, or out of reach of dogs. Whilst snow and ice are melting for tea and supper, feed the dogs. Thaw out and warm the dogs' food if necessary before feeding them. On no account must the dogs be tied up. Then feed yourself: clean up and make any repairs necessary.

*To make Bed.*—Put down a fresh covering of very small spruce boughs; then your blanket; roll up in your robe on the top, feet to the fire: curl up in as much of a ball as possible, and see that your robe is well tucked in all round. Before turning in, change into your sleeping-socks and mocassins, and put on any extra clothes you wish to. Kit sack makes a good pillow.

On the edge of the spruce bed dry the socks, mocassins, and mitts used during the day, and don't go to bed until they are quite dry.

If more than one night in same camp, make a small "wickie" of spruce poles and boughs. Build a lean-to shelter above bed, and facing fire, so that heat of fire is reflected down upon bed. Close in the ends, and bank well with snow. Try to camp near to running water. In filling kettle with snow, force the snow well down into it, and keep it well pressed down at first, otherwise you will burn the kettle. Cover your water-hole in the ice with snow, then it won't freeze.

*Snow-shoes.*—The Alaska native pattern is the best.

Hunting-shoe . . .	60 in. to 72 in. by 14 in.
Ordinary shoe . . .	42 in. to 60 in. by 10 in. to 12 in.
Trail-shoe . . .	36 in. by 9 in.

The last is only used on a broken trail.

The ordinary ski and the Canadian shoe are useless in dry snow of the far North.

*Snow Blindness.*—May be avoided completely by not washing the face, and blackening both sides of the nose, under the eyes, and on the lower eyelids. Keep these places dead black with charcoal or Indian ink.

*Ammunition.*—The best ammunition is English. The colder the weather is, the harder cordite shoots: at 25° below zero F., I have found the point-blank range of the '303 increased from 500 to 600 yards.

As soon as cold weather sets in, all firearms must be taken apart and cleaned of every spot of oil: a little graphite may be put on such parts as need lubrication. They must never be brought indoors: if they are brought in, moisture at once condenses on all parts,

and the whole weapon must be thoroughly dried and cleaned.

Cartridges are best carried loose in cartridge-bag.

It is almost impossible to judge distance correctly over snow.

Schultze powder does not deteriorate with cold. I have used English Schultze and cordite seven years old, and found them as good as new.

*Books.*—"Eskimo Life," Nansen; "The Silent Places," Stewart Edward White; "The Magnetic North," Elizabeth Robins; Works of Jack London; "Great Lone Land," "Wild North Land," Butler; "Polar World," Hartwig.

## VIII.—HEAT

DRESS, EQUIPMENT, AND MANAGEMENT. By Captain E. S. Grogan, L.F.

*Kinds of Heat.*—From the European's point of view hot climates are divisible into two fundamentally distinct kinds:

1. *Damp*, or atmospheric heat.

2. *Dry*, or sun-heat.

The damp heat gives the sensation of the hot room in a Turkish bath, while the dry heat gives the sensation of standing before a brisk fire.

In the first case, one must leave the room to get cool; in the second case, one need only leave the fire.

*The Theory.*—The normal temperature of the human body is  $98.4^{\circ}$  F., and a function of the skin is the exact regulation of the body heat to this standard. This is achieved by evaporation. The whole process in the case of humans is assisted artificially by clothes.

Clothes and skin may therefore be said to co-operate in retaining bodily heat up to a temperature of about

90° F., and in excluding atmospheric heat when the shade temperature rises above 90° F.

*Dress.*—In hot climates, then, clothing merely serves to protect the body from the rays of the sun and from insects, and for these reasons is essential to Europeans, but, on the other hand, it is a source of danger, in that it absorbs perspiration and thus may produce "chill."

Clothing should therefore be made of material which is porous, but at the same time multicellular.

It should absorb moisture freely, and evaporate slowly.

I find this object is best achieved by two garments: and the ideal combination is a thin silk-and-wool shirt, with a loose, light, and coarse-fibred canvas coat.

Little is known as to the effect of the "chemical" rays upon the human body, but it is a remarkable fact that all the mammalian habitants of the tropics appear to have a dark-coloured skin. I have also remarked that all the antelopes and carnivores, which by their habits are constantly exposed to the sun, have yellowish hair, e.g. the sable antelope, which is black, is almost exclusively a frequenter of glades; its first cousin, the roan antelope, which affects more open country, is more yellowish in colour; and the hartebeests, which are mainly frequenters of the open plains, are quite yellow.

This coloration is generally supposed to be protective; but since the plains are for more than half the year bright green, or black from fire, yellow is in no sense a protective colouring.

In any case, I always *feel* the *sun* less if I wear a yellowish garment than when wearing any dark, or even white material.

The ideal rig for comfort in hot, dry weather is silk-

and-wool shirt; loose kerchief round neck; Norfolk coat of yellowish canvas; trousers of same, cut like an Argentino Gaucho's trousers, *i.e.* low at fork, baggy, and tight-fitting at ankles; thick boots with very heavy soles; pith sun-helmet or double terai hat. For hot, damp weather: silk-and-wool shirt; white duck suit to button close round neck; white canvas shoes with thick soles; pith sun-helmet. For night: silk-and-wool pyjamas, with the trousers cut like a Chinaman's (Brettell, of the Royal Arcade, can make these); four light blankets, sewn together at one end and down two sides to make a sleeping-bag.

If the night is very hot one may safely sleep without any clothing, provided a sheet, or even a light shawl, is thrown lengthwise across the visceral section of the body.

*Management: Food.*—The normal amount of nourishment is necessary, but meat should to a great extent be replaced by beans, peas, or lentils, made into thick soup, or eaten in the form of salad. Plenty of fruit or greenstuff is essential.

(N.B.—The young leaves of sweet potato vines make an excellent spinach, and are nearly always available in the tropics.)

Lime-juice may be used as a substitute. Hot drinks are more cooling than cold drinks. Iced drinks are deadly.

No alcohol should ever be taken before sunset. I am convinced that the pernicious effects of alcohol are enormously aggravated by hot weather, and, above all, by the direct rays of the sun.

*Health.*—Regularity of the bowels is, if possible, more important in hot than in temperate climates. Any neglect on this head leads immediately to trouble.

Extreme cleanliness of the skin is also most essential, since, as pointed out above, the skin is the heat-regulator of the body. This is best served by a sponge-down with hot water on rising, and a good hot bath about sunset when the day's work is done. Omit the morning sponge in preference to the evening bath. Avoid cold water as the devil.

*General.*—If special attention is paid to

1. Bowels,
2. Cleanliness of skin,
3. Abstention from alcohol and overeating,
4. Suitable clothing,

the European can, I am convinced, lead exactly the same life which he would lead in the temperate zones; and the more exercise and physical work he performs, the healthier he will be.

Exercise promotes general perspiration, which, on evaporation, gives a sense of coolness.

There is no more stupid or groundless myth than the idea that the white man cannot "work" in the tropics, unless perhaps it be the idea that the tropics are inherently unhealthy.

The former is a convenient fiction of tropical employees, and the latter has "Drink" and "Funk" for its parents.

## IX.—SEA

DRESS, EQUIPMENT, AND MANAGEMENT. By Capt. J. St. A. Jewell, L.F.

The following notes are written with a view of assisting those who propose following the sea as a profession, and are applicable to deep-sea ships, both steam and sail.

*Kit.*—The first question regarding the kit is, what is it going to be carried in? Some men prefer a chest, some a bag, and others both. For a lad, well found, a chest and bag are almost a necessity. The chest should be small, say 2 ft. 9 in. long, and 1 ft. 6 in. broad and deep; the bottom should be raised by four  $1\frac{1}{2}$  in. corner blocks, so that water can pass freely under it. There should be a "till" at either end inside, 4 in. to 6 in. deep and wide, to hold small stuff.

The bag should be of canvas (flat-seamed), and should measure at least 3 ft. 9 in. by 18 in. diameter, and the top should be eyelet-holed. Both bag and chest should bear the owner's name.

The following is a really first-class kit as regards clothing: 4 flannel under-vests; 4 flannel under-pants; 2 pairs sea-boot stockings (if rubber sea boots are worn, 2 pairs Arctic socks); 4 suits dungaree (separate coat or jumper) and pants; 4 pairs socks (wool); 2 pairs cloth pants for working; 1 close-knitted guernsey; 1 double-fronted heavy cloth jacket for cold weather; 2 old waistcoats; 1 pair sea-boots to knee, bladder-lined and wood-pegged. Pillow-cases, two of cretonne. Soap, pipes, tobacco; 2 pairs wood-pegged blucher boots; 2 towels; a suit of oilskins, double-lined, short coat and pants with breastpiece held up by flat shoulder-straps. Belt knife, needles, thread, spare buttons, also caps, scarf, mitts, etc., etc. For feeding outfit, take a hook pot, two plates (enamelled), and a knife and fork.

*Bedding.*—A good straw mattress (known as a donkey's breakfast) and a feather pillow; a bolster is made of folded clothes. Take also a thick rug blanket (as long as you like) and three army blankets.

Every kit should include a small pot of vaseline to



keep metal (razors, needles, etc.) free from rust, also a few tools for patching boots, a pair of cutting pincers, a hammer, a bradawl, and a few nails. All clothes should have eyelet-holes somewhere, so they can be hung anywhere by rope yarns to dry after washing.

Anything outside the above list is a luxury, and for shore use.

*Bunk and Fittings.*—If the bunk is boarded up at either end, fit small shelves on which to stow small stuff, books, etc., etc. Fit curtains of cheap cretonne, so as to curtain in the whole bunk, and if you have a porthole place a small curtain over that also. Any bunk can be made to look smart by a few photos, a pipe rack, and one or two knick-knacks. Over the bunk-post at the foot end should be hung the clothes in use, and a leather loop nailed to the bunk-board close to post will serve to hold a sheath with the belt and knife with it.

*Habits Below.*—To be comfortable aboard ship in the most restricted quarters is purely a question of management. Be methodical in all matters below. Learn to smoke without spitting, and so keep the floor clean. If you must spit, keep a spit-tin at your bunk and use it, but wash it out each watch. Any mess made on the deck should be instantly swabbed up. Every dog-watch straighten up blankets, and so make the bunk look smart. A fore-castle full of tidy bunks and a clean deck is a "home" at any time, but untidy bedding and a wet floor make a pig-pen.

After every meal wash plates and stow the grub away: a dirty plate to a fresh meal robs it of all freshness. Never get first knife in the grub kid—leave that to older men—the leaders. Take your turn, and take only

what you want, and see that your wants never exceed your fair share. Keep all your clothes clean and in good repair. In the meanest ship you can always get half a bucket of fresh water once a week for washing. Wash your face in it and use it sparingly. After that, wash your underclothes, then your shirt, pillow-case, and socks. Even if the water is then "soupy," use it for washing your dungarees; a rinse in salt water will soon put matters right. Hand-washing is always better than scrubbing with a brush, though more trouble; it means greater freedom from dirt. Get into the habit therefore of always washing by hand, and never drop it.

Take fresh clothes and a fresh pillow-case once a week. Spend every Sunday morning in washing yourself, your clothes, and finish up by having a "sailor's pleasure," *i.e.* turning out all your kit. Having turned out everything, air it, and restore by rolling up each piece tightly. A lot can be stowed in a small space when each piece is rolled.

Keep boots in condition by rubbing into the leather a dubbing made of Russian tallow and Stockholm tar. If tallow is not procurable, use ordinary ship's grease "slush." With any sea-boot, leather or rubber, wear over the ordinary sock an additional covering, a thick sea-boot stocking for leather, and Arctic socks for rubber. Leather sea-boots should be dried by hanging them up in a good current of air, and rubber boots should always be wiped out with rags. Oilskins should be hung in the wind at least once a week to prevent them getting sticky. Any tendency to stickiness should be cured by redressing them with raw oil and blacklead.

The whole secret of keeping a sea-kit in good condition, and making it last a long time, is to wash

each dirty piece and repair each damaged piece weekly, and to air everything occasionally.

When "on deck" always be willing and move smartly; a tired man—an "eye-worker"—is everything that is bad. As a boy, always be the first over the sheerpole, and look upon stowing kites as your honourable prerogative. At all times be civil to officers, but don't "crawl." Whenever an order is given you, repeat it to show you've heard.

In all work aloft be neat and thorough. In sailing ships especially men's lives depend dozens of times daily on a marline seizing, and if that seizing is put on badly, a watch may get short-handed. For all work aloft, clothes must be easy, and limbs free. For this reason an oilskin suit (*i.e.* short coat and pants) is always better even for an officer than a long coat.

When working with tools aloft, *everything* should be on a landyard, so that nothing can fall. A marline spike should always be attached by its landyard to the worker's neck, and when not in actual use, should be thrust through a thick leather tag fastened to the belt. Before throwing any rope end from aloft to the deck, see the spot where it will fall is clear, and never fail to yell—"Stand from under."

*How to Progress.*—Be smart, willing, and try to learn. Nothing flatters an "old whale" so much as a really genuine request for sea knowledge. He will take a pleasure in teaching a willing boy all the little tricks of knotting, splicing, and handling well. When you've learned as much as he can teach you of "sailorising," tap the bo'sun for more knowledge; he'll give it. Officers always notice a boy who spends his spare time in learning "sailorising," and nine times out of ten will give

him a chance to prove his competency. To take each of these chances, and to make a good job of the task given, is the first step to progress; it lifts you out of the ruck. Show you have sailor ambition: it is always noticed at sea. Study navigation and the handling of ships an hour each day. Handbooks on both subjects are cheap. Any boy of ordinary intelligence can master sufficient on both subjects on a twelve months' voyage, to pass a second mate's exam. The second voyage, buy a cheap sextant and practise with it. This is a sure indication of a young sailor's ambition, and any decent officer will offer him help and advice.

The whole secret of a young sailor's progress at sea is bound up in his general smartness, his intelligence, and his expressed and indicated anxiety to learn.

Once a man has a reputation of being a smart sailor, he always collects a good "ditty bag" or "sailing" kit. The following is a specimen: 1 steel-pointed ordinary working spike; 1 small working spike; 1 steel-pointed ordinary wire spike; 1 flat-pointed wire spike; 2 box-wood fids; 1 seaming palm; 1 roping palm; 1 hardwood serving board; 2 prickers, also needles of assorted sizes.

In nine cases out of ten at sea a well-stocked ditty bag against a bunk is as a brass plate on a doctor's door—it indicates who's there.

*Food at Sea.*—Nearly all deep-sea ships are anything but overstocked with food, and there is not enough variety. The men themselves, however, can vary the monotony of ship's grub in many ways. For instance, a decent hash of chopped meat (left over from dinner), pounded biscuit, the lot mixed with a little pea-soup, the top smeared with grease and baked. Another deep-

sea delicacy can be made by soaking a biscuit for a watch in water (fresh, if possible), but salt will do, so that it is soft. Then pour off the water the biscuit has not soaked up, smear the top with grease, pepper and salt it, and bake. These are "hungryship" dishes, but they are better than nothing.

Opportunity often offers for fishing, especially for dolphin, shipjack, and bonito—sometimes young shark. The three former can be caught on a white rag-covered hook, and the latter on almost anything. Dolphin, shipjack, and bonito are coarse but fair-eating. Shark has a peculiar rancid taste, but a piece cut from close to the tail of a young shark is eatable.

All deep-sea fish should be "coin-tested" before eating, as sometimes they are poisonous. To "coin-test" cut a small piece of the fish it is proposed to eat, and cook it with a silver coin in the pan. If the coin turns black, the fish is poisonous, but if not affected, it can be eaten.

Nearly all deep-sea birds are bad-eating, but they can be improved by packing them inside after gutting and skinning with onions if possible, or if not obtainable, with powdered biscuit, before cooking.

*In hot weather* sleep under the fore-castle head or under the boats, where it is possible to keep cool. For clothes, wear dungaree pants and flannel shirt.

*In cold weather* wear flannel next skin, cloth pants, waistcoat, guernsey pilot coat, and leather sea-boots.

*In stormy weather*, when there is a lot of water about the decks, tie the legs of the oilskin pants round the tops of the sea-boots above the ankles. Keep ordinary pants up by an extra belt, and fasten the ordinary belt with sheath and knife attached tightly round the waist

of the oilskin jacket. You are then more or less waterproof.

*The Ideal Ship.*—Entirely eliminating the question of wages, the ideal ship, from the crew's point of view, would be one where gear and stores were plentiful, and of good quality. Accommodation for both officers and men should be ample as regards room, and adequate fittings. The crew should be at least 50 per cent. larger than ships carry to-day. Every man for'ard should have a good-sized locker for clothes. The food should be plentiful and varied, and also properly cooked. No limit should be placed on water for drinking purposes, and at least one bucket of water per week per man should be allowed for washing purposes. Regular work of the ship should begin and end at six o'clock, and on Saturday all work should cease at 12 noon, so that the men could wash and mend clothes.

The officer should be firm at all times, but not brutal. To "haze" a watch because one or two men in it are "hoodlums" is bad policy. They should treat boys as beginners in a new profession, advise them, instruct them, ram sea-knowledge into them. Many boys who spend the most of their time at sea cleaning brass work and doing dirty work are capable of better things. Never be familiar with the men—it breeds contempt.

## X.—WOMEN ON THE FRONTIER

BY ELIZABETH ROBINS

I am asked—despite my small claim to be accounted among the frontier folk—to say something for the

guidance of the women who propose confronting the hardships of travel in out-of-the-way places.

I will therefore set down two or three observations about dress and diet.

With respect to the dress question, there are two pitfalls to be avoided :

(1) The endeavour to wear clothes tolerable enough at home, but utterly unfit for ruder conditions.

(2) The attempt to make use of the newest and most "sporting" equipment obtainable.

Comfort and efficiency lie between these two extremes. I would warn any woman against deferring till she is under the stress of frontier life the adoption of any fundamental change in her way of dress. Before leaving civilisation behind, she should not only "try on," but wear for hours, if not for days, the boots, the knapsack, the rubber waders, the putties, or gaiters, that she means to travel in. This sort of "dress rehearsal" is as essential to women as it is non-essential to men—for reasons that are obvious.

Perhaps greatest among our problems in this connection is the hair and hat question. Of women who have not travelled the unbeaten ways, only the few who ride or yacht have much idea of the difficulty of keeping on (in rough weather) any of the usual forms of feminine headgear; and none perhaps but the traveller knows the drafts on energy and temper made by the need to be clutching at a veering cap and a clinging veil which are wobbling about on a roll of hair that is loosened from the grip of its pins.

In the depths of my heart I fear that a reconstruction of the fashion of women's hair will be inevitable, as the hitherto stay-at-home sex moves more about the world.

Until that day, let the long-haired ones braid rather than twist their hair, and let them tie it securely an inch or so from the roots before pinning it up.

To insist on the need not to multiply skirts is to encounter less opposition in these days when even ladies of fashion wear only knickerbockers under their *directoire* gowns. But the woman who goes "on the trail" will find it an advantage to have knickerbockers of the same colour as the skirt. If the luggage problem allows, she should have at least two skirts; one of short ankle-length to wear in camp, and in the early days of her journey; another reaching no farther than the knee. If she goes far, and faces real hardships, it is this skirt she will wear most—if she wears a skirt at all. Should she refuse to abbreviate her petticoats, the trails will do the abbreviating for her—but in the process the traveller will find herself a loser in strength, and hardly a gainer in either looks or dignity. It will be found that to force several yards of trailing fabric through marsh, tangled undergrowth, and the indescribably tough meshes of interwoven scrub willow; to drag it through mud or snow in making ascent or descent; to find it flapping wet about one's knees, catching and pulling one back, impaling one on jagged saplings or sharp stones; to be in a moment of danger on a moving talus-slope or rope ladder, and find one's self climbing up the inside of one's skirt, is to understand why the modern man, the pioneer and way-breaker, no longer wears the toga or even the cloak of the cavalier.

Women are so used to the inconvenient mode of dress (which only the compensating luxuries of civilisation render bearable) they are apt not to realise how, under



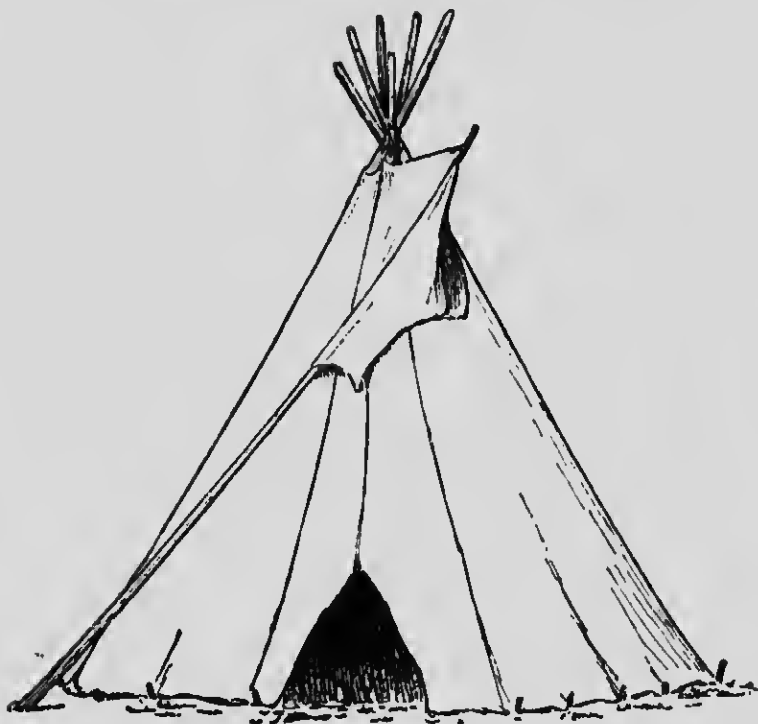
primitive conditions, the absurdity of our customary clothes makes for fatigue and physical breakdown. In this connection one may say that most women—especially the young ones—will be better equipped for travel if they abjure the corset, and wear clothes the lightest and the fewest possible.

A great many women who hesitate to undertake difficult journeys could get through them with credit if they would not only have the dress rehearsal I advocate, but managed to get a little special physical training before starting away from home. The main thing is not to attempt too much at the start. Women who want to travel in out-of-the-way places might take a leaf out of the book of no less a person than Frithjof Nansen. With all his superb natural fitness, he spent years in training for his first northern journey. A woman feels humiliated if, going from her drawing-room on to the trail, she finds herself not so well able to stand the hardship as men who have roughed it all their lives.

With reference to diet, the astonishing thing is that if one can live the frontier life at all, one can for a while live on almost anything. The extraordinary interest of it, the fine air, the exercise, seem to make even delicate people more "fit." Some of us have watched ailing men and pampered women, dyspeptics, etc., washing down half-cooked flap-jacks and fat bacon, with strong and muddy black coffee, and have seen them apparently not a penny the worse for it. But the condition of their not being quickly worse and presently dead, is that they must literally sweat for their living. If a man or a woman exercises so much that the skin is active, practically the diet can be anything *for a time*. But many people do not

realise there is a time-limit placed upon impunity. In the Yukon you will now and then hear an old miner say that he must "go out" this winter, although every visible consideration would seem to call upon him to "stay in." "No," he will tell you, "I have been eating canned stuff for three years." Should you ask if he feels the beginning of any physical trouble, you will as likely as not be told that he is all right now, but has noticed that people can live without fresh food just about three years at a time, and no longer, at full vigour. The intelligent speculate about the time-limit and its laws, but they obey them. It seems to be proved beyond question that something of the nourishment has gone out of food that has been for some time hermetically sealed. Fresh meat has long been held to be a check upon scurvy; but what is not fully appreciated is that vegetables and fruits, as well as meats, deteriorate in tins and cases, though perhaps to a lesser extent in jars. It is as though, shut up there in the dark, the virtue goes out of the food. An old fellow once said to me, "You see, it was light made them peas grow—made them any good for our growing. The trouble with all canned stuff is that you can't can sunlight."

It is notorious that dried fruits and vegetables retain a larger proportion of their feeding power—a matter of special importance to the weaker sex, who, if called upon in time of stress to carry their own provisions, may recall the almost incredible feats of endurance performed by the Alpinist by the aid of a handful of raisins and a piece of chocolate.



### XI.—CAMPS AND EXPEDITIONS

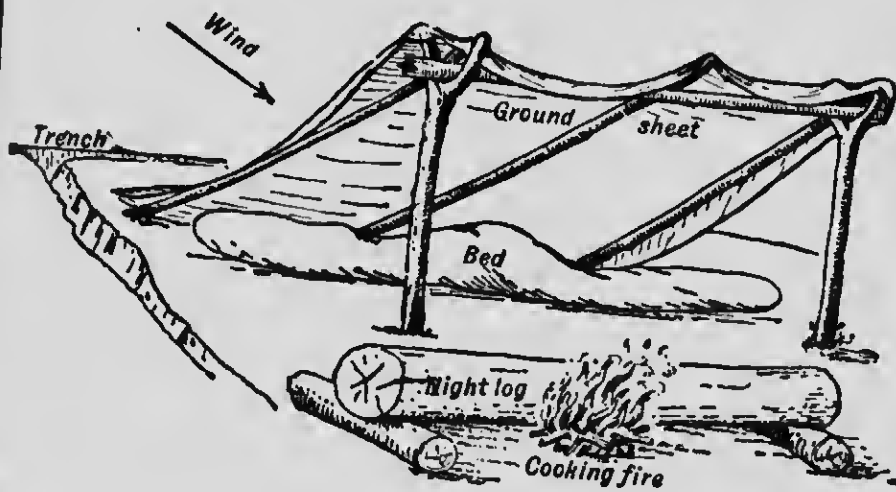
In selecting camp site, look for water, pasture, fuel, and shelter, on gentle slope not liable to flood. Kill off any dangerous insects or reptiles on site. In dry countries where there is rarely good pasture near water, march after supper to grass before making camp.

NOTE. By Evelyn French, L.F.—On camping, consider the animals first, the men afterwards. Pasture horses on farther side of camp, so that should they break back, they will be heard. For the same reason, prefer the far bank to the near bank of a river.

If camped on dry water-course near a pool, pasture horses away from the river timber, which is likely to be full of mosquitoes. Don't camp to leeward of mosquito-haunted swamps. In hot drought camp well out on river sands, which, being too hot for ants by day, are free from ants at night. Leafage frequented by ants makes inferior bedding. In river camps, ware floods.

Local creeks may flush a river, which fills and subsides before the main annual flood. Keep livestock out of river flats. If the well is sunk in river, cover it with trap door, hinged up stream, so that flood will close it, keeping out silt and gravel. A clay pan should never be deepened, as in sandy country a puncture through clay layer will lose all water.

*Bedding Down.*—For shelter from wind, look for spot where leaves and dust lie undisturbed under lee of rock, bush, or bank, however low. Failing that, make wind-break of saddle, brushwood, or canvas. Avoid lee of tree trunk, because draught sweeps ground bald. For



cold, select highest point in camp; for rain, any shelter except against tree trunk. Kneeling with face to rock or bank exposes one least.

*Cover.*—Sand, dry snow, fern, grass or heather, piled over the body, make warm bed. Those who use brown paper in bedding should soak and dry it to stop the crackling.

The pack cover or tent used for wet or mosquito country should be of the lightest, strongest, least bulky, easiest dried, waterproof material—try balloon silk or light “union silk,” from a yacht sailmaker. A pack cover used as a lean-to shelter, with the fire in front, reflects the heat on to one’s bed, and is warmer than tent.

*Tent.*—Simplest form A tent 8 ft. by 8 ft. with two poles 3 ft. 6 in. long, pointed at bottom, notched at top; four corner pegs through eyes in canvas; ridge rope sewed to ridge, extending 8 feet beyond each end to two short end-pegs.

*Pitching Tents.*—In sand dig trench, plant tent-pegs in bottom, then fill. If sand very loose use second peg with a half-hitch round it in trench. Before rain slacken the guys. Before wind, weight the flaps with stones. For wet cold, sink a hole inside tent, and fill with coals from camp fire. As fumes are dangerous, leave fly partly open. Thorn bush or entanglements outside tents will discourage thieving.

*Defence.*—Men living in tents or buildings sleep heavily, hear and see nothing, and, if aroused suddenly, are embarrassed by the darkness, at the mercy of marauders or enemies, their exact location being known. Outdoor men are difficult for an enemy to locate, sleep healthily, rouse instantly, can see everything against skyline, and have weapons ready.

In hostile country avoid camping on ground which can be overlooked, or where one can be seen against the skyline. If camp is likely to be attacked, leave supper fire burning bright, and bed down at a safe distance, on defensible ground. A picket to watch camp fire may capture prisoners whose information is of use. If you don't want to be seen, don't make fire. A lighted match can be seen one mile off. Fireflies are sometimes mistaken for men's lights. If a savage enemy attacks, he will usually come up-wind, so don't turn grazing stock down-wind, lest they be stampeded. As those who look at the fire are blinded when they turn to see into the night, at least one man in camp should remain with back to fire, so that his eyes remain focussed for darkness. Should tent be used, any candle or lantern should be placed in a bucket, lest men's shadows, thrown on canvas, guide enemy's fire. Where bell tents are used, one man for each tent should be told off, whose duty at the first alarm is to carry butt of tent pole out of the door, so dropping the canvas out of sight.

**STOCKADE.**—The form of camp needing smallest numbers for defence is a square or oblong, with two bastions at diagonally opposite corners, from which the garrison can cover all the flanks. One bastion should cover the way to water. Raze all buildings, bush, etc. which would give cover for attack. Devote available time to strengthening bastions, to entanglements and staked pits in front of defences, to make hollows within defences lined with hides and filled with water for garrison. To secure wakefulness of native sentries, give each a pile of so many stones to carry to next sentry post within period of his watch. If there is fear of country being fired by enemy, burn a fireguard round position.

Outposts are useful to send in news of pending attack, or to fire alarm shots arousing main garrison. It is often wiser to appear off guard, and encourage enemy to assault, withhold firing until enemy is exposed, then fire low. To demoralise savages, fire rockets at them.

The following defences are bullet-proof: Wrought iron or steel  $\frac{1}{4}$  in. to  $\frac{1}{2}$  in.; shingle 6 in.; brick 9 in.; coal 18 in.; sand between boards, for window barricade, 18 in.; earth or sand 36 in.; timber, cross-grain, 27 in.; snow 8 ft.

**SCHERM AND LAAGER.** By Major P. W. Forbes, L.F. *Defence and Scherms.*—In all savage warfare, and more especially when the enemy is not armed with firearms, but with weapons that are only of use in hand-to-hand fighting, such as stabbing assegais, clubs, knobkerries, etc., it is very necessary to have some sort of defensive work to stop a surprise or a rush.

The simplest, easiest, and quickest to make, is a bush fence, though if possible, put round the camp. Cut trees with good thick heads, and fairly long stems. Fell them so as to fall away from where the camp is to be, and pull them in one by one by the stem. A fence 7 ft. or 8 ft. high can be made in a very few minutes in this way. A rope or chain passed through the branches strengthens the scherm very much, and makes it difficult for the enemy to pull the branches out. In parts of Africa where lions or hyenas are plentiful, the natives, even in times of peace, never camp without some protection of this sort. In most parts of Africa the mimosa or the wacht-en-beetje (wait-a-bit) thorn can be found, and are the most serviceable for this purpose.

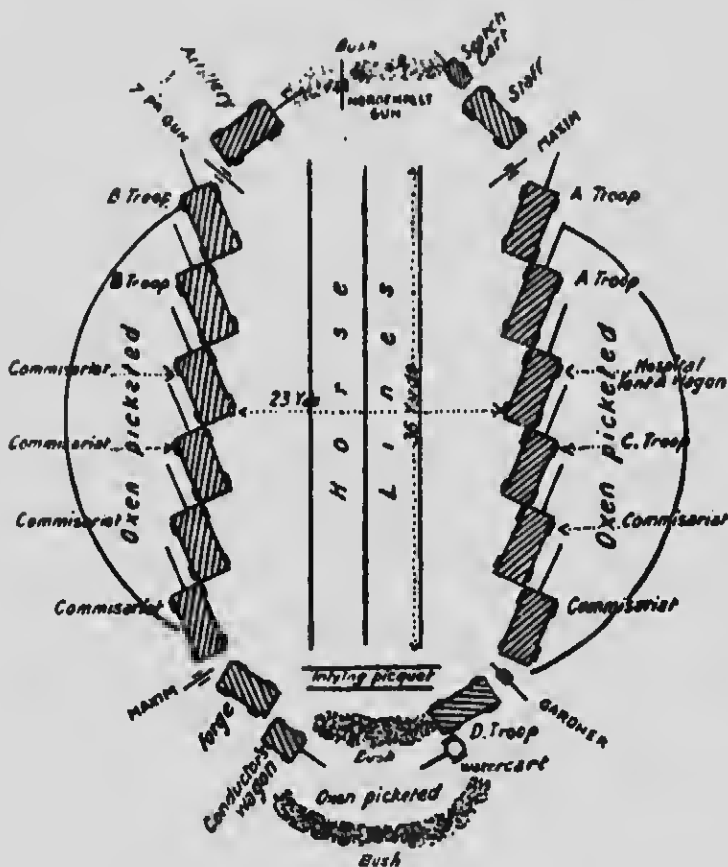
*Laager.*—When travelling with waggons, if they are

of a suitable sort—and I know of none more suitable than the South African buck waggon, *i.e.* a waggon without a tent, which is 18 ft. to 22 ft. long—a laager can be made in a very few minutes if the native drivers and leaders have been told what to do; and they should always be trained before starting on a military expedition, or even on one through country supposed to be peaceful, but where there may always be a chance of trouble with natives or wild animals.

The form I adopted in the Matabele war of 1893, and which I found very useful, and which could be constructed in three or four minutes, is shown in the diagram. This can only be done in fairly open country, or in scrub which the oxen can pull the waggons through. In 1893 we marched in two parallel columns, about fifty yards apart. On the word being given to form laager, the leading waggon of each column inclined slightly inwards and halted, and the oxen were immediately taken out on the trek chain. The other waggons, with the exception of the last in each column, inclined slightly outwards, the leading one stopping when the buck rail on the right was at such a distance from the tailboard of the one that inclined inwards as would allow room for a gun. The other waggons followed in succession, each one stopping when the front of the buck rail was as nearly as possible touching the back of the buck rail of the waggon in front. The oxen were taken out of each waggon on the trek tow as it came into position, and led round so as to come up again close to the front of the line of waggons, when they were unyoked and tied to the chain, which was fastened at each end to an iron post driven into the ground. The oxen were placed as close as possible to the two sides



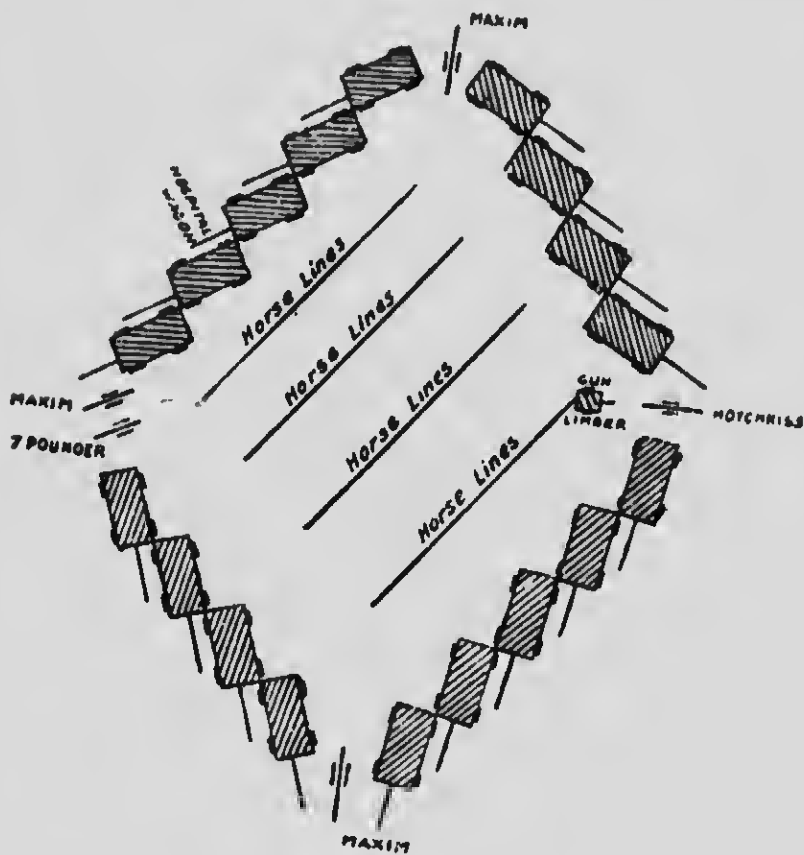
and rear face of the laager, and made a very good obstacle. If time allowed, and bush was handy, a brush screen was put outside the oxen.



The laager formed in this way held all the horses of the column, 242, which were fastened to three picketing lines down the centre of the laager, and all the men, whites and natives, about 300.

rem  
load  
up  
reme

Another form of laager, a diamond-shaped one, is shown. This is also a good form, but I prefer the former. In forming waggon laagers, it must always be



remembered that thirty or forty men can lift even a loaded waggon a few feet into its place, if not drawn up quite accurately, and much time can be saved by remembering this fact. It is also advisable to carry a

short length of chain on each waggon to fasten the buck rails of the two adjoining waggons together, to obviate any attempt on the part of the enemy to make an opening in the laager. Bush should be pulled under each waggon that is not protected by the oxen picketed outside.

*Fuel.* By Evelyn French, L.F.—Always stock sufficient fuel for the night, lest men searching for it in the dark should be bitten or attacked by dangerous insects, reptiles, or animals. In country where ants are bad, avoid red gum, wattle, and other trees where they feed, and don't leave water uncovered. Hang meat beyond reach of dogs.

*Snakes* dislike crossing a hair rope, a streak of ashes, or a rough plank. They avoid smell of a pipe, which, laid beside sleeper, protects him. Any of these safeguards will prevent snakes seeking the warmth of one's blankets. If fuel must be gathered after sundown, wear gloves. In the worst South American districts a hammock is used, slung on hair rope. A waterproof awning, with mosquito curtains drawn round hammock, will discourage both snakes and mosquitoes. Poisonous snakes leave punctures of two small fangs. Harmless snakes leave mark of a bite, with rows of teeth.

*Mosquitoes* in tropics carry malarial diseases, and in temperate and polar regions cause swelling behind ears, with feverish condition, due to blood poisoning. Men lost, exhausted, or otherwise unable to defend themselves, may be totally blinded by inflammation of eyelids from mosquito bites.

*The Arctic Mosquito.*—Thin brown Stockholm tar rubbed on the face and hands is the best armour against these pests. This is what the Laps use, and they have given it a 4,000 years' test. (Hyne.)

Carry the tar in a little bottle, apply with the cork, and spread with the palm of the hand. In camp a smudge-fire of damp fuel to windward forms effective defence both for men and horses. Men not inured to mosquitoes may value an ointment carried in 3-oz. metal whisky flask:  $\frac{1}{2}$  oz. oil pennyroyal, 1 oz. castor oil,  $1\frac{1}{2}$  oz. oil pine tar. A drop behind each ear and on each cheek makes smell enough to choke off the average mosquito, and the supply should last a season. Substitutes are mustard oil and oil of cloves.

Too much attention cannot be paid to effective mosquito veils and curtains. When sleeping out, take a sapling, bent into a hoop, with both ends in ground, to carry mosquito curtains, the edges of which are tucked under blankets; with tents, an inner tent of mosquito bar slung from same pole, with edges tucked under bed. After getting inside, a lighted candle will kill off remaining mosquitoes, and disclose any hole through which they find entry. A square rot-proof ant-proof netting, with strong calico top, is most comfortable form.

*Military Camp Sanitation.*—Subject to military necessities, site is selected by health officer. If camp on running water, he marks off space (blue flags) for watering animals, space up-stream (white flags) for watering men, space down-stream (red flags) for washing. A guard on watering place, and patrols up-stream, should have full powers to prevent any form of pollution. If camp on standing water, a fence or guard must enforce that all watering be with buckets, tins, ground sheets, water carts, or other conveyance, and that no water spilled after use, latrines, or camp refuse, be permitted on ground draining towards water hole (see Water

Section). Camp above, not below, any village or settlement.

A female fly can produce 200,000 young flies in three weeks, and they carry infection to men and food. To avert infection, sick men and cooks should be camped farthest to windward: the men next to windward, the horse lines close by to leeward of the men (horses heading to leeward); slaughter ground, sick horses, latrines, dead animals, and all offal far to leeward. Latrines must be deep, narrow, earthed twice daily, and when filled, marked with permanent signs, so that ground may never be used for camping. Urinal trenches nearer tents must be earthed and disinfected daily.

Meat newly butchered should be hung in wind and sun, away from slaughter-place, then, when surface is dry, carefully covered against flies. All refuse, offal, and litter should be burned, buried, or taken far to leeward. For dead animals, make fire inside carcase.

Camps being pitched, when possible on dry slopes, avoiding clay or newly ploughed ground; where rainstorms are prevalent, a trench should be dug round each tent, with channel to lead off water. If trenches smell, trace and remove the cause and disinfect quickly.

*Heat.*—Roof of tent or building should be in two or more layers, with free air-space between. For permanent building, copy conditions of a cave with heavy earth roof. Walls should be canvas, oiled paper, or slats set in panels, and the panels removable, adjusted to shut out sun and admit wind. Avoid cushions and draperies, which hold microbes. Sanitation requires extreme care.

*Ants.*—Set legs of furniture in pots of water, each with a drop of petroleum. Line all boxes with metal.

*Breaking Camp.*—Quench fires, and search ground for mislaid goods before leaving.

## XII.—SELF-DEFENCE

BY CAPT. GRAHAM HOPE, LATE R.A., L.F.

One of the most important rules governing the action of a scout in time of war lays down that it is his duty to see without being seen, and to get back alive to tell what he has seen. In other words, although he should be, and usually is, a good fighting man, he must never fight if he can possibly avoid doing so. Needless to say, perhaps this rule applies equally strongly in peace time. It is the duty no less of every able-bodied man to be able to defend himself, though it must not be inferred from this that he must go about looking for trouble. No genuine fighting man ever acts in this foolish manner. Indeed, as is well known, the more a man knows about fighting and the more skilful he is, the less inclined is he for a "scrap" unless absolutely forced into it.

But the necessity is bound to occur sometimes. The possibility of being attacked by roughs, burglars, foot-pads, or even by some pugnacious individual not belonging to the above classes, is never very far off, and so I have written the following notes with a view to showing how commonplace articles and means may be used for disabling an adversary, and, it may be, thus saving oneself from very serious and perhaps fatal injury.

Possibly no feature of everyday life looks more peaceful

than an umbrella. Short of a real sword, however, it would be hard to find a more efficient weapon than an umbrella wielded by a skilful hand, especially when built on a fine steel tube, instead of a stick. Indeed, it is almost too deadly a weapon. But when one's life and limbs are in danger, one cannot mince matters, and the following is the method of using it, to meet the rushing attack usually employed by roughs.

Grasp it firmly with the ends of the ribs and cover in the hand, as it cannot slip if held thus, and when the hooligan charges in at you, meet him with a thrust in the throat or middle of the waistcoat, the point below the breast bone. If you hold your improvised weapon firmly and straight, no second thrust will be needed, and it is improbable that he will be in a condition to fight again for some time afterwards. Do not extend your arm till he is within distance, as a thrust is the last form of attack he will expect, and it will then find him totally unprepared for it, as he will not see it coming until too late to avoid it. Avoid attacking the face except as a last resort, as it is too deadly a method. A thrust with an umbrella in the eye of a charging rough would kill him far more certainly than a revolver bullet. As regards defence, although an umbrella breaks readily used for striking, a fatal mistake in its use—its ribs and covering form a cushion, which gives it great powers of resistance against a blow from a stick or bludgeon.

The same rules apply to the use of an ordinary walking stick, though it is not quite so efficient, being liable to slip. In addition, a stick, if a heavy one, can be used for striking, though it should still be held by the handle, and not by the lower end for this purpose. It is quite effective enough when used thus, and less likely to slip.

## SELF-DEFENCE

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I do not recommend this method, as it is too uncertain and is not an unknown factor for the ordinary rough, as is the thrust, but if you must use it, avoid striking at the head. It is practically a physical impossibility to disable a man by a blow over the head with an ordinary walking stick.

There are, however, three very vulnerable points not far off it, the outside of upper arm from elbow to shoulder, the point of the shoulder, and the collar-bone. The first two are good points of attack, but not nearly so good as the third, which is, moreover, the easiest to reach. A very moderately smart blow upon it produces an absolutely paralysing effect, both from the sickening pain it causes and for anatomical reasons. To obtain the full effect, hold the stick tightly, so that when the blow falls your hand may be about half-way down your assailant's body, with the stick held tightly in it, at right angles, or nearly so, to the forearm, and aim an inch or so away from the junction of neck and shoulder, where the collar-bone is most prominent. By holding the stick in the above manner, you can make certain of reaching the pad of muscle behind it. In attacking with stick or umbrella, stand as for sword play, *i.e.* the right shoulder well forward, head back, with the left foot firm, turned to the left, right foot straight to the front, and the knee slightly bent. Present in tierce, *i.e.* back of the hand up, as the grip is safer that way, and less likely to slip, and let your hand be about on a level with your shoulder. Never thrust upwards except as advised in the next paragraph.

In addition to the above methods, a straight stiff stick, such as a ground ash, without a crook, is very useful in a



scrimmage when used thus: Stand square, and grasp the stick with both hands about a half a yard apart, and jab upwards right and left with the ends, always aiming for your assailant's lower ribs or the stomach above the belt. Hump your shoulders up well, to protect your neck and jawbone.

As regards defence pure and simple, if you have time, get your coat off, and, holding it by the collar, wrap it once round your wrist, twice for a long overcoat, and use it as a shield, and to disconcert your adversary by waving it in his face. Bear this method in mind carefully, as it is in the highest degree effective against any conceivable form of attack. A man armed with an overcoat and umbrella, or good stiff walking stick, is a match for any two roughs who adopt rushing tactics.

If heavy bludgeons are used against you, wrap your coat several times round your left arm, and use the padded forearm for guarding. The result will be painful, but will save your head. As the hooligan strikes, thrust under your guard at him. To guard against a belt, either spring, throw up the loose coat to meet it, or else catch it on your stick, high up and well away from you. In guarding with a stick or umbrella, keep the point well below the handle, so that your opponent's weapon may not slide down on to your unprotected fingers.

For a knife attack, pad your arm as above. An ordinary rough usually holds his knife point down, and attempts to come to close quarters, corps-à-corps, and stab down. If he does this, hold your guard high, and as he closes, drive your fist or stick into the pit of his stomach, from under it. For this purpose, stand as for boxing, left foot in front, catch his stab on your padded

forearm, if he succeeds in getting close enough to deliver it.

Above all things, do not despise the humblest objects as weapons, and remember that if you can disconcert your adversary's vision or attention for a single second, you have gained an advantage that should make victory very nearly certain for you. Thus for a burglar in a bedroom, use first a pillow or coverlet. This sounds almost ludicrous, I know, but such an unexpected, if harmless, onslaught will disconcert him long enough to follow up your making a much more deadly attack with a chair or the weapon you keep by your bed, if you follow such a practice. Apropos of this, a shillelagh or bludgeon of some kind is a far more efficient weapon in the hand of a man just aroused from deep sleep than a revolver.

If attacked by a mob, run for all you are worth. For one reason, it is not courage, but folly, under most circumstances, for a single man to stand up to a crowd if he can get away. For another, a crowd will soon spread out, and, if you use your head, and know how to fight, you will probably soon have an opportunity of making one or two of your assailants very sorry for themselves, and of escaping again afterwards.

I have not mentioned firearms so far, but there are one or two hints which must not be forgotten as regards facing a man armed with a pistol. I may mention that they do not apply to countries like America, where the use of the revolver may be said to be a fine art, but only to English and European roughs. If a man begins by raising his pistol above his head, and then brings it down, chance his hitting you. You can do so fairly safely. He may be a good target-shot, but obviously does not understand the art of using his weapon against a human

enemy. The same applies to a man who aims a revolver at your head from a distance. Revolvers always throw up, and his bullet is morally certain to miss you.

It is worth noticing that a revolver is far more efficient in the hands of the vast majority of mankind when used as a club, for which purpose it should never be held by the barrel, but always by the butt as if for firing, the forefinger of the hand through the trigger guard.

But the man who has his revolver in action as soon as it reaches his hip, or who points it at your stomach, without troubling to look along the sight, is dangerous, and your wisest move is to accept the inevitable. Your only chance consists in throwing something, a coat or such like for choice, into his face, a procedure which should always be adopted, if possible, against a man with a revolver. Then rush in, and adopt the general tactics I have recommended. Such men, however, are not likely to be found among the roughs of cities.

I would conclude by four all-important pieces of general advice. First, unless attacking the collar-bone or throat, as mentioned above, invariably choose as your object the lower ribs or "mark," *i.e.* the unprotected point of the stomach, where the ribs divide below the breastbone. This rule is specially useful when using your fists in rough-and-tumble. Never hit the eyes or nose, etc., if you want to end a fight quickly, and never grapple a man unless you are a powerful and skilful wrestler. Secondly, make yourself as efficient as possible at boxing, ju-jitsu, or sword-play, at all three, if possible. Thirdly, never fight if you can possibly settle disputes by peaceful methods; but, fourthly, if a fight is unavoidably forced upon you, do your utmost to make

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the individual who began the trouble very sorry indeed for having interfered with you.

*Books.*—Hancock's "Japanese Physical Training: Jiu-Jitsu."

Part I. of this volume has been revised with reference to Galton's "Art of Travel" (John Murray); "Camp and Trail," Stewart Edward White, and "Hints to Travellers," a technical volume for explorers by the Royal Geographical Society.

Two societies for training boys in morale; the British Boy Scouts, founded by General Baden-Powell, and the North American Birch Bark Roll, founded by Ernest Thompson Seton, have valuable literature and practical work.

See also "The Camper's Handbook," Holding; the "Book of Camping and Woodcraft," by Horace Kephart; "Trail and Camp Fire," and "Travel and Big Game."

**NOTE.**—The training which makes a Frontiersman may be commenced in England, and young men taking a course of instruction at the Imperial School of Colonial Instruction at Shepperton-on-Thames may be safely regarded as wage-earning from the outset of their colonial career. This school was founded, and is conducted by, Captain Cecil E. Morgan and Mr. Evelyn French, members of the Legion who are contributors to this volume.

*PART II*  
*MEANS OF TRAVEL*

INTRODUCTION

BY CAPT. CECIL E. MORGAN, CHIEF TRANSPORT  
OFFICER, L.F.

THE Transport of the Army is conducted entirely by the Army Service Corps, the personnel of which is in time of peace sufficient to cope with the demand upon it. The actual vehicles and stock of horses, and other draft animals at its command, are, however, never adequate to meet any sudden call of manœuvres or war: and this shortage is made up by an admirable system of permanent contract with large employers of transport, who, for a retaining fee, hold their stock at the disposal of the War Office. When these contracts are pressed into service the staff of the Army Service Corps is taxed to the uttermost to find trained officers, drivers, and conductors.

It is to meet this demand that the Council of the Legion of Frontiersmen have ordered the organisation of the Headquarters Transport, and members of the Legion with a knowledge of transport and its methods may rest assured when the next big war comes of lots

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of work in this direction, and, for the credit of the force, must strain every effort to be well up in the details of their work.

Every Frontiersman has at some time or other been obliged to depend upon his own unaided efforts at some kind of transport; and as it is only by specialising that one gets perfect results, my advice to him is to confine himself so far as possible to the transport he has been accustomed to, so becoming an expert whose services will be in demand when the occasion arises. Organisation is imperative for successful operations with transport, and transport, however good without it, is a body without a head, the chaotic existence of which will inevitably end in disaster.

Commandants and their transport officers should therefore practise transport organisation on paper, even if they have not the actual small transport at their disposal. Practise working out weights of rations, forage, and the like. It will be found to be an interesting game, and the practice obtained will be invaluable when the time of need arises.

Supposing the Commandant of, say, Sheffield, tells his transport officer that he has received orders to move the Command to Manchester, and also supply transport for 1,000 men and 1,000 horses, with six days' rations besides, the Command to move on 'Thursday,' the order being given on Monday. The transport officer must then turn to his list of breweries and others from whom he can get waggons, and notify them with deliver these when required. He must consult with the supply officer, who will supply him with the weight to enable him to order his waggons, although with practice he will know them himself. To this he will

add the weights of forage, etc., and the waggons, coal for traction, petrol for motors, etc.

It will be remembered that during the Nile Expeditions the Government required 600 French Canadian voyageurs for river transport work. In all the tropical campaigns carriers have been employed, and indeed there is no type of transport animal or means of conveyance afloat or ashore which may not be utilised for military purposes. Hence the very careful tabulation by the Legion of Frontiersmen of the services for which its members have been trained. It is our hope that should the Government have use for any type of transport not included in the machinery of the Army Service Corps we may have the privilege of sending a group of experts to assist that Department in the field.

Many Frontiersmen feel strongly that the pony-herd and pack-transport methods will greatly add to the mobility of Legion units when on active service. With this end in view, any training which can be undertaken by Commands in the actual handling of pack animals will be of especial value.

## I.—HORSE

INTRODUCTION. By A. W. V. Crawley, L.F.

I take it that the real usefulness of the pick of our Frontiersmen in any war will be their rapid movement through rough or smooth country alike; and this cannot be obtained by any other method than that of the frontier, which is by use of pack horses and, whenever possible, of a remount herd.

*Horsemastership.*—The differences between civilised and range horsemastership need no explaining to Frontiersmen. The English methods, co-extensive with civilisation, and adopted by European armies, have a copious literature. The methods of the frontier have little or none, but we may compare our local work in various regions with the authorised system.

These notes have been revised by range horsemen, representing the Hungarian, Russian, and Mongolian steppes; the Australasian and South African plains, the Pampas, llanos, and North American stock range.

Civilised horsemanship deals with the indoor horse, who lives in a house, has servants, is delicate and finely bred, with high courage.

Range horsemanship deals with the outdoor horse, raised wild, broken by cheap, cruel methods, but showing no human touch save that of the leader, and notable for endurance.

Civilised horsemanship deals with a horse short of scent and hearing, but using the eyes more, and so needing constant control with bit and rein.

Range horsemanship deals with a horse with sight long enough to guide the feet, while scent and hearing are far beyond human range. The horse steers on a course given by the rider, with a simple bit, and single slack rein.

Civilised horsemanship attaches importance to lightness of load for running or jumping. The light saddle, slippery for safe falling at high speed, makes it easier to fall off than to ride, so that equitation becomes an art taught in schools.

Range horsemanship requires sustained travel and quick turning. Importance is attached to distribution



rather than to weight of load. As it is easier for a man to carry two buckets of water than one, so the range saddle, regardless of weight, is built for weight distribution, covering the largest possible bearing surface on the true ribs, eighth to sixteenth, while a high arch connecting the panels leaves a free channel of air along the spine. The rough-grained or greasy seat makes it harder to fall off than to ride, so that riding is a habit rather than an art.

Frontiersmen prefer two or more cheap ponies to one costly charger. The ponies are pastured on herd, under sufficient guard, only those for immediate use being kept up and grain-fed on the lines. Range horsemanship, both in peace and war, uses wheeled vehicles only with the moving base of an expedition, the transport, away from the main camp, being with pack animals. Should horse-flesh be scarce, Frontiersmen would seek leave to stampede the enemy's stock for their own use. Where each man has several ponies, there is little wastage except from actual fighting, and the cost is less than that of a single charger frequently replaced.

The notes hereunder do not apply to travel with English equipment. Consulted on English horsemanship, Lieut.-General R. S. S. Baden-Powell has kindly furnished the following corrective note:

"Letting men sit side-saddle on a tired horse is the easiest way of giving it a sore back. At walking gait it is far better for the rider to dismount and walk. The loup or lobbing-canter is the easiest pace for horse and man. Except a continuous walk, the round trot is the most tiring. Frequent cantering and walking alternately—the rider then going on foot—is the way to get over the ground in going a long distance. I believe sugar or

molasses to be better than meal in the water, and in giving gruel to a tired horse."

*Selection.*—When horse and rider live together, the servant, like a mirror, reflects his master's qualities. To courage, energy, cheerfulness, and kindness, a horse responds with confidence, endurance, content, and love. On active service the gentlest, best nourished, best tended horse is the one whose master may be trusted with long-distance riding. The man need not be specially robust, but must have high nervous development, strength of character, tenacity of will. The horse should be sound, mature, in hard condition, and a glutton.

*The Main Difficulty.*—The horse is only as strong as his weakest part, and when he fails the fore-limbs break down first. Pay special attention to the shoeing of the fore-feet, daily see that the frog is perfectly clean. When mud or clay has to be traversed, wash the pasterns carefully. Always walk down hills, and on steep descents dismount.

*Weight.*—The conditions are exactly the reverse to those for running and jumping. The man's weight counts for less than his perfect ease, and a free poise of the body from the waist upwards. It is doubtful if any artificial system of riding relieves a horse; and natural riders, sitting skin-tight to the saddle, at all gaits, are most successful in endurance work.

*Saddle.*—The greatest records have been made as follows: Paschkov used the Cossack pattern, ; Rose the Mexican, 40 lb.; Kit Carson the American stock saddle, 40 lb. These distribute the load over four square feet of horse, and seem better for endurance work than the English pattern, which concentrates the burden on a few square inches. No work done with light saddles

compares with the Californian record of four men without remounts—600 miles in 6 days.

NOTE. By Evelyn French, L.F.—The saddle should be of any weight-distributing type, with the leather inside outwards, because a rough surface is needed to give a strong grip. To improve the grip the heavier English and Australasian saddles can be modified so that the padding is removed, making a hollow to fit the leg (E. ff.).

A useful Queensland practice is to use a crash towel or a cloth under the saddle. It ventilates freely and is easily washed. The blanket (W. America) is better than a numnah, as more readily adapted to the relief of any part of the back which shows signs of inflammation. The blanket, as kept clean by a sweat-cloth, is bedding for the rider, and saves the carrying of extra weight. Blanket and sweat-cloth should be lifted clear of the withers, leaving a channel of air along the spine.

On the trail, except in military work, one may vary the proceedings by reading a book, smoking, feeding, singing, or playing some musical instrument, if only to keep one's hands from fretting with the reins. If legs get stiff, dismount and walk.

*Gait.*—A horse knows more about gait than any man. He may have been punished for trotting, tripling, or ambling, or worried out of a good running walk into a bad canter. For stumbling never punish. Leave him alone. A horse can see where to put his feet, which the man cannot. Riding with slack rein will cure and sometimes prevent stumbling, and the bit should be of the gentlest pattern. Walk the first mile to supple the horse, the last mile to cool him. Let him choose between trail and turf. Forget everything learnt in riding-schools, and be comfortable as the best way to ease your

horse. Only when the horse is fagged or frightened take him well in hand to cheer and soothe him. Punish yourself rather than hurt him, for you are more likely to deserve any blame than he is. Above all things, be merciful.

*Endurance.*—Without exhaustion a saddle-horse has been known to cover 132 statute miles in a day (R. N.W. Mounted Police), or 136 miles in 26 hours (Australia). Short distances may be made at high speed. For the day's work, an average horse can keep up an average of five miles an hour, and this with most horses is the best speed for sustained travel. For 1,000 miles and upwards, or a month's work, few horses can average more than 21 miles a day without breaking down in the fore-limbs. For sustained work at high speed more than one horse is needed, and the cowboy, working 8 months at 50 miles a day, requires six horses, three ridden each day, with one animal in reserve. A man's endurance is about two and a half times that of a horse.

*Sores.*—On unsaddling always examine the back and line of girth for hair turned or rubbed, or skin inflamed. Apply black grease, which will mark the sweat-cloth or blanket, or girth at exact spot. Then on resaddling, fold the blanket with an extra thickness alongside the marked spot to relieve it of pressure, or on girth make a pad with rag or grass to lift it clear. Any kind of saddle with old or misfitted pads will injure a horse. On expeditions, a man detected in carelessness should be severely punished. Where horses are overworked and starved, sore backs are inevitable. Remedies : Urine ; 1 oz. gall in 2 oz. vinegar ; ointment of puff-ball fungus and grease ; ointment of gunpowder and lard ; balsam of myrrh diluted ; cold salt water applied while skin is hot. The copper ointment

called gall cure is the strongest of all, but so rapid that sometimes scab falls off before wound heals.

*Feed.*—Having a small stomach, the horse needs frequent meals, and under the heavy strain of long-distance riding should have a varied and luxurious diet. Sugar or molasses are of the greatest value, especially if given in the drinking water. In moderation give salt, carrots, apples, and other delicacies when they can be had. The main danger is that of scouring, and green food of any unaccustomed kind is perilous. Watering should be frequent and slight; gruel and oatmeal water given whenever possible. Avoid stalling the horse with a surfeit of grain, but rather cut down the amount to make him eager, and divide the ration into several feeds. Don't water after feeding grain. However hot, a horse may be watered safely when standing knee-deep in pool or stream, provided he is kept going afterwards and at moderate pace.

*Food Value.*—10 lb. hay = 2 lb. oil cake; 2½ lb. peas or beans; 4 lb. vetch, alfalfa; 5 lb. oats, rye, wheat, or bran; 6 lb. barley, Indian corn, pea-straw; 8 lb. clover; 28 lb. potatoes; 35 lb. carrots, cabbage; 40 lb. old potatoes; 52 lb. wheat- or barley-straw; 55 lb. oat-straw; 60 lb. turnips.

*Rest.*—In unsaddling for halts, give him the chance to take a dust bath, and to stale without being hurried. Keep the sheath clean. Never let a resting horse be without hay or grass. A little grooming is needed to keep the pores of the skin free for perspiration. Whisky or any form of alcohol is most valuable to rub on the hot skin after unsaddling. Its rapid evaporation cools the skin, so that water and grain may be safely given even in short halts. In cold and wet weather.

travel rather than let a horse stand shivering. In great heat travel at night, but remember that the natural hours for sleep, 1 to 4 a.m., should be allowed for rest. Let a horse doze on the trail, provided he keeps his gait, and man and horse are all the better for occasional spells of sleep on a long march.

*Overriding.*—If a tenderfoot allows his horse no chance to stale, apply sudden shock of cold water over loins, also over the tenderfoot.

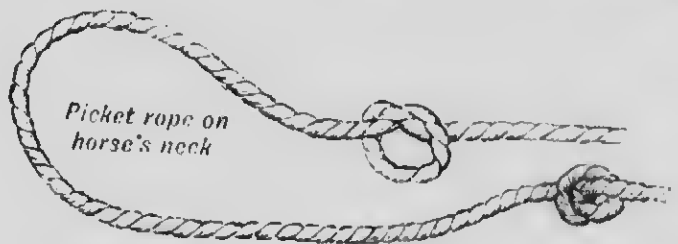
*Colic, swelling.*—One span forward from hip bone, and one span down, lance with a packing needle.

*Cuts.*—Use axle grease.

*Scouring.*—Dose of salt water.

*Greasy Heels.*—Cracked heels. Wash clean with soft soap, and keep in axle grease.

*Horse shoes* for cold shoeing needed on trips, away from supplies. No. 4 is the average size. For fore shoes, avoid shoeing too long or too narrow at heel. (By E. ff.)



To tie a horse, make him fast to a supple bush or bough, or tie head to tail. For the latter, pass rope across the hair of tail, bend the hair across it, then across the doubled portion make a half-hitch with stopper. Horses should be trained to stand when rein is thrown to the ground. To train, give a horse something to drag under these conditions. Be extremely

careful not to picket horse with a slip-knot round head. Picket rope is only used where no bushes will tangle horse. A very small peg driven upright will hold horse if a swivel loop enables him to walk round stake without coiling rope. See to horses on picket before sleeping. (By E. ff.)

Where a pack animal is needed, travel with three horses, riding them by turns. They work best in company. At night stake one of them, preferring a mare, or hobble and use a bell.

If you cross rivers, camp on the far side, as security against their breaking back. On any ground, pasture horses beyond the camp, so that you will hear them if they break back. (By E. ff.)

Where a man climbs without his hands, a horse can follow. Up to 120 lb. cargo, a pack horse keeps pace with a mounted man, swims rivers, crosses swamp, penetrates bush, climbs mountains. In war, unlike a vehicle, he is not conspicuous at a distance, leaves no special tracks, makes no noise at night to arouse an enemy.

Saddle and pack-blankets, and pack-cover, kept clean by sweat-cloths, make ample bedding.

HERDING AND YARDING. By Evelyn French, L.F.

*Causes of Stampede.*—A man on watch, riding into herd by mistake; lighting a pipe; clap of thunder; cattle very tired; rabbit running into herd; bush cattle calling or running into mob; blood on an injured animal; a saddled horse shaking (surcingle should always be worn). Man in camp should not get between fire and cattle, except mounted herders who sing. Cussedness.

If on night herd the animals are restive, the herders should sing to them continuously. If they stampede,

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the duty of herders is to turn them until they circle, and let them mill until they steady down.

If transport animals are fresh, an enclosure may be needed for catching them in the morning. The wildest horses will rarely touch the walls of any enclosure, even of calico, brushwood, or a single rope. Ropes held out from the ends of a waggon form a sufficient enclosure (corral, kraal), into which stock can be driven, but only smooth men, used to horses, should be trusted to rope or catch them, as a tenderfoot will stampede the bunch.

If molested by wild horses or cattle, away from shelter, stand still, facing them, and if near fire, flourish a brand. Wear nothing red when handling cattle.

Horses graze up-wind and up-slope, circling the slope if too steep, and they graze towards shelter, towards home. In good pasture, horses feed quickly and rest early; in scant feed, take all their time feeding. When not held by man, horses form families, strongest stallion getting biggest harem. Stallion ranges his family between water and grass, never leaving district unless compelled, holds his own pasture, and has special places to cast his droppings, and always close-herds his mares. Geldings have their own runs in families.

The habit of taking short sleeps when at leisure adds greatly to length of hours wherein one can do good work. In heat, travel early and late, but rest horses from 1 to 3.30 p.m.

*Books.*—“Origin of the Thoroughbred Horse,” Cassar-Ewart. Management: Works of Captain M. H. Hayes.

**EQUIPMENT OF HORSEMEN.** By the Editor.—In a civilised country outfit only for civilised life, and for the frontier buy kit on the frontier, where local equipment meets local conditions. England produces the best



hunting and fishing gear, ankle boots, underclothes, and leather.

*Protective Colouring.*—Nearly all animals present lines parallel to horizon, and where they live in short grass, the vertical lines of the legs are often neutralised by bands of dark colour. A man standing upright cuts the horizon line, and is therefore more easily seen, unless the colouring is cut at the waist. If the body is dressed in greenish khaki, it may pass for vegetation, if in dark blue, for shadow. From the waist downwards, an earthy or yellowish colour contrasted with the body may pass for earth bank. Where the man is mounted, the division of colouring at the waist carries out more or less the lines included by curve of horse's back. In all cases, broken colour is better than whole colour. Glittering metal is a deadly danger to the wearer, and should be covered or rusted. If horse has violently contrasted colours, such as piebald, a wash of permanganate of potash tones him down.

*Dress.*—The intention of dress being to protect the body, the sweat-absorbing underwear to avert chills must be woollen. To absorb heat rays before they reach the skin, this underwear should be yellow, orange, or red. Frontiersmen generally wear a 'kerchief round neck for comfort, and these colours give highest protective value against sunstroke, which strikes the upper end of the spine. For use at night as mosquito bar, the scarf should be of lightest China silk. As a sling or tourniquet for surgical first-aid, the size should be 26 inches square.

*Hat.*—The Stetson, or stiff-brimmed slouch, hat best guards the eyes from sun and storm. Pass a hootlace round front outside, through eyelets above the ears, and

tie hard round back of skull, to prevent hat blowing off, and to open free passage of air behind and over the head. If hat-brim gets too limp, cut holes round edge, and lace up with bootlace.

*Shirt.*—Coats and tunics have to be taken off for work; the split front and open wrists make them useless for warmth, and they provide the minimum of protection at a maximum weight and cost, the only redeeming feature being the pockets. If one has transport, a coat is a comfort in the evenings, otherwise give your coat to the poor, and wear a shirt, windproof for cold, of pale yellow cotton or silk for extreme heat, canvas for bush, or navy blue or khaki serge for ordinary climates. For cold, have small opening at throat, laced, with flap behind, and wrists to button close. For heat, have larger openings at wrists and throat, to allow air to flow round the body, but laced or buttoned for closing against chills. Buttoned breast pockets, belt pouches, and saddle wallets will carry all needed gear.

*Trousers.*—So far we have described the uniform of the Legion, which adds for leg gear the *band* pattern of riding dress, however bad, to save the members expense. The stock range men of many countries, who ride farther than civilised horsemen, wear, not breeches, but trousers; in dry climates, of beaver moleskin, or deer; in bleak climates, of warm cloth or buckskin. Try buckskin sewn on serge.

*Shaps.*—On lone trails where, if a leg is disabled, and one cannot mount, there is danger, wear the Spanish-American leg armour, shaps (chaparego) of heavy leather. They shield the legs from timber, rocks, thorn, kicks, bites, heat, cold, rain, snow, and give a strong grip in the saddle. They are removed for

serious work afoot, and useless for mounted rifles in war. Blanket or duffle shaps best for snow. Cut like a loose pair of trousers without seat or fly; the two leg pieces are each sewn to a half belt. The half belts are laced together in front, with buckle and strap behind. The seam is on outer side of leg, not sewn, but laced with a string of leather, or a row of snap buckles. Pockets on fronts, with flap and button.

*Boots.*—Excluding stiff-ankled patterns as useless, the writer commends the long boots made in East Europe, Western America, and all the Colonies. A long boot preserves, if supple, the natural strength of the ankle, which is impaired by any system of tight lacing, and secures for the leg defence, loose covering, and free ventilation. Heel must be of size to absolutely prevent foot getting through a stirrup. The counter which encloses the ball of the heel must be built up stiff and curved slightly over to prevent chafing. The light top-horse leather is best—should be long enough to kneel on, keeping the knees dry in camp work or fighting to prevent rheumatism. Kept well oiled, boots do not harden, and are so easy to put on that one may sleep in one's socks when on active service. Where one works afoot in ground which tears off sole (like burned veldt) a binding with wire (soda-water wire) will strengthen front welt round toes of any boot.

*Spurs.*—To be safely used without cruelty, the rowel must be blunted or removed. Western American rowels are made 2 inches and upwards in diameter, in order that the points may be very blunt. The spur then becomes something more than a mere badge of cavalier rank, being useful to gently encourage the horse, keep him alert and guide him in fine steering. Locked in

girth, it enables one to lie along horse's neck, reducing size of target when attacked; to open difficult gates, pick up objects from ground, and hold on with one leg. Rowel should be loose enough to rattle, so that horse, knowing his master's sound at night, will not be frightened when he wants to catch him. For silent work afoot, take spurs off. Strap should be broad for comfort.

*Belts.*—Any waist-belt to carry sheath knife and pouches. Bandoliers over shoulders disable the lungs, and are bad. Wear bandolier round waist, cut on curve of leather, loose over left hip, with revolver in holster down right thigh. In war men carry supply of ammunition on body, but extra bandoliers may be slung round neck of horse.

*In Belt Pouches.*—Compass, flint, burning glass, matches, cash, and papers, smoking materials, jack knife. One may have to call upon the last reserves of strength, and to rely on alcohol means collapse. Coca leaves, yerba maté, chocolate (except in hot weather, and for men liable to constipation) are the most compact stimulants.

*In Wallets.*—An emergency ration. Gall cure. Pocket medicine case and emergency dressing, mosquito salve and veil, toothbrush in a case, soap in a tobacco pouch, towel (crash is easiest cleaned), toilet paper, matches, hooks and line for fishing. An oilskin coat of balloon or Chinese silk, cut so that the skirts spread over the saddle, is lighter and warmer than the cavalry cloak. The poncho, of good stuff, is possibly best of all rain cloaks.

*Argentine Saddlery.*—By H. S. Orde, Commandant, L.F.—The Argentine recado or saddle is made up of



# MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No. 2)



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numerous parts, and is used by the native as his bed a night. It consists of

(a) An old sack, thrown over horse's back.  
 (b) A muga or native woven blanket, folded four-ply.  
 (c) The corona, consisting of two sheets of leather sewn together. The ends are rounded off, and a pattern is generally stamped round edge.

(d) Bastos. These are two small pillows, about 18 in. long, made generally of straw (made much like a bottle cover) and encased in hide. They are attached at the ends by a thin cord of rawhide, and lie on each side of backbone.

(e) The girth and over-girth are now placed in position. The over-girth is merely a broad piece of rawhide, covering the bastos fore and aft, and reaching down about to the same position as the straps on English saddle. A ring is sewn in on each side, allowing about one-half to be free. Two holes are cut in front of ring to carry stirrup leathers. The girth is made in the same way, but is longer, and has, of course, no holes for stirrup. On the offside the rings are attached by a length of rawhide about  $\frac{1}{2}$  in. wide, and about 3 ft. long (this allows for lengthening the girth); and when saddling horse the rawhide rope lies permanently attached to girth, is threaded through the ring on over girth, back through the girth ring, and so on three or four times, stopping when the end has been put through the girth ring last. By pulling on this end, the girth is tightened up to the required pressure.

(f) The cojenilla, or rug, is then thrown over all. This is generally a sheep-skin cut to fit, and the wool washed and combed, though a well-to-do native goes in for a manufactured one.

(g) The solve cincha, or surcingle, is then placed in position. This is merely a small edition of the girth, and has a loop on the off-side ring for lasso attachment.

## II.—PACK TRANSPORT

BY CAPT. CECIL MORGAN, L.F.

*Types of Equipment. First Type.*—Iron arched or other saddles usually carrying load suspended from hooks, but all with the cargo secured by means of a surcingle, wanty strap, or rope passing under the animal's belly. This type includes British Government marks, patented patterns, European, Asiatic, and Australian designs.

Should the parcels for either side, after weighing, be not exactly of equal weight, articles must be added to the lighter until the balance is exact.

Each parcel is then lashed up with a loading rope, fitted at one end with a loop or ring, and the lashing must be so adjusted that such loop or ring is at the top, and not on the surface which is to touch the saddle.

The two packages, duly balanced and lashed up, are hung to the hooks of the saddle. The wanty strap lashes the cargo to the animal, and is made fast under the belly.

Except for the simplest even loads this system produces all sorts of trouble when the pace is more than a walk. (1) The hooks being generally too high, there is top sway, which produces sore back; (2) The saddle not being adjustable to animals of various shapes and sizes, the pads are usually too far down on the ribs; (3) The generally uneven tension of the wanty strap under the



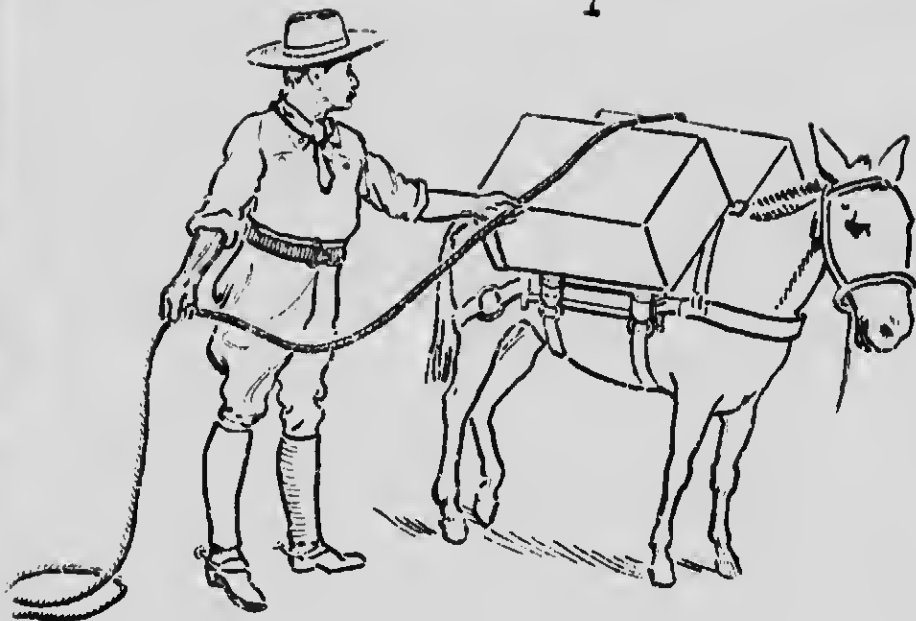
belly results in galls, varicose veins, or even a rupture of the membranes of the stomach ; (4) There is no continuous tension, for the load works loose rapidly as the animal stales, or after a short trek ; (5) Top loads, uneven, or single loads are impossible.

*Second Type, of Spanish Origin.*—The sawbuck, or an ordinary saddle for light packing, and the aparego as used for heavy packing in Western and South America. The lash rope makes the cargo fast to the animal, either with a diamond hitch or a stirrup hitch, but in any case the rope passes under the belly, and tightens on the cincha or girth of the saddle. While far better than the first type, this second type cannot be adjusted to animals of varying sizes and shapes, and the lash rope causes galls. The defects numbered 2 and 3 above apply to this system.

*Third Type.*—The girth or cincha secures the saddle to the animal, but the lash rope makes the cargo fast to the saddle, and does not pass under the belly. Legion packers may be called upon to utilise all types of equipment, and carry all kinds of cargo ; but will find that the two worst difficulties of pack transport are met by a saddle adjustable to size and shape of the animal, and by a style of lashing which dispenses with the rope under the belly.

Riggings whereon the cargo is secured to horns on the lower edges of the saddle are used in some parts of Central and South America, but the only model in which the saddle itself is adjustable is the Morgan pack-saddle, which I am requested to describe in these notes.

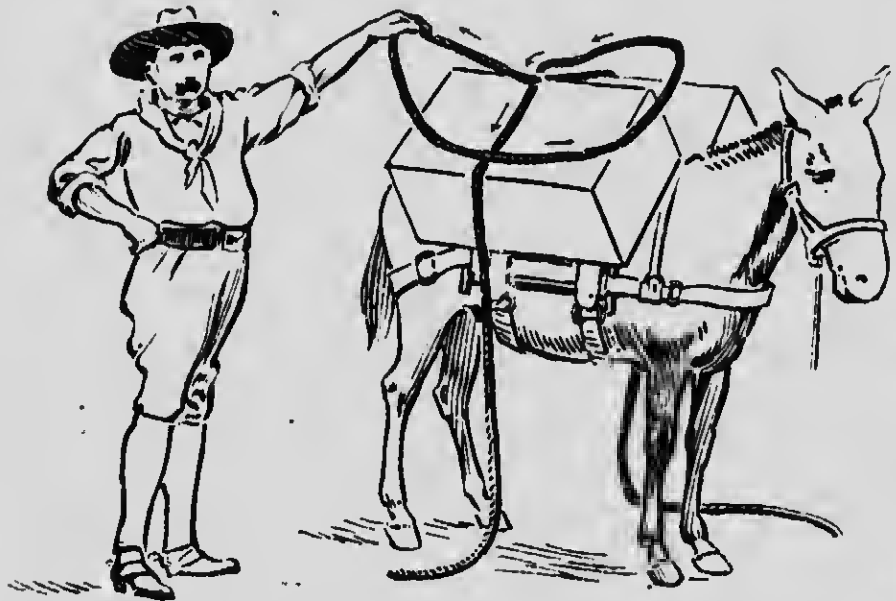
This invention consists of two frames or ladders of bicycle tubing, connected by two top bars which slide one into the other, as does the handle of a bicycle into



its socket. The two frames when joined form an inverted angle with a blunted apex above the animal's back. The frames are attached to stuffed leather panels, and the whole rigging is girthed with webbed cinchas, made fast with the Mexican latego.

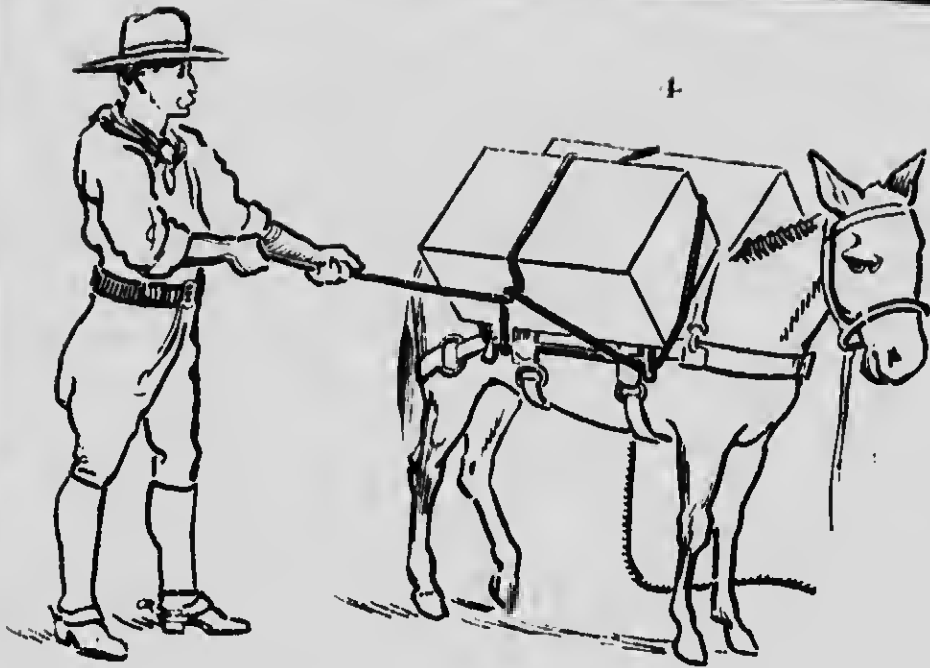
The top bars, being sliding and adjustable, can be fitted to any animal, so that the panels rest uniformly on the

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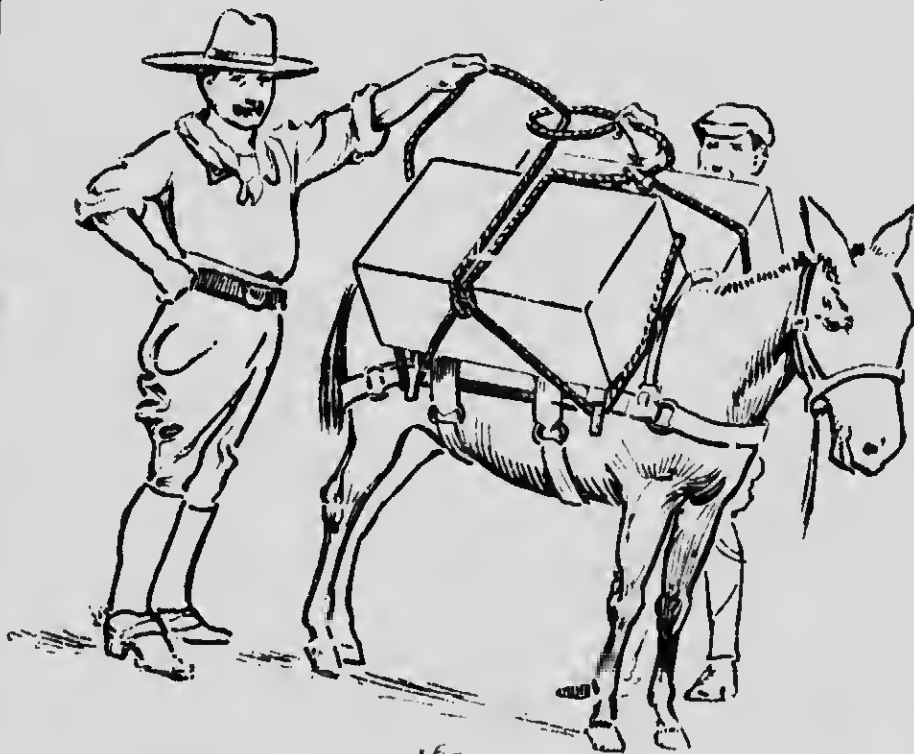


bearing surfaces of the back. Having been adjusted, the top bars are secured in position by lugs and stout screws. Breastplate, breeching, and crupper are all of the army pattern, Mark III., except that the crupper is covered with sheepskin to prevent chafing.

The loads being lashed up are connected with a sling-rope, so that they may hang loose on the two sides of



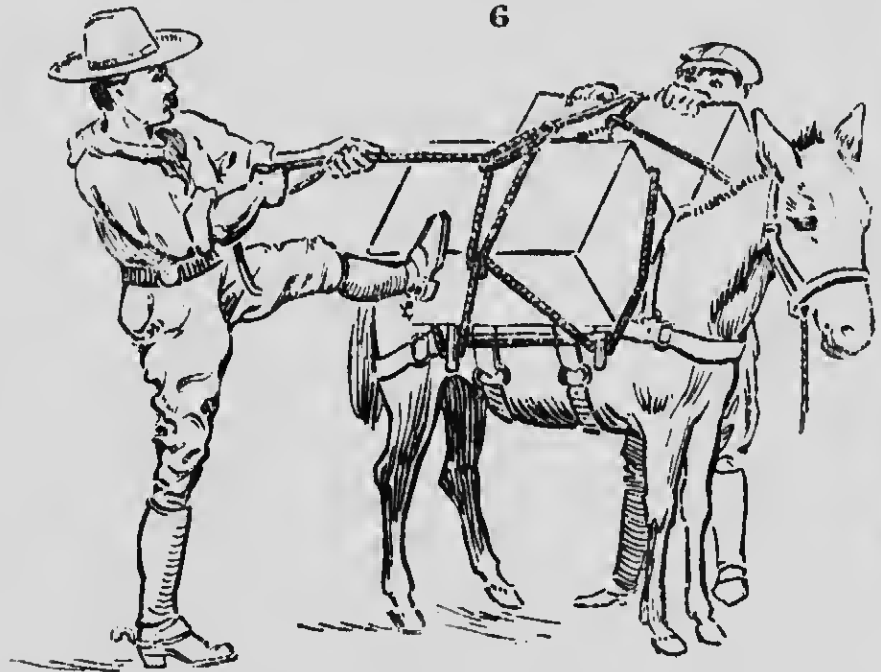
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the saddle, as low as possible, but above the projecting horns at the bottom of the frame. The heavier load is pushed higher on the saddle, and the lighter side allowed to drop until the cargo is perfectly balanced.

The lash rope is thrown as a Diamond, exactly as in the variety known as the Stirrup Hitch, except that the



bottom loop of that hitch passes under the horns of the saddle instead of under the belly.

Wheel on Morgan pack-saddle, showing one side of the Double Diamond Hitch passing under the horns of the saddle. The other side is exactly similar, and the loops of the hitch, front and back, are prevented from slipping off the round surface of the wheel by being

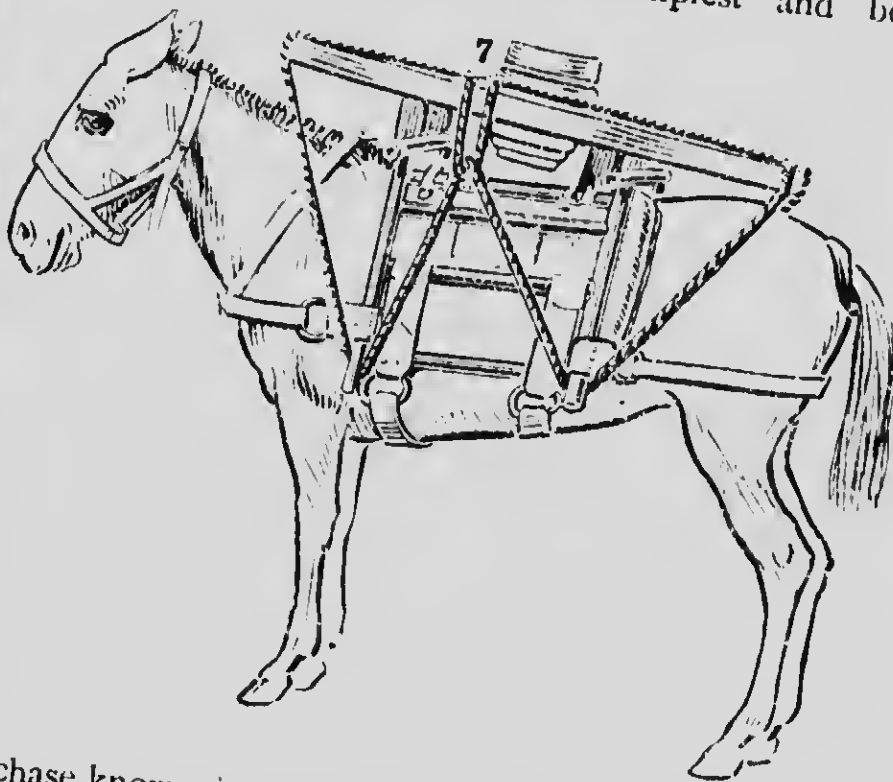
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## PACK TRANSPORT

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loosely tied together with small pieces of rope or "Ties" before the hitch is finally tightened. The wheel is kept off the neck of the animal by a piece of wood of sufficient thickness, which is placed across the front of the saddle for that purpose.

Although the Diamond is the simplest and best



purchase known, it is not easily taught by diagram, and instruction is best left to the pack masters of the various Commands. I shall always be pleased to answer questions, and to give instruction to members, or opportunities for practice. Frontiersmen applying at headquarters will be advised as to where to find me.

A few don'ts may be of use to learners.—Don't, by rough lashing, move the load when once it is properly balanced. Don't tug or jerk, but pull steadily in lashing. Don't lose your temper because the panels keep "coming down" during a first day's trek. They always do, and additional padding in front must be thrust through the stuffing flap in the panels. Ropes stretch, lategoes stretch, top bars come down, and cinchas get loose at first; but after the second day there is no further trouble. Don't fail to look well to the front top bars until the panels have settled: as a neglected top bar touching the withers causes a sore which needs a lot of curing.

*Precautions against Sores.*—See that the saddle panels are dry, clean, and well brushed, that they fit the withers, and rest on the weight-bearing portion of the back—the lumbar region. See that front cincha is well back from the forearm. See that crupper, breastplate, and breeching fit. See that front of saddle is well clear of the withers when the load has been on for an hour. See that the back, belly, and under the tail are perfectly clean. If a sore appears, take out stuffing of panel over that spot, and quilt round the resulting hollow. To locate position of the sore cover it with black grease, put on saddle, and remove stuffing and quilt or blanket where the panel is marked. After a trek if roughed, turned, or shaved hair is noticed, look to balance of load, fit of saddle, or tightness of the cinchas—there has been sway. To harden backs, sponge well with alum and water or human urine after sundown. If a small sore is present, powder with calomel, and if blow-fly is to be dreaded, paint with collodion after outspanning. For deep-seated sores, keep clean, apply any handy antiseptic, and bind

up to keep off sun and flies. Always call a halt after first hour of a trek, to allow animals to stale, and to look round the gear. Keep centre of gravity as low as possible. Don't cinch too tight. Don't tighten up harness on flat ground, as a well-balanced cargo on level country needs no cinchas at all.

*Chinese Pack Saddle.* By A. T. le Fevre, I.F.—Mules, bullocks. A rib of bent wood across at front and rear, curved to shape of animal. Front and rear ribs connected by longitudinal slats laced into ribs. A padded panel at each side raises arch clear of spine. Over this a wooden saw-horse of bent wood, curved to same radius, resting between fore- and after-ribs. Pile cargo on saw-horse, and lash with ropes. The sawbuck with cargo lifts off for noon halt. Cargo made up on ground. There is usually no girth, but breeching and crupper used.

**PACK TRAIN.** By the Editor.—Spanish-American practice.

*El Capitan.*—At terminals conducts business of expedition, in camp inspects all animals while loading and unloading, on route rides far in advance, finding the way, selecting crossings, and finding camp sites.

*El Segundo.*—The second in command superintends all work in camp and on trail.

*Los Arrieros.*—Each cargador or near man has an off man to help him. Sometimes each cargador has definite charge of a group of animals. The arrieros, working in pairs, load animals, adjust cargo on line of march, unload, repair animals and harness, furnish any relief needed for night herd, or camp-guard, and report to the Segundo.

*The Cook.*—Rides at the head of the pack train, leading the bell-mare, who carries the kitchen boxes, in



order that he, with his outfit, may arrive first in camp. Sometimes a detail of arrieros replaces the cook, sometimes details are told off to assist him in camp.

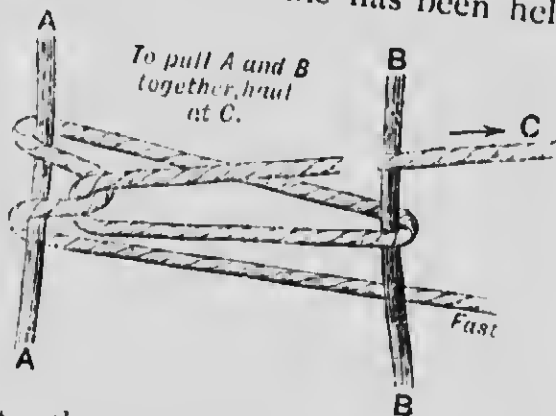
*Wrangler.*—A boy or young man may be employed as night-herder with no other duties. After outfit marches he gets a morning sleep, so long as he catches up before it camps. Only by using a herder can one secure that the herd is always held in pasture, to be driven into camp at break of dawn, without the hard-worked arrieros being forced on herd at night.

*La Madrina.*—With a mule train the bell-mare is usually white, that colour being easiest seen, and carries a bell to locate her position at night. She acts as Capitan to the animals on herd, and without her mules are difficult to hold together.

*El Aparejo.*—The apparel or harness for heavy cargo consists of a pair of large leather panels, ribbed with willow sticks, stuffed with swamp hay, and adjusted through a hole in each underside, to exactly fit animal wearing it. On animal's back a soft sugar-bag or other sweat-cloth protects the folded blanket, which is thus kept clean as bedding for the crew. The *corona* comes next, a strip of carpet ribbed at each end with a stick, to prevent harness sliding on the blanket. On this *corona* rests the *aparejo*, which has breeching and crupper, and a *cincha* (girth) to lash it to the animal. Lying on the *aparejo* is the *sovrán helmo*, a piece of canvas of same size, stiffened at the sides to keep cargo from sliding backwards or forwards. Next comes the *carga*, in packages hung on either side by a sling-rope, so that they may be exactly balanced. A third parcel may lie on top, and here rests all loose gear. Over all is spread the *manta*, of rainproof canvas. The whole is lashed

home to the animal with a 35- to 40-ft. rope, having a wooden hook at one end. The lashing is a diamond, a stirrup, or other hitch.

*To Lash up a Package.*—At a quarter of the length from each end make a secure half-hitch, then, facing end of parcel, pass the cord round the ends of the parcel. Pass the bight as a little loop under the farther cross-lashing. Then take the end of the cord back under the nearer cross-lashing. Next pass the end of the cord through the little loop, which meantime has been held secure with your right hand. Now pull the end, and you will draw the little loop into a long loop, reaching back almost to the near cross-lashing, where you make fast. This purchase draws the whole of



the lashings much tighter than they can be made with a man's full strength. It is not only the best lashing for ordinary parcels, but can be applied between the after-basket lines of a diamond hitch, drawing these basket lines together, and so tightening the hitch that it can never be dislodged by an animal bucking.

*Sawbuck.*—Only trained men can handle the *aparejo*, which is unsuitable, except for the heavy cargo of regular transport. Hence in North American practice, and especially for light packing, the sawbuck is more generally used. (See Appliances: Pack-saddle.)

*Stock-saddle.*—The American stock-saddle makes a

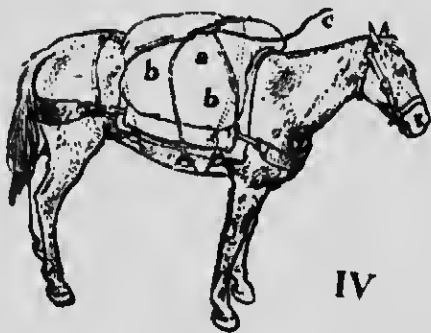
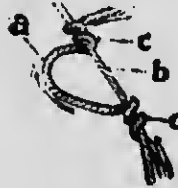
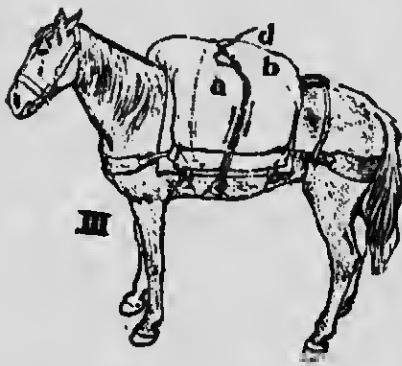
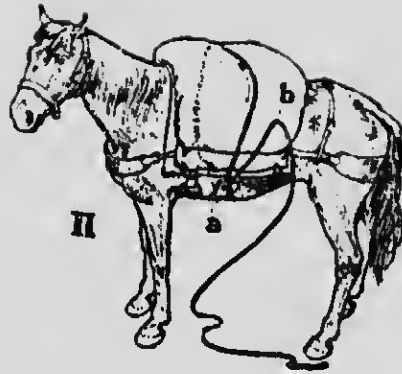
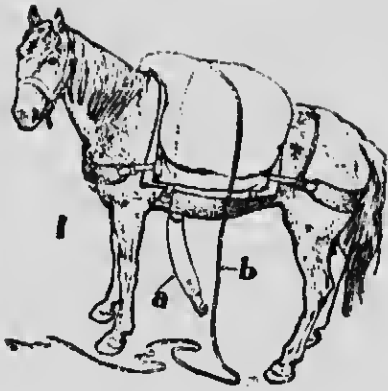
good pack-saddle for emergencies, its tree being as good as a sawbuck. Take 20 ft. rope, and make two half-hitches in the bight round horn of saddle; then make ends of rope fast to each other behind the cantle. This sling-rope will balance and hold any cargo, such as a carcass.

*Camp of Pack Train.*—Lay down boughs 18 in. apart, in semicircle, points to leeward. On these rests the cargo, each load covered with its rigging, and lash and sling-ropes coiled on top ready for use. Cover all with two *mantas* for each four or five loads, using spare *mantas* as ground-sheets and bivouacs for crew. If given grain or forage, each animal stands on outer edge of curve opposite his own load. The kitchen is at mid-circle, so that men can rest dry and sheltered near the fire.

*Varying Factors.*—Type of country, size of animals, and efficiency of men, must determine the numbers of men and animals engaged per ton of cargo, also the weight of loads and length of marches. For 180-lb. loads, average will not exceed 15 miles per day; while for 100-lb. loads, 20 miles is good work. It is a safe rule to harness as dawn breaks, serve coffee, supply food to be eaten on trail, load, tighten loads after first mile, make a long, single march, and in hot weather halt for the night not later than 1 p.m., so as to allow day grazing.

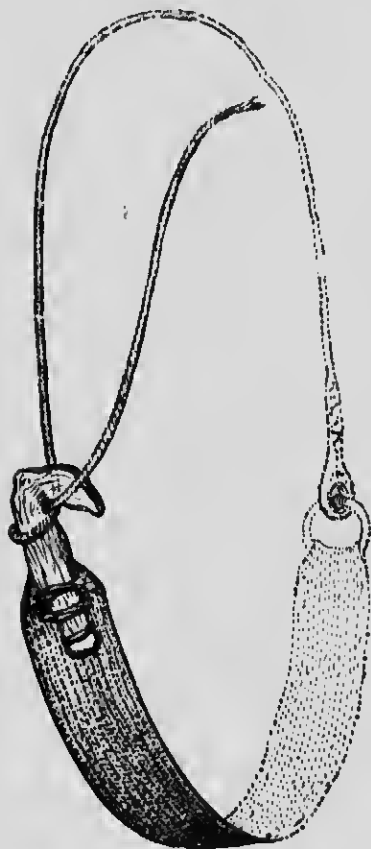
*PACKING.*—We are permitted by Mr. Stewart Edward White and by The Outing Publishing Company of Deposit, N.Y., to reproduce the following diagrams from "Camp and Trail."

*The Single Diamond.*—Throw the pack cinch (*a*) over the top of the pack, retaining the loose end of the rope. If your horse is bad, reach under him with a stick to



THE SINGLE DIAMOND.

draw the cinch within reach of your hand until you hold it and the loose end both on the same side of the animal. Hook it through the hook (*a*, Fig. II) and bring up



*The Jam Hitch.*

along the pack. Thrust the bight (*a*, Fig. III) of the loose rope under the rope (*b*); then back over and again under to form a loop. The points (*c-c*) at which the loose rope goes around the pack or close together, according to the size of the diamond required (Fig. V). With a soft top-pack requiring flattening the diamond should be large; with heavy side pack, smaller.

Now go round to the other side of the animal. Pass the loose end (*d*, Fig. III) back, under the alforjas, forward and through the loop from below as shown by the arrows of direction in Fig. IV.

You are now ready to begin tightening. First pull your cinch tight by means of what was the loose end (*b*)

in Fig. II. Place one foot against the animal and heave, good and plenty. Take up the slack by running over both ends of the loop (*c-c*, Fig. III). When you have done this, go around the other side. There take up the

slack on *b-b*, Fig. IV. With all there is in you pull the loose end (*c*, Fig IV) in the direction of the horse's body towards his head. Brace your foot against the kyacks. (See Appliances in Part I.) It will sag the whole hitch toward the front of the pack, but don't mind that: the defect will be remedied in a moment.

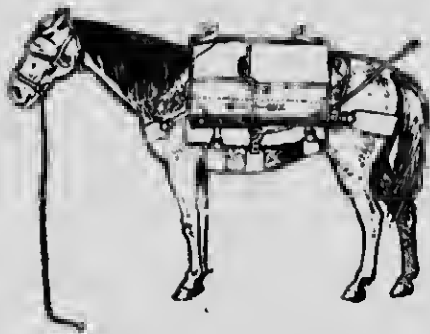
Next, still holding the slack (Fig. V), carry the loose end around the bottom of the alforjas and under the original main pack rope (*c*). Now pull again along the direction of the horse's body, but this time toward his tail. The strain will bend the pack rope (*c*), heretofore straight across, back to form the diamond. It will likewise drag back to its original position amidstships in the pack, the entire hitch, which, you will remember, was drawn too far forward by your previous pull toward the



*The Square Hitch.*

horse's head. Thus the last pull tightens the entire pack, clamps it down, secures it immovably, which is the main recommendation and beautiful feature of the diamond hitch.

*The Square Hitch.*—Throw the cinch hook over the pack, and cinch tight with the jam hitch before described. Lead the end across the horse, around the back of kyack



*The Bucking Hitch.*

on the other side, underneath it, and up over at *a*. The end here passes beneath at *b*. You will find that you can, when you cinch up at first, throw a loose loop over the pack comprising the bight *bed*, so as to leave your loose end at *d*. Then place the loop *bed* around the kyack. A moment's study of the diagram will show you what I mean, and will also convince you that much is gained by not having to pass rope (*a*)

underneath at *b*. Now pull hard on loose end at *d*, taking care to exert your power lengthwise of the horse. Pass the line under the alforjas toward the rear, up over the pack and under the original rope at *c*. Pull on the loose end, this time exerting the power toward the rear. You cannot put too much strength into the three tightening pulls: (1) in cinching through the cinch hook; (2) the pull forward; (3) the pull back. On them depends

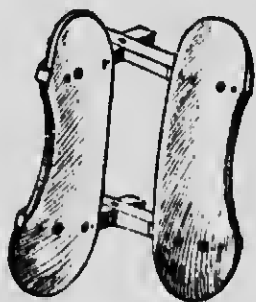
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## PACK TRANSPORT

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the stability of your pack. Double back the loose end and fasten it. This is a very quick hitch.

*The Bucking Hitch.*--Pass the pack rope around the kyacks on one side, and over itself. This forms a half hitch, below which hangs the cinch. Lead the pack rope over the top of the pack, around the other kyack, and through to form another half hitch. Cinch up, and throw either the single diamond or the square hitch. The combination will clamp the kyacks as firmly as anything can.



*Under Side of Pack  
Saddles.*



*Shape of Collar Pad—  
for Pack Saddles.*

### III.—DRIVING

BY GIFFORD HALL, M.F.

*Waggon Transport.*--Select good, even-gaited walkers if possible.

Slowest horse makes the pace. Remember this paradox--that while, generally speaking, the fastest and keenest horse tires his slower mate, he is apt to break down first, killed by waste of energy.



The cheery word is better than whip. Urge a horse by curt use of name, sending home one pistol shot crack if he does not heed. Only "pour in the leather" in an emergency, at the pitch of hill, in heavy sand, or crossing stream.

Never whip a balky horse after he is at obstinate stand. Rest him, and coax. To whip means utter defeat. Whip an unwilling horse if you like. A balker is often a high-strung, willing animal, that gives up because when he takes the collar he cannot shift load on a plunging start. In starting team, let horses "take collar" slowly and evenly, gradually gaining motive weight. A sawing team is an abomination.

*Four-horse Team.*—For leaders select lighter and more active animals than for wheelers. Leaders must be able to pull strongly, and keep well away from wheelers. Cool-headed but keenish horses are for choice. A slow horse is useless on lead, and "breaks the pull."

For wheelers select "lifting" pullers—horses that "drag and hold." A good near-wheel horse will often "hold" all by himself a waggon going uphill, and will sometimes break or screw it out of a deep rut or "chuck-hole" by sheer collar pluck. Always put best horse on near side, and worst on off side or "under the whip." Never favour any horse in a team through silly sentiment. Every horse should do his share, but it is advisable *sometimes* to favour your best wheeler that he may have power in reserve.

Watch well to divide work with all four horses. Don't let leaders drag waggon and wheel team, or wheelers drag waggon and push leaders.

*Harness.*—Collars must fit. Never mix collars. A collar too large puts strain on points of shoulders, and

galls them. Small collar chokes. Collars should fit against shoulder slope, allowing passage of flat hand between collar and neck when bearing easy. They should fit well above shoulder point.

Always see that traces on a horse's harness are of equal length. Unevenness in length throws pull in or out, and is bad for horse.

Keep harness soft and easy as possible, by greasing and fitting to size of animal wearing it. For ease to self and horses, see in driving two or four that the reinspread of horses' heads is neither too much nor too little. Let your horses' noses be straight ahead, not pulled close together or pulled outward. Never use a check rein. Use open bridles—no blinkers.

*Driving.*—Above all, use common sense. Never fret horses by "showing off" yourself or team. Conserve your team. Coming down one hill to go up another, get a little momentum to "spring" a good start. On a short hill, it may be advisable to "rush," and so miss strain of slow pull. Never rush a long hill, never rush long stretch of sand, or dust, or mud, though you may rush short stretches. Always rush a creek or river that may have bad bottom, especially if there is steep bank on opposite side. And never stop your horses for a drink in a *hole*. Water them where you can get a good start again.

Many Western American freighters feed but twice per day—before and after day's work. They do not water team between camps, declaring thirst makes horses keener to pull till the outspanning, with its reward of water in plenty.

I opposed this idea while light-freighting and stage-driving, giving my horses water as often as my judg-

ment deemed it wise. Result : horses in better condition than when waterless for so long.

Use you brake! Learn to use it with consummate judgment, humouring your waggon at every rise and fall of ground which necessitates pressure or relief. Presently your foot will learn to play the brake as a helmsman plays his wheel—light and heavy pressure by instinct. More horses are racked up by men who forget their brake, than by real service.

*Grease your Axles.*—Keep them well greased all the time. *Never* forget.

Driving in rugged countries is not mere rein-handling. No one can teach it by pen, no one learn it by reading. Sit with a good driver, and watch. Ask pertinent questions. Presently take reins. If you were meant by nature to be a driver, you will soon drive.

In packing box on waggon carry jack screw, hammer, cold chisel, wire pliers, spike nails, and light, strong rope for lashings.

If waggon tongue breaks, "fish" it by running four strong pieces of wood along tongue, over, under, and at the sides, covering break, lashing them firmly.

If wheel breaks, replace it with branch of hardwood tree, lashed firmly to axle, at such angle as to keep waggon at even balance. Such supports will not bear heavy load, and make a hard pull for team.

For cold shoeing, carry shoes of sizes to fairly fit team, and learn to drive and clinch a nail truly.

Hoof rasping can be dispensed with. An Arizona freighter has been known to drive nails with a stone, and use another as anvil.

The "chuck waggon" of American cattle round-ups is good model for light transport. It is a compact, short-

coupled four-horse waggon, with cupboard at rear, of which the door tail-board is hinged for use as cooking table.

The waggon carries outfits, food supply, and camp gear.

To get waggon down apparently impossible side hills, let riders, or men on foot, hitch ropes to upper side of waggon, and pull against top weight, while driver makes best slope he can to the bottom.

In camping, team horses, run with pony herd, are separately picketed, or tied to wheels of waggon (brake hard set). The driver is always alert to guard them.

Stock must be fed on plenty, and are driver's first care, himself coming second. He must never hurry or neglect animals to save himself trouble. A driver who does not count his stock friends is useless for travel.

Let driver study his stock. Horse nature varies. A driver should know his team individually to drive it well collectively.

To push a team doing its best is rank folly. Remember there is a to-morrow. A good animal punished severely but once is apt to be broken-hearted ever afterward.

Look out not to founder a horse by feeding, watering, or standing him in a chill place when overwarm. It is easily done. Keep team on road moving after watering it.

If horse goes suddenly lame, examine for stone picked up in shoe. Remove stone at once.

When camping on low ground or black soil in wet weather, don't sleep underneath, lest the waggon settle. It is always wiser, for many reasons, to camp in waggon.

*Sleighb.*—Lift runners upon sticks before camping, lest the frictional heat melt snow, and they freeze to ground. If horse falls through ice, rope him by neck

and yank him out, with another horse to pull. Rub him down and travel fast. Don't camp until he dries. Carry crowbar to pound out water hole. Keep hole covered with snow, and a bush will mark it for other travellers. Camp where possible on land, not ice.

#### IV.—TRANSPORT ANIMALS

**ASSES.**—Almost equal camels in thirst endurance, thrive where horses starve, are least liable to sickness of all transport animals. The large powerful Portuguese breed equal pack-horses in weight of load. Gentle and intelligent men needed in handling them. To cure kicking, insert fork of a stick like bit in ass's mouth, tie forks behind ears, while butt of stick touches ground. Without lowering head, the ass cannot enjoy kicking. Without lifting tail, he cannot bray, so, where noise is dangerous in hostile country, lash a stone to the tail.

*Asses in East Africa.* By C. W. Hopley, C. M. G., L. F.—The donkey is a great asset to British East Africa, and is largely used by travellers who wish to leave the beaten track, and do not wish to be bothered with the feeding of large numbers of native porters. They will carry from 120 to 130 lb., and cost from £2 to £4 each, according to the demand at the moment. The saddle used by the native traders consists of a couple of adjustable bags made of gunny sacking, which rests on a *numnah* of sacking stuffed with grass. The saddle bags are held in position by breast and crupper straps of sacking.

This type of saddle is, however, ill ventilated, and

## TRANSPORT ANIMALS

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apt to cause bad galls on the back. A better type of saddle is a well padded A frame, with or without a *mumnah*. Great care must be exercised with regard to the breast and breech straps; they must be wide and soft and well fitted.

A good deal depends on having skilled donkey-men. They are not common, but can be obtained. A headman to take charge of donkey transport would probably cost 30s. to £2 per month and rations, and drivers 15s. per month and rations.

With the help of donkeys, sportsmen, prospectors, etc., can much reduce the cost of a journey. Donkeys can usually be relied on to travel 15 or 16 miles per day; they require no grain food, but graze here and there as they go along, and after they reach camp. They should, if possible, not be marched later than 1 p.m., as they do not get sufficient time for grazing, and suffer in condition. Not less than 10 per cent. of spare animals should be taken, for if a beast here or there becomes galled, it can run light for a few days and heal.

A tin of tar, izal, or some non-corrosive, strong smelling antiseptic should be carried to paint on saddle galls to keep flies and rhinoceros-birds away. (NOTE.—The rhinoceros-birds settle on a small sore and peck at it until it goes down to the bone.)

A supply of rope should be taken to tether donkeys at night, as they are sure to stampede if lions come round the camp. If there are plenty of men attached to the expedition, it is better to build a zeriba of thorn bushes, just large enough to hold the donkeys: they then huddle up together and keep each other warm.

Donkeys are less susceptible to tsetse fly disease than cattle, horses, and mules, and are practically immune

from horse-sickness. Rain also does not seem to affect them at all if they are well fed. Upon arrival in camp, they are usually turned loose, and require very little attention, not being at all liable to stray. Staff required for donkey transport: one driver for every four or five donkeys, and a headman in addition.

MULES replace horses in arid country where feed is bad. They are sure-footed and clear-headed for mountain service, but die if taken into very wet districts. (See Pack Train.)

NOTE. By C. J. Cutcliffe Hyne, L.F.—Do not use spurs to a Morocco mule, as these merely wear out and do not propel. Scratch the mule on the withers with a lead pencil or a sharp stick, and you will get all the pace procurable.

NOTE. By C. W. Hobley, C.M.G., L.F.—Mules are too expensive and scarce in East Africa to be used as pack animals. They are, however, every year being more extensively used as draught animals. During the last year or two a considerable number have been brought into the country from Southern Abyssinia. They are small animals and thus are deficient in weight, which is such an essential for a draught animal. They are, however, very willing, and are hardy. They cost from £18 to £25 at Nairobi, which is about double their value on the frontier. The best mules in the country come from South Africa: those which have been immunised against horse-sickness fetch as much as £40.

Horses are still comparatively few in East Africa, and are thus only used for riding purposes. This scarcity of horseflesh is due to successive epidemics of horse-sickness. It is, however, hoped that these visitations

will become more and more rare. It is, moreover, very probable that a cure will be discovered within the next year or two, as veterinary science has already discovered a method of immunising mules against the attacks of the disease. Prices for horseflesh are, therefore, naturally high. Abyssinian and Somali ponies cost £28 to £35, Arabs and Walers £35 to £50. As it is not known how horse-sickness is transmitted, a valuable pony should not be taken away into the bush out of range of its stable and regular grain food. Ponies or mules on trek should always be provided with a tent, and should not be allowed to feed on wet grass. With regard to grain food for animals, locally grown maize or intama (millet) is very good. If possible, maize should be crushed before being given to an animal.

**OXEN.**—Easily kept together, feed in shorter hours than horses or mules, need little tending. To break in: *To break*: and throw, using a snubbing post to take strain. *To break*: a man holds down by screwing tail, another by keeping down to ground. A Y of tough stick 8 in. long, but end sharp, is forced through membrane dividing nostrils, and a thin leather string made fast to either end of nose-stick. The thong is wound round horns in figure of eight, to be used for catching him when needed. *To pack*: Dig hole in sand under belly, and laying a bale of skins on the back, pass lashing round belly. Stand clear for circus. After first troubles, feed salt, and scratch back and tail, and a few days' practice at loading makes him gentle. *To load*: Generally a good cloth, and a pair of large panniers, secured with surcingle, replace usual pack-saddle.

**CAMEL TRANSPORT.** *Feeding.*—Like that for horses,



food for camels is mixed grain and forage of kinds varying with country. Camels grazing seldom eat poisonous shrubs, picking their feed.

*Camp.*—Clear away all straw, lest they injure breast, pads, and hocks. Keep lines clean. Groom daily to remove ticks. Keep camels in separated groups of twenty-five, lest contagion spread in event of sickness. Picket group in circle, forage in centre. Secure restive animals by doubling up one foreleg, tied short. Use blankets on cold nights. Avoid damp ground. Pasture herd daily. In watering, prefer warm pools to cold streams. Water regularly as with horses.

Prior to a dry march, train camels to do longer and longer without water, until they are hard enough for desert travel.

*Marching.*—On dry march trot steadily in morning. Halt for afternoon heat. Walk and graze through afternoon march.

In ordinary marching a loaded camel moves on level ground about two and a half miles an hour. If marching with convoy independent of troops, get away in morning so as to make camp again by 10 or 11 o'clock at latest. If very hot weather, march at night, arriving at camp just before daylight. The camels will then have plenty of time to graze. Don't water on road if sure of water at next camp. Before sending to graze, feed half daily ration of grain, and don't take saddles off till backs have cooled. Water once a day, about 4 p.m., is sufficient. Camels should be fed remainder of grain and foddered in evening, and be groomed.

*Load.*—A healthy camel carries about 400 lb. Apportion lighter loads to animals losing condition.

*Care.*—Carefully inspect on making daily camp for

ticks, galls, bruises, and thorns in foot pads. Watch for diarrhoea and shrinkage of hump. Long waterless marches and carelessness assist heavily in death and breaking down of animals.

*Camel Gear.*—Noting how much more liable to galls camels are than horses or mules, the value of Captain Cecil Morgan's patent adjustable framed saddle becomes apparent. This saddle will be in general use with the Legion of Frontiersmen for all transport service. (See Pack Transport Section for description.)

A large canvas sheet should cover all packs. It is also useful to keep camel warm and dry at night in rainy weather.

(Camels useless in damp climates.)

*Camels in British East Africa.* By C. W. Hobley, C.M.G.—These are used in the country stretching from the north of Lake Baringo to Lake Rudolf on the south border of Abyssinia; they are also used a great deal by the Somalis inland from Kismayu. Caravans of Boran traders occasionally wander down from the frontier and bring troops of camels with them, selling the same in Nairobi for about £5 each. Some of these are broken to draw carts. It is doubtful whether the climate of the East African highlands will suit camels for long, as it is said that they miss certain bushes, the leaves and twigs of which form their staple diet in their own country. The camel from Boran and Turkana will carry about 350 lb. if carefully packed; but for a long journey it is recommended that the loads be made lighter than this. They will travel twenty-five to thirty miles per day in two spells with a midday rest. The best camel-men obtainable in East Africa are Somalis. Staff required: about one man to every two camels.

Turkana camels can be purchased in limited quantities through the district officials at about £2 each, unbroken; they, as a rule, are not difficult to break in if one has a man who understands how to teach them to kneel.

ELEPHANT TRANSPORT is expensive except where there is good grazing. Elephants can be grazed on leaves and branches of trees, and wherever grazing is good and sufficient a grain ration is hardly a necessity. They cannot stand extreme cold, and are useless for transport work where grazing is bad, or dry forage insufficient.

Mahouts and native attendants are not always trustworthy; so transport supervisors should personally understand elephant's nature and requirements. Make friends with sugar-cane or banana.

Females are best for transport, as males are liable to become crazy. Young elephants have smooth skins and bright eyes, old elephants dim eyes and dry, wrinkled skins. Elephant is in prime at thirty-five years of age, is worked out between sixty and seventy. Load for a first-class animal is 1,200 lb., for second- and third-class, 960 lb. Class depends upon height from ground to withers. Elephants  $8\frac{1}{2}$  feet and over are large, under  $8\frac{1}{2}$  feet, medium, and under  $7\frac{1}{2}$  feet, small.

*Food.*—Green reeds growing in swampy grounds, plantain leaves and stalks, green rice straw, sugar-cane, and all good upland grasses. The grain ration is generally unhusked rice or flour, the flour made into unleavened cakes. Water twice daily, and allow to bathe whenever possible, and they are not overheated. They should be groomed with some rough substance like cocoanut fibre, while water is poured over them.

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*On march*, pace averages 3 to  $3\frac{1}{2}$  miles an hour. They cannot jump or spring, and a ditch of 6 feet wide and 6 feet deep is impassable for them. In cold weather they should be covered at night. Marches should be made so that they may have plenty of time to eat.

*Ailments*.—Elephants are susceptible to chills, rheumatism, internal parasites, etc. Food should be changed if they fail in condition. Picket on high and dry ground whenever possible, and in permanent lines standing should be kept dry and clean.

*Book*.—"Military Transport in India," by Capt. W. Wickham, *Times of India Press*, Bombay, 1892.

**DOG TRANSPORT.** By Commandant E. M. Bruce, L.F.

*Dogs*.—Weight should be 100 lb; *bitches* 90 lb. They should have broad shoulders and short legs; under 75 lb. are useless. They should be as closely bred to the wolf as possible—a heavy coat, short and thick, with good feet, and as little hair as possible between the toes. Leaders must be specially picked for intelligence. An average team is from four to seven dogs: a really fine young team, broken and complete, with harness, is worth from \$500 up.

*Price*.—Dogs over 100 lb. weight are worth \$100 up, otherwise from \$20 up. Wolf-dogs cannot be managed by kindness; treatment should be severe but just. Civilised dogs are fastest and best, with regular food and treatment, but for rough work, cold weather, and irregular food, they cannot be compared to the "Huskie" or "Malemoot."

When working the civilised dog puts in all his strength and so tires himself; the Huskie always has something in reserve. Wolf-dogs fatten where civilised

dogs die of starvation. They will go farther and better on shorter rations. There is very little trouble with their feet or food. They are great thieves, and will steal anything in camp, whether eatable or not.

*Food.*—One-third of a pint of rice, half a pound of bacon per day, per dog. Boil the rice; fry the bacon; mix when hot; allow to cool, and feed warm: or give  $1\frac{1}{2}$  lb. dry dog-salmon, or one big, dry white fish, or  $1\frac{1}{2}$  lb. dry meat, or 2 to  $2\frac{1}{2}$  lb. fresh meat. Food for dogs is not cooked on trail.

Feed only in the evening, all dogs separately but at the same time. A little food at mid-day halt is good, but not necessary. Change feed when possible to give dogs variety, but be very careful not to give fresh meat too suddenly. Dogs cannot work on rabbit (Arctic hare), neither can man. Boiled hide, with the hair on, of large animals, makes excellent food, and also destroys and removes any worms. Stew it for four or five hours.

*Travel.*—Load on the sled with average trail, 100 lb. per dog. With a good trail, up to 200 lb. per dog; with a bad trail, 60 to 100 lb. per dog. On an average trail a loaded team will make twenty-five to thirty miles per day; on a good trail from thirty to thirty-five miles, provided dogs are good, fresh, and fit. If trail has to be made fresh, heavy-loaded teams do well if they do an average of sixteen miles per day, provided trail can be well broken ahead and no obstacles are encountered. Speed does not increase much on long distances as the loads lighten, owing to wear and tear, sore feet, etc. Great care must be taken of dogs' feet, as snow, especially if fresh fallen, will ball under and between the toes. Keep hair cut as

short as possible between the toes (use a small pair of blunt-pointed scissors). Always watch the feet and clean out balled snow when necessary. If foot-sore, put on dog mocassins, made to *lace* up to the knee, not to *tie* round or under knee. Be very careful that no snow can get inside the mocassins. Unloaded or very light-loaded teams can make twice the speed of loaded teams. A fast team, travelling light, with good driver and trail, averages fifty miles a day: loads should not exceed 40 lb. per dog to at least four good dogs. Small dogs and big, loose-jointed dogs are unfit for speed or transport. (A foxhound is a very good type of make and shape.)

If dogs have to go through water in very cold weather, dry them as far as possible when dry snow is reached; then halt, and give their feet a chance to dry thoroughly. All wolf-dogs hate water in the winter, and the leading teams will probably have to be dragged through it.

One cannot travel without danger to self and dogs when temperature is  $-40^{\circ}$  F. It is possible to travel slowly up to  $-60^{\circ}$  F., but very risky. It is impossible to travel below  $-25^{\circ}$  F. against any wind for a long distance.

**Harness.**—Great care must be taken of the fit of the collars: they should fit close round the base of the neck and be fairly soft; constant attention must be paid to the stuffing that it does not lump. Collars cannot be made by amateurs. If harness must be made, make a breast-band instead of a collar; traces 5 ft. long, snap to close on the inside; ring on trace for snap just in front of belly-band; belly-band and back-strap well clear of the point of the shoulder; traces sewn on to back-strap. Individual dogs must have individual measurements.

When not in use, harness and all leather-work must be kept out of reach of dogs, and perfectly dry.

*To Harness.*—Lay out harness joined up. Put in leader first, then others, before loading sled. This gives collars time to warm and soften.

*Packing.*—They can be used for packing in the summer, but it is bad for their feet: maximum load, half weight of dog. They will keep up with men on foot if undergrowth is not thick. Two belly-bands and a breast-to-tail strap are required.

One man follows behind dogs in case fresh adjustments are needed, or in case of anything being dropped.

*Sled.*—Best type of sled 8 ft. to 10 ft. long from tip to tip: width, 14 in. from outside edges of runners. Runners  $3\frac{1}{2}$  in. wide, shod with brass  $\frac{5}{8}$  in. thick: runners screwed up tight to shoes: screws 6 in. apart. Sled built entirely of ash and oak: height  $4\frac{1}{2}$  in.: front curve of runner 15 in. long. All fastenings (except runners) made of raw hide. Load for sled—600 lb.: 300 lb. maximum.

This sled is much better than a toboggan; it rides higher, runs lighter and faster, and carries a greater load with less effort.

For freight, a "box" of the heaviest canvas (length equal to length of sled, minus 6 in.; width 13 in., depth 18 in.) is placed on sled. It has sides, front, back, and bottom, but no top: eyelets are let in all round the top edge, 8 in. apart. Freight is packed in this; lace up and then lash down on to sled from centre to ends. This keeps freight dry and prevents loss of small articles.

Sled is steered by a "Gee-pole" fastened on right-hand side to nose and first or second standard. Pole is about 7 ft. long.

Rope from front of sled to single-tree, about 7 ft. 6 in.

*Driver's Outfit on Sled.*—Complete change of clothes, shirt, and underclothes, spare mocassins, socks, "German" socks; spare pair of Indian mitts; blankets or fur robe; repair outfit; small surgical case and medicine case, pot of vaseline, Mennen's powder and friar's balsam; rifle and ammunition; axe and file, bradawl; babiche, large and small; split copper rivets; sinew and triangular needles; spare pipe, tobacco and matches; spare sheath knife; bedding; a small bottle of petroleum (for starting a fire rapidly, only for use in case of necessity); teapot, frying-pan, nest of three cooking pots;<sup>1</sup> mug and deep dish; fork and spoon; grub, and dog feed, and dish to cook dry food if necessary; freight; and a small bag to fasten outside load, containing change of socks, "German" socks, mocassins, and snow shoes.

**REINDEER.** By C. J. Cutcliffe Hyne, L.F.—He (the sledge deer) gets over the ground quickly, it is true, but he leaves all possible grace out of the performance. His gait is a series of long striding slides, which makes one think he is eternally on the point of coming down, and predict for him wrung withers, sprung hocks, and a necessity for embrocation on every muscle of his body. He overreaches at every step, and rattles his great splay hoofs against one another like some one playing castanets. But, if not overpressed, he can get over enormous distances at an eight-to-ten-mile-an-hour speed (according to the ground), in front of a 200-lb. load, in the worst Arctic weather, and on a miraculously

<sup>1</sup> *Aluminium* cooking and camp vessels are useless. Avoid them altogether. *Copper* cooking pots are best.



small supply of forage ; and he possesses climbing powers which would put even a Spanish contrabandista's mule to the blush.

It is a curious sight, also, to see a reindeer herd feeding in the gloom of an Arctic night, when a six-foot layer of snow intervenes between the glowering sky and its food. Each deer digs for itself a pit, hoeing the white mass with its prominent brow-tines, and scratching out the powdery snow with its forefeet, after the manner of a fox-terrier delving for rabbits ; so that when it is grazing on the succulent moss below it is quite out of sight from the snow surface above. The deer does not enlarge the floor of this pit to any extent, and it does not understand the art of making a trench. When one patch of the moss is eaten bare, it clambers to the surface again and makes another pit. When the sleigh traveller, driving along through the dark twilight, comes across one of these places where a deer herd has been digging down to food he generally has plenty of occupation before he has crossed it safely to the farther side.

*Harness.*—There is a saddle of leather, most elaborately worked. For the middle of the deer's neck there is another collar, decorated with a fine brass bell. The trace is of raw hide, plaited square. There is a single-tree of bentwood, with a looped thong made fast to its middle. This thong was passed through a hole under the forefoot of the sledge, and the loop was slipped over the bitt on the stem-head, so that the deer could always be cast adrift from the sledge at a moment's notice. The boat-shaped sledge itself was a miracle of light blue paint, but a cranky thing for a beginner to sit in. It would roll forty-five degrees without capsizing, but it was apt to exceed the forty-five. There is a pole

to guide with, and the pole is a thing of use; for riding at speed in these sledges over an uneven snowfield is distinctly a matter of balance.

## V.—TRANSPORT BY HUMAN CARRIERS OR PORTERS

*IN BRITISH EAST AFRICA*

By C. W. HOBLEY, C.M.G., L.F.

In the early days of our occupation of the interior of Africa, human transport was then practically the only kind used, and thousands of tons of stores were carried into the interior by these means. Even nowadays for sportsmen, prospectors, and others travelling far away from railways and cart-roads, it is the most satisfactory form of transport for tents, boxes, and personal baggage generally. It may be well for reasons of economy to supplement it with pack-transport, but porters will always go where pack-transport will become hung up, and where pack animals will die of disease.

The best way is to get such porters through the nearest District Commissioner, and to arrange that the chief from whose jurisdiction the men are derived should send with them one of his own minor head-men, who should be paid by the employer. Spare men to the extent of 10 per cent. should be taken. Rations should not be issued for more than two days at a time.

If the expedition contain men of two or more tribes, the caravan should be cut up into sections, each with its own cooking-pot, so that men belonging to one tribe can

eat separately from those of another. Each tribe has its own little fads, articles of diet enjoyed by one section are often tabu to another, and friction caused in this way often leads to serious trouble.

It is wise to have a few men (in the proportion of 10 per cent. of the strength of the caravan) engaged as "askaris" (the word "askari" means soldier). Caravan askaris are not soldiers, but really superior porters, or rather gangers or foremen. They are experienced men of good character who have risen from the porter class, and who can and will carry a load upon occasion, but do not expect to do so except in emergency. Each askari should have charge of 10 to 12 porters, should be responsible for their appearance at the fall-in before the march, upon the march, and for their work when they reach camp. He and his fellows will keep watch at night, keep the camp fire going, and alarm the camp in case of attack by wild beasts, etc. They are generally armed with obsolete rifles, like Sniders. They pitch the European tents upon arrival into camp, pile the loads, help serve out rations, act as mail runners when letters have to be sent in to the nearest township, help any porters who fall lame upon the road, and perform a hundred small duties.

When a caravan reaches camp, it is the duty of the porters to clear the site for the camp, to fetch water and firewood, and to build a zeriba for the donkeys or any other domestic animals there may be.

When starting out, it is a mistake to overdo it for the first few days, the porters probably being in soft condition, so that the first two or three marches should be short, say not more than 10 miles each.

Weigh the loads before starting, and see that none exceed 60 lb. Boxes should not be more than nine inches

deep, or more than 28 to 29 inches long, and those with very sharp edges should be avoided. Tent poles should be jointed in the middle, or they catch in the bush and impede progress.

Plenty of spare lashing rope should be carried for tying up loads, and if any rivers are likely to be encountered, carry a coil of 50 yards of 2½-inch manilla rope.

Always carry a few axes and half-a-dozen matchets, or "pangas," as the Swahilis call them, and a hoe or spade for digging a rain trench round the tent. Sewing twine and some sail needles should be remembered for repairing pack saddles, sewing up food loads, and some spare gunny sacks are very necessary. A tarpaulin to cover loads in camp is essential. Carry a supply of simple medicines and surgical dressings for the use of the caravan.

The porters should be given tents either of green canvas or American drill; the local government also insists upon porters being supplied with cotton blankets, which cost about 1s. 4d. each locally, also cheap water-bottles for the men are necessary items of equipment.

If the expedition is of considerable size, the most important thing is to get a good head-man.

With regard to the management of porters it is almost impossible to lay down rules, for no amount of writing will teach a man the art of managing men. It is a trite remark to say that natives are a large edition of children; it is, however, at best only a half-truth, and we know how dangerous these are. They are, it is true, simple-minded folk who think a great deal about their meals; but it should not be forgotten that they are phenomenally quick at measuring the character of their employer, and gauging exactly to what extent they can get the better of

him and bluff him into giving out extra rations or doing ridiculously short marches.

To be a successful caravan leader requires great tact, infinite patience, laborious attention to details, and considerable strength of mind. Never bribe men to do things; but reward them when they have done especially well. They must be trained to feel that they can trust their employer "to play the game"; this spirit will incite the better men also to "play the game" to the employer, and the balance will follow like sheep. One may sum up this advice in very few words: 'Treat the men fairly, don't continually nag at them for trifles, show them you mean what you say, don't beat them except as an extreme measure, feed them well, talk to them, and try to find out what they want and think about, and it will be found that most of the difficulties will disappear.

### *IN WEST AFRICA*

BY WM. FLETCHER, L.F.

Go to principal merchants, or head chief of village, and inquire for a good head-boy, stating you want so many boys. From white merchants you can get a permanent head-boy, but from a chief only the loan of one. Head-boy gets wages from £2 5s. to £4 a month in West Africa, according to abilities as guide and linguist, and 5d. to 7d. per day for chop.

Having secured head-boy, tell him to bring carriers for inspection. Wages: French West Africa, 5d. to 7d. and two cups rice per day; British West Africa, 1s. to 1s. 6d. subsistence, 3d. per day for chop. Inspect carriers, throw out the spottiest, lamest, and senile, select

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the best. Give advance 5s. or 10s., but not more than £1. Order parade 5.30 a.m. for 6 a.m.

Meanwhile make up your cargo into loads exactly weighed, 56 to 60 lb., but not more. Select hammock boys, cook, interpreter, clerk, and steward. Loads are usually cased to avert leakage.

Muster for march. Head-boy tells off carriers for loads. Be ready yourself. March 6.30. A decent head-boy will do 24 miles a day for short marches. Halt in hottest hours for feed and camp, say, 4.30 p.m. Second day boys will be stiff, so give them 16 miles. After that gradually increase marches, which, on a long trip, will average 18 to 20 miles.

*Treatment.*—Head-boy to enforce discipline on pain of being fined himself. He will see the carriers work. An extra shilling to head-boy will encourage carriers to an extra mile or two. If boys work well, give a little extra rice on very hard days. Treat them as school children, never relaxing firmness, but always kind. For your own health, *walk*, only using hammock in heat of day. Never use hammock early in morning, as that means a sleep, followed by chill and a fever. Head-boy will do much for a good "book" (credentials). Head-boy must discover thieves, or pay for their thefts. He is held accountable for everything. If boys break back, you have to engage fresh carriers. If you can catch runaway, hand him over to nearest white official. Interpreter's duty is to go ahead to a village and inform chief of your coming and need of a house. Pieces of cloth, according to rank of chief, form his present. If no chief, but only head-man, behaving decently, give bottle of gin. French coast gives best facilities for keeping staff, because each staff-boy has a book signed by officials, which

he has to show on his return from a trip, and which contains your entries, good and bad.

*South Africa.*—Go to chief for boys. Cargo up to 120 lb. for 15- to 20-mile day's march. Up to £2 a month, head-boy £3. No advance on wages. 1 lb. mealie meal and salt for rations. No hammocks. Head-boy with sickle makes grass bed. No liquor. Give present to chief when boys return.

*Lapland.*—Finns will carry 60-lb. load 20 miles in a day; Lapps will carry 55-lb. load 30 miles.

*Chinese* use 6-ft. pole, carried on shoulder, of pine wood or split bamboo, 5 in. wide, shaved to fine edges, tapering to ends, 8 lb. to 12 lb. Slung baskets, or platforms carry cargo. Average load, 80 lb.

*Red Indians* knit woollen strap, 4 in wide, 10 ft. long, to lash up load; middle of strap pulung at forehead, arms free.

## VI.—CROSSINGS

*Bad Ground.*—Carriers are saved labour in getting cargo across, if you station them a few feet apart in line, to pass parcels from hand to hand, as with bucket train at a fire.

*To Cross Streams.*—Use a jumping pole, or swing across on a rope slung from overhanging tree.

*Ford.*—Where river snakes through meadows, note at which bend the near bank makes longest, sharpest promontory. At the end facing the far bank, the best line for fording is on either hand at right angles to your front, and towards nearest promontory on far bank.

## CROSSINGS

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This assures good entry and landing. A foot in swift water, carry heavy weights in hands to counteract weight of current. To avoid mud or quicksand look for pebbles on bed.

*Crossings without Horses.*—Men who cannot swim should be buoyed up with floats, secured under armpits, and towed across. A swimmer can tow a man who holds him by the hips, but is apt to be strangled if held round neck.

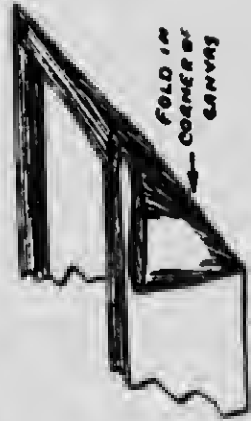
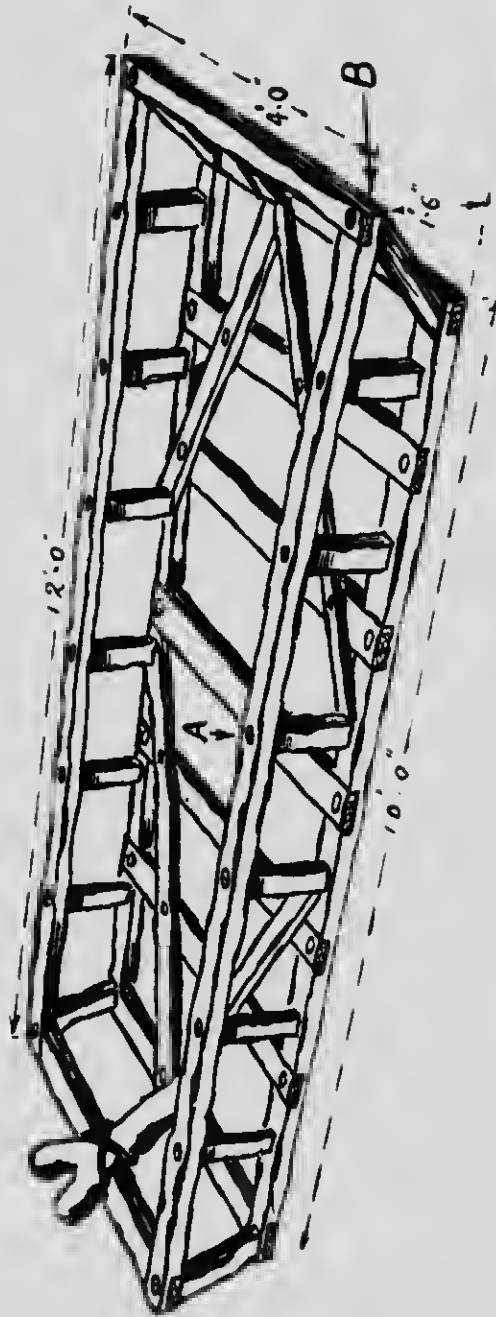
*Floats*—An intestine blown out, and tied up, coiled round neck or under armpits. Empty bottles corked, and worn inside shirt.

*Rafts: Materials.*—Poplar, dry pine, cedar, bamboo, skins distended by bellows or with hay, gourds, calabashes, petroleum tins, empty barrels, wicker and clay baskets. Eight ordinary corn sacks distended with grass or brushwood, will float one ton, and any sacks or bags will float a man in rough water. When thoroughly wet, canvas stops leaking except at seams.

*Swimming Horse.*—For small crossings, unfasten buckle which joins the reins, and dispense with down-stream rein, throw stirrups across saddle, and keep in saddle. In large crossings, stay in saddle till horse strikes out in right direction, then slip astern, grab his tail and float. In the worst rivers, some horsemen swim holding stirrup on down-stream side, so as not to be washed against horse, and steer by splashing his face. To persuade a mulc, back him into water hock-deep, then turn him round and he'll swim. In swimming a bunch of horses or cattle, a rider must lead to give them confidence. Very crank canoes and boats should not be used for towing a restive animal.

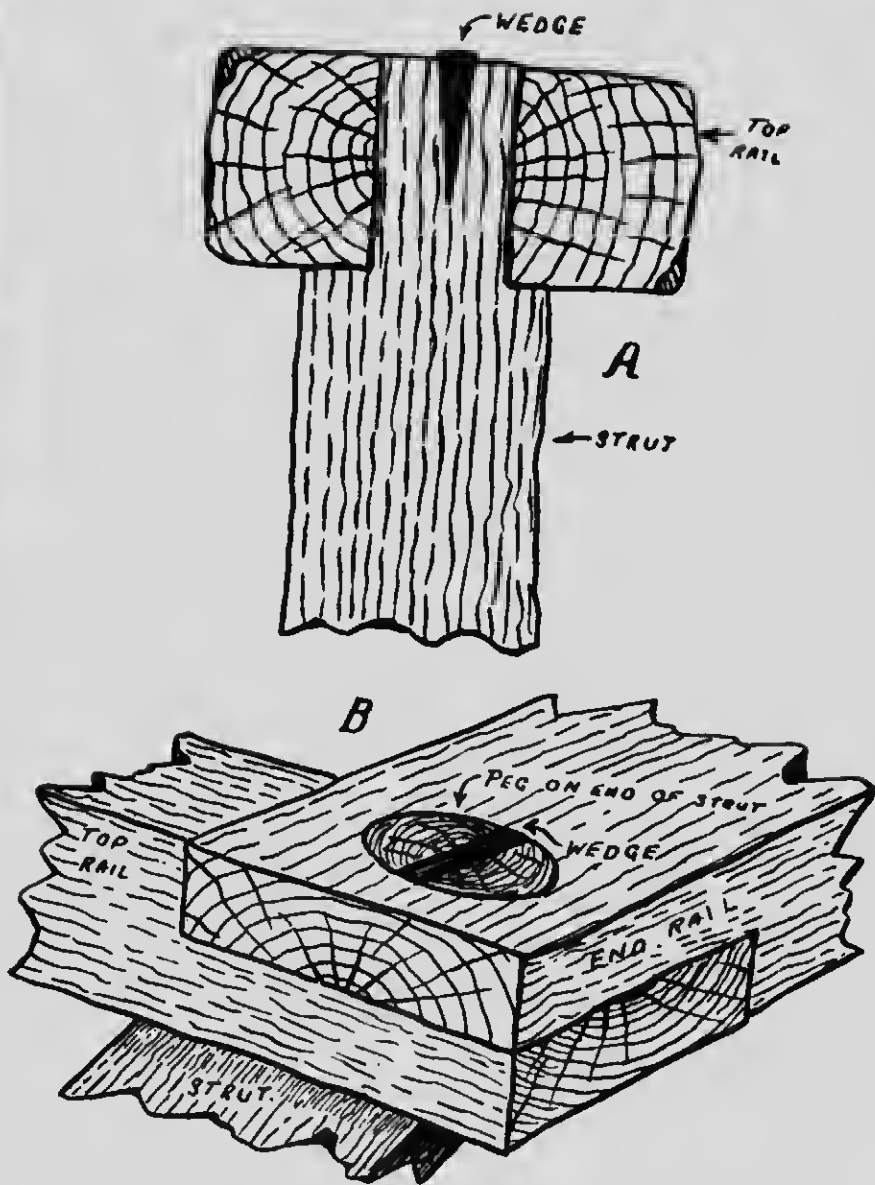
*Swing Bridge for Carriers.*—A tree, felled on either





CANVAS PUNT.

FRAME OF PUNT BUILT OF ROUGHLY SQUARED GREEN TIMBER,  
MADE IN A DAY WITH AXE & AUGER ONLY  
DEAD WEIGHT CAPACITY  $\frac{3}{4}$  TON



FULL SIZE DETAIL OF  
JOINTS AT A & B

bank to fall up-stream. The stream swings the heads of the trees outwards until they entangle, forming a blunt angle pointing up-current, which serves as foundation for bridge.

*Pont.* By Linton Hope, L.F.—To instal a ferry punt on a swift river, stretch a rope (wire if possible) across just above the drift or landings. The punt is then attached to the cross rope by two lines, one at each end, which have single blocks (or a large thimble) stropped in the end and travelling on the cross rope. To cross, haul the punt up, shorten the head line, and slacken off on the stern line until she is at forty-five degrees to the current, heading *up-stream*. The current will then run her across to the other side. To return, reverse the position with regard to the cross rope, so that the punt again heads up-stream at forty-five degrees, pointing towards the opposite bank. An anchor in the centre of the stream and a long cable attached with a bridle to the punt will have the same result on small rivers, but is not suited for large ones. The whole principle is that the current strikes the flat side of the punt at an angle of forty-five degrees and pushes her across the stream.

## VII.—MAKING BOATS, CANOES, AND RAFTS

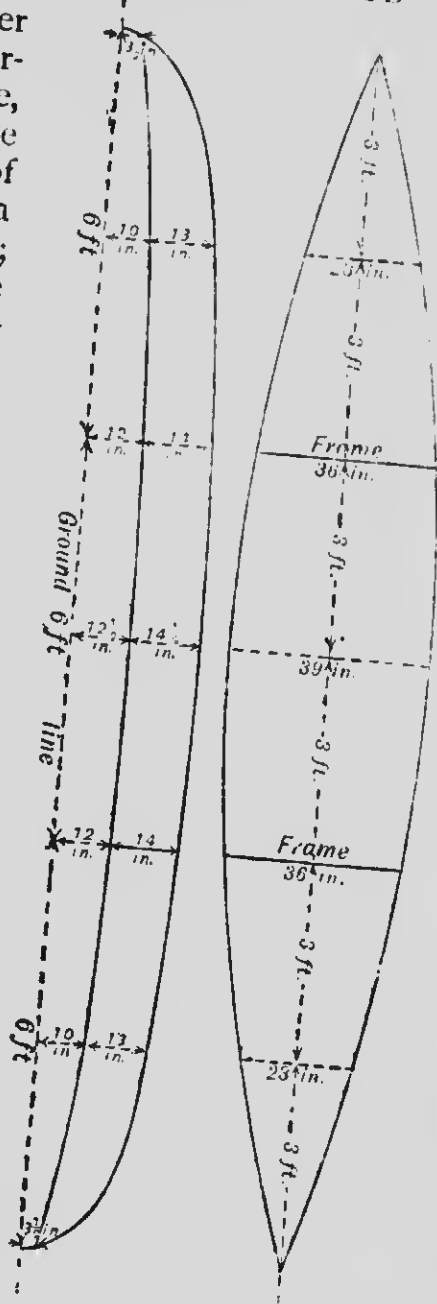
BY LIEUTENANT LINTON HOPE, L.F.

Cut thirty-four straight supple poles about 15 ft. long, and 1 in. diameter, tapering to  $\frac{1}{2}$  in. diameter at ends, also four similar poles 4 ft. long, tapering from a full  $\frac{3}{4}$  in. to

bare  $\frac{1}{2}$  in. Lash the latter in pairs, butt to butt, overlapping 18 in. String, hide, or bark lashings may be used. Find a piece of level ground and set out a straight line 18 ft. long; divide this line into three equal parts by two transverse lines exactly at right angles to the first. Set off  $16\frac{1}{2}$  in. along each cross line from the centre, for the ends of the two frames.

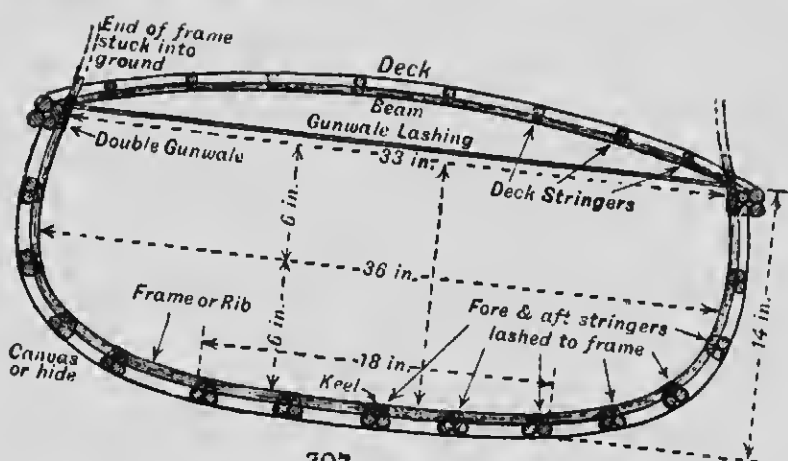
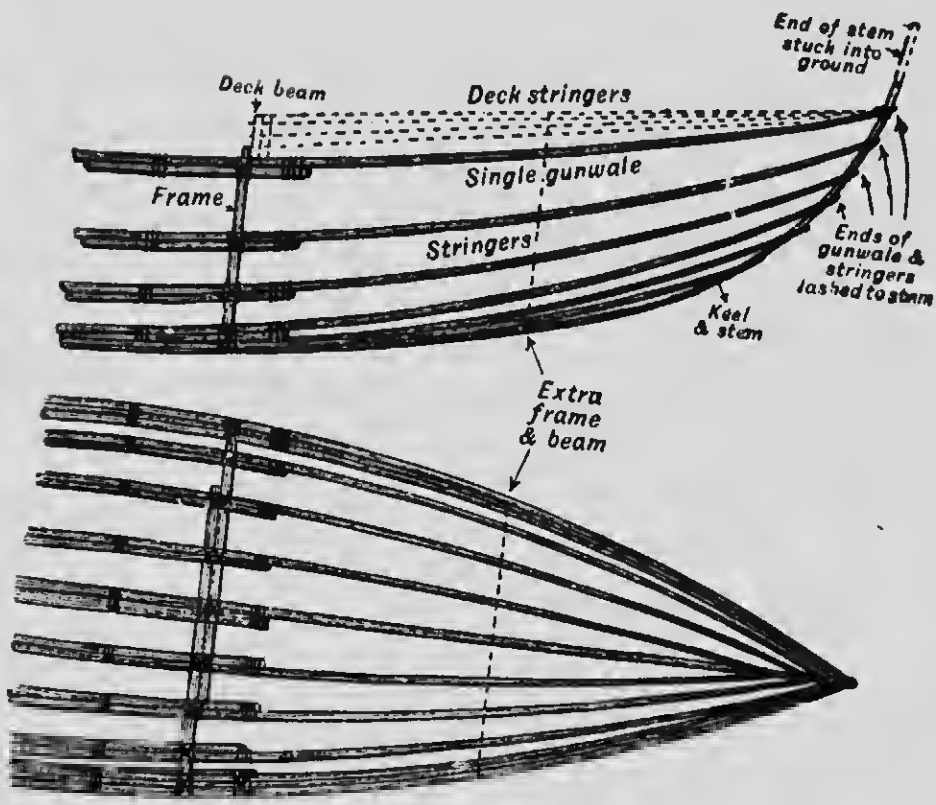
*To Make the Frames.*—A pair of the short poles must be bent to the shape shown in the drawing, and lashed across the ends with the gunwale lashing to keep it in shape. These ends are then stuck firmly in the ground at the points on the cross lines already marked off,  $16\frac{1}{2}$  in. from the centre. See that the two frames are as near the same shape as possible. Any irregularities can easily be corrected by lashings and struts across from side to side.

*To Make the Keel, Gunwales, and Stringers.*—Lash



the long poles in pairs with 7-ft. overlap, and with lashings about every 9 in. along the overlap.

*Setting up.*—Take the longest and stoutest pair of poles and bend as near as possible to the shape of the profile of the canoe, sticking the ends well into the ground as before. Lash this keel in the centre of each frame firmly. Bend two more pairs of poles round the frames at the gunwale line, which can be measured up from the ground. Lash firmly to frames, stem and stern, keeping the curve fairly full at the ends. Lash six intermediate pairs of poles as stringers each side, at equal distances round the frame and to the ends, keeping the two sides and ends as much alike as possible. When all are securely lashed, cut off the ends close to the lashings, and cover the whole with canvas or rawhide, sewn on with string, hide, or bark. Pleats will be necessary in the ends to obtain the shape, and these should be turned *up* from the keel, and made as high up the stem and stern as possible. When the canvas or hide is in place, an outer pair of poles must be seized on outside the gunwale as a protection from the paddles. Canvas should be painted, or dressed with grease, and hide should be put on wet, and when dry, dressed with oil or grease. If the canoe is for sheltered waters, such as small rivers, etc., a pair of straight cross poles must be lashed across the frames to tie the gunwales together, but if she is for rougher waters, the ends should be decked, and curved deck beams must be lashed across the frames as shown, with a permanent gunwale lashing underneath; a second beam should be fitted halfway between the frames, and the ends of the boat and deck stringers lashed fore and aft on the beams, the whole being covered with the same material as the rest of the hull. The central opening



may be further shut in by side decks constructed in the same manner, and such a canoe will carry two men, and keep the sea in fairly bad weather if handled by experts. She is to all intents a true whaleboat, which is the finest sea-boat known. She is also easily made, very light and strong, and will carry a lot of stores if the latter are properly stowed. Canoes on this principle may be made of any size, and in countries where they grow, bamboos are very suitable for making such a craft. They may be paddled with single bladed paddles, rowed with oars, or sailed. For this purpose a small mast and sail should be fitted at one of the frames, and a board about 12 in. wide and 3 ft. deep, should be hung from the lee gunwale to stop leeway. The position of this lee-board can be varied fore and aft, until the boat nearly steers herself. The steering is done with a paddle over the lee quarter.

In Canada, somewhat similar canoes are made of one piece of bark from the paper birch. They are often made without any frame, but are very frail. Pine gum and resin are used for patching and stopping leaks. Resin and tallow are best.

*Rafts.*—If soft light timber is plentiful, make a log raft, lashing the ends of the logs together with a cross pole at each end. If no suitable timber can be found, make a frame of poles, and lash bundles of reeds or even dry grass under the frame until it will support the required load. Inflated skins or casks are better than bundles of reeds, if obtainable. Don't try to make a raft of hardwood: it won't float anything beyond its own weight; it is very hard to work, and spoils your axes for nothing. In crossing rivers infested with crocodiles, make all the splash and noise you can, as they are usually timid. The same thing often applies to sharks.

VIII.—NOTES ON THE RIG AND MANAGEMENT OF A SMALL SAILING VESSEL

BY ERSKINE CHILDERS, L.F.

The notes are for rough general cruising. I assume throughout that the Frontiersman is short-handed, or even single-handed.

*Rig.*—It is of the utmost importance to have your canvas so disposed as to be handled as simply as possible, and with as little labour as possible. The two things are not necessarily the same. For instance, a standing lug in a small craft requires only one simple halyard, but is on that account proportionately heavier to hoist than a mainsail with throat and peak halyards. Conversely, a yawl involves two after-sails, but each is proportionately smaller and lighter to handle. The decision should depend on the size of the vessel. For the smallest class of open boat, use a standing lug; for the next class, say up to 20 ft., a standing lug and jib; up to 35 ft. or thereabouts, a yawl; and beyond that, a ketch. I have omitted the cutter rig proper, and of course a well-designed cutter is an admirable boat, especially for speed, but it is not so handy as a yawl or ketch, owing to the relative size of the mainsail. If you are committed to a cutter, on no account have a long boom projecting over the taffrail. It will embarrass you in a vital matter—reefing.

For simplicity and safety of handling, nothing beats the ketch. Both mainsail and mizen are easily managed, and both are real driving sails, and can be used independ-



dently of one another. The mizen of a yawl, on the other hand, cannot be regarded as a driving sail, least of all in working to windward, but it is a great convenience, and for purposes of heaving-to in bad weather, a great element of safety.

*Anchor and Cable.*—Let the main anchor err if anything on the side of bigness, at least a pound to every foot of boat's length. This is a point where you must not consider labour, and the same applies to length of chain cable and length of warps. In riding out a gale, quantity of ground tackle is as important as quality. For warps use coir if you can. Its lightness, coilability, and general manageability, combined with strength, are extraordinary; but treat it with the utmost tenderness. If you are riding to a warp, carefully parcel with sacking or other waste material—(the jacket off your back, if all else fails!)—every part which is in the least danger of chafing. Contact with a sharp edge or excrescence of any sort, wood, wire, or iron, will chafe a warp through in no time, when it is under strain. You should have at least one, and, better still, two or three spare anchors of smaller size. And here again don't shy at weight. It seems a pleasant thing (say when you are anchored in a tideway) to tumble a very light kedge into the dinghy, row it away, and toss it out; but if it blows a gale at midnight, and you have swung to that kedge, you would give your bottom dollar to know it was a bit heavier.

*Compass.*—Theoretically, the smaller the boat the larger the compass you need. The theory may be pushed into the regions of extravagant paradox, but the principle is sound. The smaller the boat the more violent the motion, and the greater the necessity for a

## RIG AND MANAGEMENT OF SMALL VESSEL 211

steady needle. Arrange as best you can, but don't regulate the size of your compass rigidly by the size of your boat. If it is humanly possible, fix the compass below deck behind a little window. It will save an infinity of trouble with the binnacle lamps in rough, rainy weather. Be sure no spare anchor or other piece of iron is stowed near the compass.

*Centre, or Lee-board.*—If there is any question of a centre-board or lee-boards, for rough work, especially in strange waters, use lee-boards, which, by the way, may be improvised without much difficulty. What you lose in speed, you will gain in security. If an iron centre-board touches the ground accidentally, it is liable to buckle and jam in the case, with the result of endless embarrassment and grave risk. A lee-board merely slips up and warns you of shoal water.

*Care of Rigging.*—Keep a close and suspicious eye on all running rigging, especially with a view to chafing. Examine blocks frequently for any signs of splintering, however trivial. A little splintered sore will ruin a halyard rapidly. Watch the serving of the jib-sheets where they cross the forestay. See that every cleat presents a perfectly smooth and rounded surface to the clutch of the rope belayed to it. Be pitilessly sceptical about the condition of wire rigging, especially the bobstay. Wire is often healthy in appearance, but rotten at the core. Distrust, too, the stem-bolt of the bobstay. Being just between wind and water, it is very liable to corrosion.

*Beating to Windward.*—This delicate art would require a treatise by itself. I offer only a few major hints. The most important rule of all, but the least appreciated by most beginners, is to keep the sails full

and the boat going well. In his anxiety to keep close to the wind, the tyro is wont to keep too close, starving the sails of wind and crippling the vessel. It is better to be too full than too close. At the same time, the helmsman must be ready to respond to the slightest change in the direction and force of the wind, to seize his advantage should it "free" a little, and forestall it should it come more ahead.

To keep your vessel moving well is the only way to keep her under control. This control is most necessary, and yet most difficult to maintain, when the sea is heavy and the wind strong, and the smaller the boat the more pressing is the necessity. A light hull loses momentum very rapidly. Timidly steered, with excessive luffing into the wind, she will not only make little headway and much leeway, but is liable to stop dead and fall off into the trough of the sea, the most dangerous of all positions. If you positively must round some headland against the wind, or beat off a lee shore, there can be no compromise; you must harden your heart, risk taking water aboard, and keep her hammering through it all she knows. In this, as in many other situations at sea, nerve and audacity spell safety, and what passes for caution spells disaster.

*Beam Sea.*—In bad weather, to sail with the wind on the beam and broadside to the trend of the waves is the most difficult and dangerous task a small craft can undertake. By adroit luffing to meet the most vicious seas, the thing can be done, but with the sea rough beyond a certain degree the job becomes impossible, and the only resource, short of heaving to, is to steer for a time to windward of the true course, and regain it again by running off.

## RIG AND MANAGEMENT OF SMALL VESSEL. 213

*Running before a Heavy Sea.*—This is to be regarded as a difficult but quite normal undertaking in all general cruising. It requires two main things: confidence, and a firm but *light* hand on the helm; confidence, because the job is not nearly so perilous as it looks (any decently designed and decently steered boat can do wonders before a very formidable sea); a firm but *light* hand, because the great thing is to keep a steady course, without sheering and yawing, with the risk either of broaching-to, or gybing all-standing. Learn to *check* the vessel in good time, whichever way she tends to sheer, with just that amount of pressure on the helm—and not an ounce more—that will keep her straight. A little too much, and she will plunge off in the opposite direction, requiring violent pressure to bring her back, and again violent pressure to stop another yaw. Result: exhaustion and demoralisation to the helmsman, and ever-inminent risk of a smash-up. Remember that the farther forward your canvas is, the better your control. Furl the mizen, if you have one, and run under close-reefed mainsail (or trysail) and jib. The mizen, especially if the wind is on the quarter, will give her an enormous access of weather-helm, which will tire you out.

Running on a compass course *dead* before the wind is a very troublesome operation, and one very exacting to the nerves, owing to the constant risk of a gybe all-standing. If you feel unequal to the strain, it is safer to bear up slightly out of your course, gybe later, and regain it.

Gybing in heavy weather is a hard and delicate job if you are short-handed. If you are actually single-handed, my advice is, when in doubt, not to attempt it at all, but as a matter of course to “stay” the boat. Flatten in your jib-sheet, wait for one of those periodical

"smooths" which recur even under the worst conditions, bring her round with decision, but by no means so abruptly as to lose forward way, hauling in the slack of the main-sheet as she comes, tack, and, if the "smooth" still holds, bear away before the wind again. If the "smooth" does not hold, don't get flurried, but leave the jib-sheet a-back after staying, and wait so, hove-to, until the next "smooth" appears. Choose your moment, and keep her away before the wind again.

*Heaving-to.*—If conditions of wind and sea become too bad, there are two resources: to heave-to under sail, or to ride to a sea anchor. The latter is the safest, but is only possible when you have abundance of sea-room, for you will drift fast to leeward. To heave-to under sail, reduce your forward and aft canvas respectively, to the smallest possible limits, bring the vessel to the wind, belay the weather-jib (or fore) sheet (as the case may be), and flatten the main (or mizen) sheet (as the case may be) fairly close in. Then watch her behaviour, trimming one sheet or the other on the guiding principle of securing a balance between the two sails, forward and aft. You will generally find it necessary to lash the helm a little to leeward. The object of the whole operation is to keep the vessel riding as much as possible bow-on to the waves, but not so much as to have her continually shaking in the wind and then falling off into the trough. A fairly designed vessel should make a little headway all the time. These are only general hints: no two vessels lie-to in exactly the same way. It is on these occasions that the mizen of a yawl or ketch is invaluable. It is admirably adapted for balancing purposes, and enables you to get rid of the weight and leverage of the main-boom altogether.

*Sea Anchors or Drogues* may be improvised, but no small vessel (and especially an open boat) should go to sea without one ready made. Its principle is simply that it must be something which will float, and, at the same time, offer some substantial resistance to passage through the water, while offering no resistance to the wind. The simplest and best drogue is a canvas cone, about 3 ft. long, sewn to a hoop about 2 ft. in diameter, to which is attached a bridle of three ropes, ending in a short single length. (There must be a small grommet at the apex of the cone, to which to fasten the trip line.) For use, heave-to, bend a warp to the drogue rope, and a light line to the grommet at the apex (this line to be kept quite slack throughout), heave overboard, pay out 20 to 40 fathoms of warp, lower canvas, and she will ride head to sea. When you can make sail again, haul on your trip line, which will capsize the drogue, and so enable it to be easily hauled in. In default of a ready-made drogue, a canvas bucket would do, or some spars or oars lashed together, and bridled so as to ensure their floating at right angles to the direction of the wind and sea. A capsized dinghy will do at a pinch.

*Coasting.*—There are two golden rules in coastwise cruising.

1. Study your tidal currents, and *work* them for all they are worth, especially when you are dealing with head-winds, and are short- or single-handed. Arrange, if you can, to be anchored and asleep during the lee-going tide, and beating to windward on the weather tide. If you are single-handed, it is not worth while to beat against the lee-going tide, however weak. But always start an hour before the fair current makes. The foul

one will be languishing to zero then, and you will get a good start. It is useful to remember that the rough, normal rule on a clean line of coast, uncomplicated by estuaries and deep bays, is that at any given point off shore the current turns contemporaneously with half-tide (*i.e.* mean level) on the shore opposite that point.

2. When in doubt avoid the land. This may seem an ironical counsel of perfection for coasting, or it may seem a truism in view of rocks and shoals. My meaning here is that the character of the sea near the land is always more dangerous for small vessels than it is farther out. Close inshore, strong currents and irregularities of bottom make the sea short, irregular, and vicious, whereas in the offing it is longer, more regular, and comparatively harmless. I am speaking of bad weather, of course. Give a long berth to a bold, rocky headland. There is sure to be a tide-rip or "race" off it, and though you may travel faster, if the current is with you, you subject your boat to unfair risks.

*Miscellaneous Hints: Reefing.*—Always cruise with the first and second reef-pendants rove through their cringles and sheaves, and ready to be hauled down. In reefing, tie the reef-points under the foot of the sail, not under the boom. Reef in good time, before the lift of a heavy sea makes it doubly difficult. When anchored for the night in an open roadstead, or in any exposed place, take two reefs before stowing the sail.

*Anchoring.*—Don't drop the anchor until the vessel has lost headway. See that the anchor drops flukes-down and clear of the bobstay. How much cable? In ordinary fine weather, six times the depth of the water. In bad weather you can't give too much (if there is room), and your safety depends absolutely on plenty of

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*scope.* When anchoring, take bearings on the shore to mark your exact position, and watch periodically to see that she is not dragging. On a rough or doubtful bottom, attach a buoyed trip-line to the *crown* of the anchor before letting go. Trice up the bobstay after anchoring (especially important when a warp is used—for fear of chafing). When lying in a tideway, never omit to carry out a kedge anchor, broad on the beam or quarter. Make its warp fast to the main cable out-board, and pay out cable till the knot is well below the surface.

*Lacing Mainsail.*—Unless you have roller reefing gear, never have the mainsail laced to the boom.

*Dinghy.*—If you carry the dinghy on deck, lash it immovably, even in the finest weather. If humanly possible, always carry it on deck, at whatever cost of inconvenience, and however fine the weather seems at starting. To get it aboard in a seaway is a wretchedly troublesome and often an impracticable job, and in bad weather a dinghy towing astern is a dangerous nuisance.

*Shifting Jib.*—In shortening sail, begin by shifting jibs. It is a nasty job in bad weather, and had best be got over early. A brail on the big jib is a very useful thing. Pass a small line round the sail through a thimble on the roping and back through a ring on the clew. Make the end fast to the forestay. When the out-haul is let go, haul on your brail, and the jib is "muzzled" and gathered in easily.

*Lead.*—Use two leads for sounding: a small one (about 4 lb.) for shallow depths, say up to three fathoms; a heavy one (10 lb. or so) for deeper work. Do not allow yourself to put up with any slovenly substitutes, such as rowlocks or shackles lashed together. If you are travelling fast they will be useless. (E.C.)



*Boats and Canoes ascending Rivers.*—When wind and current prevent sailing, row in clear water or paddle in weedy water along the bank, using the backwaters. Where backwaters are small, and in rounding promontories, use a tracking line and tow from the bank. Track ropes must be light and long, because on a short rope the swerves may capsize canoe. Rope must be made fast low down in a canoe, and only in very stable boats to a mast, lest the leverage on a swerve capsize her. One man at stern, and another, if possible, at bow, steer with poles, while the rest tow. The bow man needs knife handy to cut adrift if necessary. On undercut banks trackers should keep inland if possible to avoid landslides. Where banks are too foul for walking, long, light, tough poles are needed for poling. On narrow rivers, having reached head of a backwater just below a promontory, paddle or row across the stream, with a strong spurt, so as to catch backwater on far side. Where the rapids are strong, a steering oar is needed for the sharp, decisive leverage, which will whip a canoe out of whirlpools. If a canoe spins in a whirlpool, strike straight down-stream, and run the rapid rather than wait to capsize. Where rapids are too risky to climb, cargo should be in 50-lb. packages, and crew provided each with a long sash, four inches wide, for carrying. Bight of sash passes across forehead, each end forming a lashing round parcel. If canoe is too heavy to carry, lay down poles or rollers, peeled, so that juice of wood makes them slippery. If vessel too heavy on rollers, use a winch. Ships have thus been portaged across country.

*Running a River.*—Inspect the whole length of a rapid before running it, and, if it looks bad, portage

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the cargo by land. Avoidance of rocks or snags depends entirely on strong rowing or paddling to give sufficient steerage way. Best man takes steering oar, and a man in either bow with a pole to head off rocks is useful. If stream is deep and clear, lower a weighted sail square beneath bows to catch undercurrent. This is useful with a head wind.

*Surf* from seaward is always worse than it looks. Strip ready for swimming. Lash everything that would sink, loose everything which would float. Prefer steering oar to rudder, as it gives stronger purchase.

*Bar.*—If wind fair and strong, sail, if not, row. Where a sea breaks round the boat, keep oars high, but ready to row the moment it passes.

*Beach.*—Back in, meeting extra heavy seas with a few strokes seaward.

*Landing in Surf.*—Swimmer reaching shore should roll over on his back before breaker strikes him, and turn over to clutch again as wave retreats.

**POWER TRANSPORT** (NOTE by "Anon.").—So far these chapters have dealt with well-tested means of travel, whereas power transport is still experimental. Animals, for instance, possess a balancing instrument within the ears. A balancing instrument has been applied to torpedoes, but until it can be applied to land vehicles, they require the use of wheels abreast. Self-balancing vehicles will only need a single rope or rail instead of a costly permanent way, so that the tactical use of vehicles will replace that of transport animals across country in war.

Both land and marine animals pick up their fuel and turn it into power as they travel, whereas both land

and sea engines have to carry so much fuel that their cargo capacity is impaired. Our pack horse would be useless if he always had to carry a load of oats. Both by land and sea the engine may in time dispense with the carrying of a heavy load of fuel.

The ancient reptilia took the air as birds. In the same way we may hope that the engine of the future, actuated by power flashed through space, will not always need to run on a mono-rail, but will in time take flight on aeroplanes.

But with the perfecting of each new machine comes a further demand upon the valour, endurance, and initiative of men. The Frontiersmen of the air will not be less useful to the State than those of the old order. Meanwhile, the best training for the work of the future is to master all present means of power transport, and to keep in close touch with each new discovery.

## IX.—THE VALUE OF MOTOR BOATS IN A NAVAL WAR

BY LORD MONTAGU OF BEAULIEU

Regarding the defence of home waters, there is now a considerable number, which I estimate at 300, of efficient sea-going motor craft, which could assist in observation duties and in case of war. These should, I think, be divided into districts, each under the command of a local officer, on somewhat the same lines as that on which the Naval Volunteer Force is organised. When the fleet is mobilised the officer commanding each portion of the coast or group of harbours would have

## VALUE OF MOTOR BOATS IN NAVAL WAR 221

control of these boats and be able to use them as his sea-sentries, and thus prevent the enemy blowing up dock gates, defence booms, or mercantile marine at anchor. For this work a motor boat could easily be fitted with small search-lights, to make this duty more easy.

The Motor Yacht Club, the majority of whose officers and members are thoroughly practical sea-going yachtsmen, might well, with the assistance of the Admiralty, initiate this scheme; and I am sure that the Legion of Frontiersmen would be glad to assist in co-operation with the Motor Yacht Club to establish such an organisation.

The motor boat is only in its infancy, and in a few years there will be quite a considerable number of these craft swift and seaworthy, which will be most useful auxiliaries to the Navy for home-defence purposes, and also assist when necessary on the high seas.

It should not be forgotten also that the intimate knowledge of tides and soundings near harbours at home which is possessed by the local motor-boat owner might prove invaluable in war. Regular pilots might not then be always obtainable, or might not know accurately enough the minor shelters which are available for destroyers and torpedo-boats. Thus I think the Legion of Frontiersmen and the Motor Yacht Club have a great opportunity for assisting in perfecting the defence of the country.

Originally motor boats were noisy, but the modern motor boat has become comparatively silent, and with under-water exhaust, which could be arranged for war purposes, they could hardly be heard at all. Such vessels attached to a war fleet, each craft being under

the control of two men, one to attend to the engine and the other to steer, would, I am sure, prove immensely valuable. Also in relation to torpedo work, it is quite possible for a motor torpedo-boat to be carried in future by every battleship. A boat only 24 ft. long, carrying a couple of torpedoes, can easily be made to attain a speed of 20 knots. Thus a craft of this kind might be able to do immense damage to an enemy's fleet. The risk, of course, to the two men and the boat would be great; but there has never been a time—and I hope there never will be—when Englishmen have been afraid to risk their lives for their country; and if an enemy's battleship could be sunk or seriously disabled, the loss of two men and a small motor boat is a sacrifice which would be well worth making.

The value of scouts in naval warfare is undeniable; and probably there is no form of boat so suitable for harbour defence, the watching of estuaries, and general patrol work in shallow water as the motor boat. A vessel of this kind, well covered over, and from 40 ft. to 60 ft. long, could go out in quite coarse weather; and, if handled by a capable steersman, should run but very little risk from storm or from being hit by the enemy, there being no funnels to give away the presence of the boat at a great distance. Motor boats being as a whole low-lying craft, they would, if grey or a neutral tint, be easily able to elude observation. For watching submarines when they come to the surface near the shore, or small torpedo boats, motor craft would be invaluable, and if armed with a small and specially designed three-pounder or pom-pom they would be able to stop quite considerable-sized merchant vessels, or, in case of their refusal to stop, could disable them by firing at vital parts,

such as the stern or stem, and thus compel obedience to instructions.

The swiftness, shallow draught, and inconspicuous hull of the motor boat will be valuable assets in naval warfare, whether for offence or defence.

## X.—MOTOR CARS AND MODERN WARFARE

BY S. F. EDGE

Modern armies calling as they do for rapid traction and transport not only of material, that is, stores and guns, but also of personnel, will undoubtedly in the near future look to the rapidly developing motor industry to solve many difficult problems arising from the mobilisation and maintenance of our forces in the field. The calls upon motor transport will be many, and they may be roughly arranged under two headings:

1. "Train" or traction of material.
2. Transport of personnel.

The first of these sub-divisions does not concern the subject of this article, as it is of the transport of individuals rather than of stores or guns that I propose to write.

The use of motor cars at the actual fighting front of an army in close contact with an enemy would also, at the present time, seem to be a question upon which it is impossible to speak with any degree of authority, for the simple reason that motor cars have not hitherto been employed in this manner. It is obvious, too, that considerable modifications and alterations in their constructional features would be necessary before it would

be safe or advisable to employ motor cars within reach of rifle fire, to say nothing of field artillery.

Protection of passengers and of vital parts of the car by means of armour plates, bullet-proof wheels and tyres, and many other points would have to be dealt with before even the question of moving from point to point across country off the main roads need be considered. I will, therefore, leave this feature of the employment of motor cars to be solved at a later date.

Cars, however, might well be attached to detached bodies, or contact squadrons, pushed out a long way to the flanks of the army as a means of preserving uninterrupted intercourse with the main body, such communications as are at present maintained by means of mounted orderlies or field telephone and telegraph. The field telephone at best is but a precarious means of communication, and liable to interruption from many causes; as, for instance, a loose horse may snap a wire, a shell may fire the grass, trees, or houses, and fuse the wires, or a spy may sever it without difficulty.

Another possible use of motor cars in the actual scenes of combat might be to use them as a rapid means of transport of a small containing force intended to seize an important point to hold for the main body advancing at a slower rate behind the small body. A bridge, the mouth of a defile, or a deep ford, given suitable conditions, might well be defended for quite a considerable period by a small force, rushed to the front by means of motor cars. It is, however, on the lines of communication that for the present the motor car will play its chief rôle.

Headquarters, situated as they are nowadays, some ten miles in the rear of the fighting line, are kept in touch with the progress of events by means of telephones

and mounted orderlies, and the commander-in-chief is seldom afforded an opportunity of personally supervising the execution of any special operation. With the advent of the car, however, it will, in the future, be quite possible for him to visit personally many different points on a European field of battle, where roads are plentiful, and this increased facility for inspection will, no doubt, often enable him to seize opportunities which might otherwise escape his observation. So much for this feature in connection with the employment of motor cars. It is impossible in an article of this length to touch but the fringe of so vast a subject, and questions of supply between base, advance depôts, and the distributing centres at the front, lateral communications, divisional and brigade staff work, are subjects which might be dealt with at almost any length, and in this relation the use of motor cars during manœuvres in all European armies is a subject that might be studied with advantage by any one interested in this latest development of modern warfare.

The transport of wounded from the front to the rear and to the base hospitals is, however, worthy of consideration even now. Any one who has experienced the jolting of an ambulance waggon (even on a smooth road), and the discomforts incidental to a journey in such a vehicle, will appreciate what an enormous improvement in the comfort of the wounded would result, were the present rough and jolty horse-drawn ambulances replaced by the smooth and swift motor transport. One of the greatest disadvantages of the present-day ambulance is the slowness of its movements, depending, as it does in many instances, upon horses which may have been worked very nearly to death, and



are also suffering from an insufficiency of food and water, lameness, and bodily injuries. It has occurred, too, that the horses of a gun detachment having been killed, the ambulance is indented upon for teams to move the guns, with the result that the wounded, for the time being, have had to go to the wall. It is plain, then, how much the ambulance service might be improved by the substitution of motors for horse-drawn traffic.

Power, reliability, efficiency, economy, and smoothness are the essential qualities which we must look for in a suitable motor for ambulance.

## XI.—RAILWAY NOTES FOR THE GUIDANCE OF SCOUTS

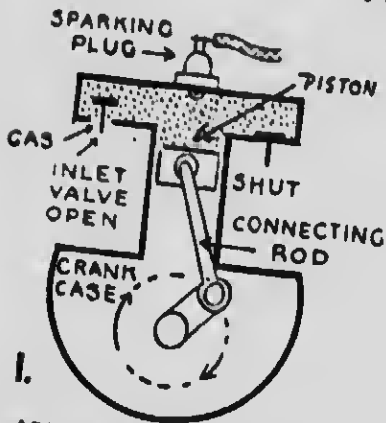
By J. T. PULLON, A.M.I.C.E., M.A.M.I.M.E., ETC., L.F.

At the outset the writer would remark that, while these notes are written for the benefit of those ignorant of engineering and railway matters, and intended to assist them at a critical moment, he is fully aware of the danger of children playing with edge tools. This is the position of a novice in handling a locomotive or meddling with a railway, but occasions may arise when these risks must be taken.

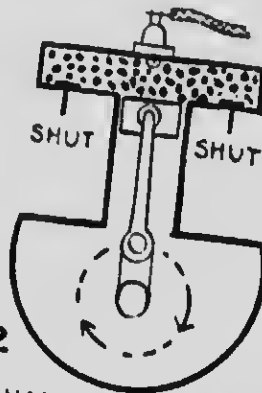
Suppose a party of scouts have been fortunate enough in the early stages of a campaign to obtain, or rather to see their way to obtaining, possession of a portion of a railway; they would have to adapt the means at their disposal to the conditions under which they found themselves in any particular case, and their methods for the attainment of their object would vary

# HOW A PETROL ENGINE WORKS

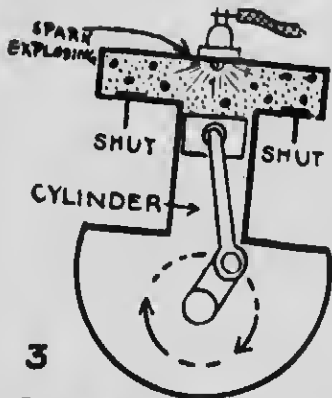
(Reproduced from "Pearson's Weekly" by courtesy of C. Arthur Pearson, Ltd.)



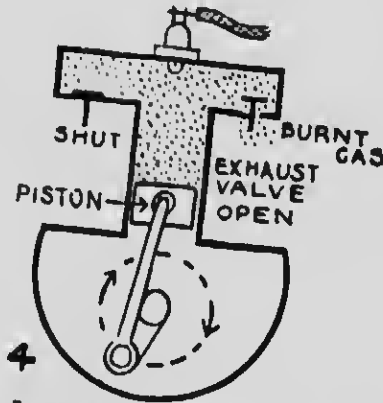
1. ADMISSION OF THE CHARGE



2. CHARGE FULLY COMPRESSED



3. EXPLOSION OF CHARGE BY ELECTRIC SPARK - POWER STROKE



4. EXPULSION OF BURNT CHARGE

DIAGRAMS SHOWING THE CYCLE OF OPERATION IN AN INTERNAL COMBUSTION ENGINE OF THE FOUR-STROKE TYPE.

in each instance. The first thing to be done would be to get as much knowledge as possible as to the actual conditions in order to act accordingly, always remembering that the enemy was quite as much on the *qui vive* and as capable as themselves.

One idea might be to obtain possession of an outlying station by holding up the few station hands and then utilising the telegraph or telephone, if such existed, in giving such orders (or bluffing) as might enable the party to get possession of a train. Or it might be that by destroying a small portion of the line or otherwise blocking it, a train might be held up and taken charge of. A capable man in charge of a small scouting party would under most conditions have sufficient resource and learn enough of the movements on the railway to plan a seizure, such as is here contemplated, of anything but an armoured train or one carrying a force of armed men, and the holding of the same. Even the latter might be blocked and hindered till the arrival of the advance column by the arrangement of schemes or traps for their derailment, such as switching them into a blank end siding (where such existed) by connecting hidden wires to the switch, and working them from ambush at the correct moment, or drawing most of the spikes and uncoupling fishplates, leaving a rail or rails loose to overturn when the engine came on them, using such appropriated platelayers' tools as were available for this.

In some cases the train might be blocked by rolling rocks from above on to the line, especially at a curve. On side hill ground or in a cutting, or a culvert might be blown up by a small charge of explosive. Other methods might be suggested, but the suitable one would depend on the conditions of the moment. It would

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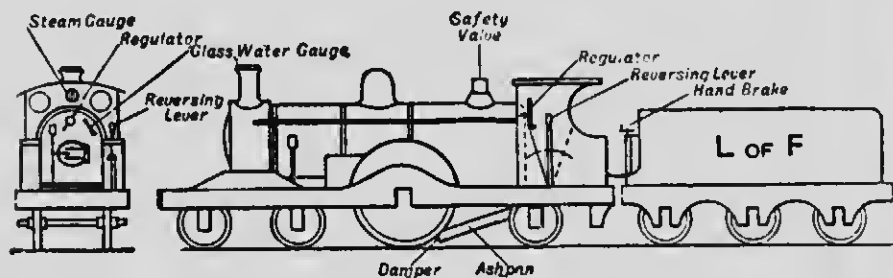
probably be necessary to destroy a section of telegraph in the direction of the enemy's whereabouts. Of course it would always be desirable that some of the scouts should understand telegraphy, and if they had some railway experience it would be of great advantage, but these notes are written for the assistance of the novice in these matters. The utilisation of the railway immediately after seizure would depend upon the conditions at the time, whether it was advisable to keep the line open for own use or to make a breach to prevent the enemy regaining or using the section seized, etc. (See Demolitions.)

Take another case. A few scouts get, say, some twenty miles ahead of the advance column, and circumstances enable them to seize an engine or train; they are unable for any reason to utilise the services of the engine-driver or fireman, and they have no railway experience. To help them to what they require, though a dangerous thing, a little knowledge, is the object of the following notes about locomotives.

A locomotive consists of three principal parts—a frame or carriage on wheels, carrying a boiler or steam generator, and also cylinders and mechanism for utilising the energy of the steam for the turning of the wheels, in order that the whole may move along the rails.

The boiler is provided with a steam-gauge to show the pressure of the steam, and a glass water-gauge to show the height of the water inside it. With regard to the latter, so long as there is water in sight in the glass there is no serious danger, but the water should be kept as nearly as possible at about the middle of its height, and not very much more. This is done by

means of the injector, which may be called a species of water-pump, without moving parts, the flow of steam through it carrying water along with it into the boiler. To start it working, the water from the tender or tank is caused to pass to the injector by turning a cock which will allow it to escape at the first by an overflow pipe, generally seen at the side of the engine, then by *slowly* opening the steam-cock of the apparatus until the water ceases to escape at the overflow the jet to the boiler will be established. If this is broken, and steam comes out at the overflow, the steam-cock must be



closed and the water allowed again to escape at the overflow, when steam can be turned on as before. The amount of water admitted to the boiler can be regulated by the suitable manipulation of these water and steam-cocks. In order to raise or maintain the steam-pressure the fire must be supplied with coal, and this is successfully done by keeping a not too thick amount of fuel, say, about 9 inches thick, over the grate, and seeing that this is always covered, putting on coal at the thin places in feeding the fire.

In order to start the engine from rest, steam must be supplied to the cylinders, to move the pistons therein contained backwards and forwards, and so through the

connecting rods and cranks to turn the wheels. The distribution of this steam causing the regular reciprocation of the pistons is controlled by the valve gear, and this gear is manipulated by a lever called the reversing lever, generally placed at the right-hand side of the engine, and capable of movement forward and backward over a notched quadrant plate. When this lever is in the centre or vertical position the engine cannot be put in motion, but if the lever is moved to the forward or backward position, it will cause the movement of the engine in either of these directions when steam is allowed to pass from the boiler to the valve-chest of the cylinders. This admission of steam is by a regulator valve, the lever for opening and closing which is situated generally at the centre of the upper back part of the firebox on the footplate. When the engine or train has got well started away the reversing lever should be moved a notch or two towards the central position until the best speed is attained, the less the load or lighter the train the nearer mid position this will be. Sometimes an engine will not start when steam is turned on, although the reversing lever be in one of the extreme positions. In this case, whichever position it refuses to start in, it must be reversed and the engine moved very slightly, and it can then be again reversed, and the engine will move in the desired direction. Sometimes this reversing lever is replaced by a screw moved by a handwheel, but the motions of the valve gear are exactly the same as already described. If on starting an engine there is water in the cylinders—and this is frequently the case—there are cocks on them controlled by another lever on the footplate, generally near the reversing lever, which should be opened and kept

open for a short time after starting the engine until all the water has escaped.

A very good lookout must be kept, and the train must be slowed down somewhat on sharp curves to avoid any chance of derailment. This may be done by partially closing the regulator, thus lessening the admission of steam to the cylinders, or the engine brake may be temporarily partially applied. Should the steam be low when the engine is standing, or much black smoke be issuing from the chimney, open the cock or valve of the steam-jet in the chimney. The pipe of this generally runs from the firebox inside the hand-rail along the boiler, and enters at one side of the smoke-box. Its effect is to blow up the fire by creating a draught in the chimney. Also there are damper doors in front and behind the ashpan under the fire-grate bars, the front one of which in the direction the engine is running should be partly opened while running. These dampers are controlled by levers on the footplate. The engine will need oil on the various moving parts, and this must be given at the earliest opportunity, when standing.

Finally, take the first opportunity of handing over the engine from the control of the novice to a competent and experienced driver, as there are many other precautions to be observed in order that an engine may continue in successful service. It need hardly be mentioned that a supply both of water and coal is necessary for continuing running, and the first chance of replenishing these or either of them should be taken, and should water run short, it may be necessary to drop the fire in order to avoid serious damage or a disastrous accident.

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*PART III*  
*TRAINING*

INTRODUCTION FOR MARITIME  
SERVICE

By E. G. P.

THE coastwise population of the empire are courageous and resourceful, and have great potential defensive powers; but what would be their present position in case of a raid or invasion? They would be as helpless as sheep; they would not, under the law of nations, have the right to lift a hand either to oppose an invader or even to assist their own national Forces. In the absence of these latter, the roads would be open to a rapid advance of the enemy's outposts, and a large district might be overrun, its population dominated, and its communications destroyed or converted to the invader's use, although it might possess sufficient resources to hold him in check had these been developed and organised beforehand.

An organised population is not liable to panic; it has responsible leaders to look to for guidance, and its thought and purpose will be concentrated on obeying their directions, whereas an unorganised population,



leaderless, helpless, and wholly inexperienced in war, may follow any coward's counsel, and the moral effect thus produced may have the most disastrous and far-reaching consequences. Also, and perhaps most important of all, where efficient organisation is known to exist, raid or invasion is far less likely to be attempted, and therefore such an organisation becomes a weighty factor in the maintenance of peace. It is the eventual aim of the Legion of Frontiersmen to provide such an organisation, and by its means to give our coastwise population throughout the empire the opportunity of enrolling or registering themselves in order that they may have :

(a) The legal right to wear uniform and defend their homes.

(b) Leadership.

(c) The opportunity of using in their country's service such skill, knowledge, or experience as they have acquired in the course of their ordinary duties or employment.

(d) The means of turning to account such military knowledge as they have been able to acquire in peace time, through rifle clubs, signalling, and scouting classes.

(e) Machinery by which arms will at a few hours' notice be available for those capable of using them.

(f) A means of co-ordinating and subordinating their efforts to the will of the central authority responsible for the defence of the empire.

These objects are clear and definite, and must appeal to all; but it may be well to emphasise the great importance of (c) all sailors, yachtsmen, boatmen, fishermen, motorists and cyclists, woodmen and gamekeepers,

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horse owners and carters having knowledge and resources which could be turned to good account without any special training beyond that required for organisation.

The Maritime Branch of the Legion is already at work among our seafaring population, and considerable progress is being made. The Board of Admiralty have unofficially expressed their approval of the movement, and their advice and co-operation will be sought as opportunity offers and occasion demands.

Mariners of all classes are being enrolled, and authorised to wear the simple uniform of the Maritime Branch of the Legion. Where possible, instruction will be given in signalling, and in the identification of warships, and all enrolled men will be available either to the Admiralty or under their own leaders, for pilotage work along the coast, or for manning any special craft engaged in the innumerable services connected with scouting, mine-laying, communications, and supply which would be developed in war.

No steps have yet been taken to organise the non-seafaring population, but the Legion is actively promoting the formation of rifle clubs, and what has been written above sufficiently indicates the simple lines upon which it is hoped to work.

Europe is often described as an "armed camp," and one great nation in particular has gone so far as to systematically borrow money for armaments, the cost of which, even in peace time, exceeds her annual resources. Such a policy as this indicates, and almost necessitates, future expansion at the expense of some other nation weaker or less prepared for war. For the moment the contest is not military or naval, but financial, and one great merit of the Legion scheme is its cheapness. .. This

is derived from its purely defensive character. Units organised for offence, and possessing mobility, are necessarily costly, and become more so as civilisation advances. Organisation for local defence may be perfected at an insignificant outlay, and the South African war has taught us the defensive capacity of an armed rural population, even if wholly untrained to modern offensive warfare. These remarks apply with even more force to our Colonial population, whose natural defensive capacity in proportion to their numbers is greater than ours at home. Some expense must be incurred, but it should be trifling in relation to the results obtainable.

The Legion does not in any way compete with the new Territorial organisation. On the contrary, it hopes to feed it by awaking patriotic ambitions which will not be satisfied with the purely defensive rôle here indicated. But the cost of the Territorial Scheme imposes a strict limit on the numbers enrolled, and in modern war "big battalions" are more than ever likely to secure the "favour of Heaven." The Legion's point of view is that it is possible, at small cost and by quiet organisation in the day of peace, to develop such defensive power and numbers as will remove any temptation which now exists to raid or invade any portion of the Empire.

There are many, and the writer of this may be included amongst them, who do not believe that an invasion, or even a serious military raid, upon the British coast is a possible eventuality in face of our present naval superiority; but this belief in no way affects our conviction that defensive organisation of this character is a national necessity. In such a matter assurance cannot be made too doubly or trebly sure. New circumstances may arise which none of us have

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foreseen, and the emergency may come when no time is left us to prepare for it. Also, and this history teaches us, the confidence bred of national preparedness would be an invaluable asset to our Army, and, above all, to our Navy, in their conduct of offensive war. However difficult or impossible invasion may be, the demand for constant protection against it, and the fear of it, might paralyse the movements of our fleets and armies at critical moments. This card has been most successfully played against us in past wars. The measure of the nation's preparedness will be the measure of its confidence, and of the freedom with which our mobile forces can be directed on whatever points the higher strategy of the campaign requires their presence. This consideration alone is sufficient to justify the undertaking, and the Legion confidently asks for the support and co-operation of all who are like-minded.

## INTRODUCTION FOR LAND SERVICE

BY LT.-COL. ALSAGER POLLOCK, L.F.

A great deal of arrant nonsense has been spoken and written about the comparative merits of Regulars and Irregulars, chiefly indeed by people who are entirely ignorant of the strong or weak points of either, but also by sundry bigots, who, deeply impressed by the value of that which they do not understand. The real truth, of course, is that Regulars and Irregulars have each their particular spheres of usefulness, and should

be employed accordingly. Whether ideal Regulars should be considered equal to, better than, or inferior to ideal Irregulars is merely an academic question, which it would be waste of time to argue. All we know with certainty is that good Regulars, if skilfully led, and fighting under conditions not utterly unfavourable to them, will always beat bad Irregulars; and furthermore, that ideal soldiers, in whom are perfectly combined the qualities of the best Regulars and Irregulars, simply do not exist.

The nearest approach to the ideal that is recorded in history was furnished by the famous Light Division in the Peninsular war. In this solitary instance each individual officer, N.C. officer, and man had been so admirably trained that he was a scout and skirmisher, almost equal to a Frontiersman, while the units of that Division were at least as well disciplined and trained, *as units*, as any others in the Duke of Wellington's incomparable army.

The ideal unit would, I think, be one composed of officers and men, all of whom were thoroughly experienced Frontiersmen, while, at the same time, trained and disciplined, in the Regular sense, up to the standard of the Brigade of Guards. The difficulties, however, that would obstruct the production of such an ideal unit appear to be well-nigh insuperable. Given the Frontiersmen, and assuming their willingness to commence, and their patient perseverance in submitting to, the necessary course of drill and discipline, an inevitable result would be a considerable reduction of their individual value; what had been gained by making them first-rate Regulars would have been lost by crushing, to a great extent, the ready initiative, born of self-reliance

and founded on experience, which had formerly rendered them so especially efficient as scouts and skirmishers. Nor, upon the other hand, is it possible by means of any artificial system of training, carried on amid civilised surroundings, to render Regular soldiers individually equal to men who have learned their lesson, by sheer force of circumstances, during a nomad life on the South African veldt, the Canadian backwoods, the Australian bush, or the "back-behind" of any wild territory you please. Only when a man's life actually depends upon the sharpness of his own wits can those wits be fully cultivated to that end. The expert Frontiersman represents the survival of the fittest, hence the impossibility of producing him by artificial means. The only method by which the desired result might be obtained must be dismissed as nevertheless impracticable, because of the extreme difficulty of actually applying it. If the officers and men of a Regular unit, trained as such up to the Guards' standard, could be sent afterwards, for half-a-dozen or more years, to live the life of frontier pioneers, it appears fairly certain that if recalled for service in case of need, the survivors of them would be found capable of adapting themselves to circumstances, performing *in the ranks* the part of Regulars, but when isolated, or in small parties, throwing off the shackles of Regularism, and reverting to the rôle of the tried Frontiersman. Thus, and thus alone, might such conflicting elements of military efficiency be induced to amalgamate. The finished Frontiersman cannot afterwards be turned into a Regular, and all corps formed of such men should therefore be treated accordingly; the fact that they are Irregulars, not Regulars, should be frankly recognised by those who command them. The

promoters of the Legion of Frontiersmen have wisely recognised, as a fundamental element of its constitution, that the value of the Legion rests upon the efficiency of individuals as Frontiersmen, and also as skilled or rough-and-ready craftsmen, not of units, and have therefore regarded the unit as an administrative rather than a tactical organisation.

Discipline, so far as it applies to the obedience to be rendered by a subordinate to his chief, is not the stumbling-block to the efficiency of a unit composed of Frontiersmen that is so often and ignorantly supposed. Every true Frontiersman recognises that when men are called upon to act together for a common object, they can do so efficiently only when handled by a competent leader, whose word is law. A member of a band of Border Pioneers who refused to obey orders would obtain but short shrift from the boss, and the other men would fully approve of his summary execution. But the Frontiersman expects that the orders he receives shall be confined to giving him his job, while leaving him free to do it in his own way. Therefore the leader of partisans requires tact as well as firmness, if he is to get out of his men the best work they are capable of.

The principal difference between Regular and Irregular units, in point of utility, is that in the former case fighting value rests principally upon a basis of *collectivism*, and in the latter upon *individualism*. Sometimes the one and sometimes the other will be found superior for the purpose in hand. A body of one hundred Irregulars is composed of *one hundred individuals*, but a body of one hundred Regulars is *one unit*, in which the individuality of each man is merged in the mass. To explain my meaning I will give an

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example. Let it be assumed that Sandow has never pulled in a tug-of-war team, and that we have at our disposal ten Sandows. Against the untrained team of Sandows we oppose a first-rate team, trained up to Naval and Military Tournament form, but scaling, say, two stone per man less than the Sandows. Team against team, the trained team would win, in spite of its inferior weight, but pit man against man, and the Sandows, by dint of sheer weight and strength, would have it all their own way. In war, the question of superiority would similarly be decided according to circumstances. In one case a Regular unit, because trained to fight *as a unit*, would beat much larger numbers of Irregulars, individually superior in all the natural qualities, while in different conditions a band of Irregulars would vanquish a Regular unit numerically stronger than itself.

It is the business of a commander in the field who has Regulars and Irregulars under his orders, to use them respectively for the particular services for which they are most suitable. For example, if a hill occupied by the enemy is wanted *immediately*, send Regulars to take it by storm, and if the troops sent are good enough to face the resistance encountered, they will win the hill without loss of time, but probably at a great sacrifice of life. If, upon the other hand, time does not press, send Frontiersmen, who will in due course shoot the enemy out, at a cost comparatively small. Again, if it is desired to discover where the enemy is, or to make things uncomfortable for him by petty surprises, a few Frontiersmen will be of greater value than many Regulars. Meanwhile, it must not be overlooked that during prolonged hostilities, good Irregulars, properly



led, acquire automatically the powers of intimate co-operation that at first belonged only to the Regulars. Their individual excellence will remain unimpaired, while collective excellence will have been added thereto. But when such conditions have been reached, these Regular-Irregulars will be a precious possession to be carefully husbanded for use only in special circumstances—circumstances in which the success of an enterprise depends upon small numbers, so as to escape observation, but when the few must be of superlative quality in order to overcome when arrived, the resistance of many. In any case, however, good Frontiersmen ought not to be squandered needlessly in the attack of positions; their proper rôle is to furnish exceptionally sharp “eyes and ears” to the strategical and to the protective cavalry of a force in the field, and also to act as handy men in a variety of crafts. A British Army well supplied with Frontiersmen might be defeated, but it could never be surprised; nor could it ever be at a loss for men capable of plying, at all events in a rough-and-ready fashion, almost any imaginable trade.

EDITORIAL NOTE.—Although many books are noted as useful in a Command Library, one only is commended to all our members: the “Field Service Pocket Book,” issued by the General Staff, War Office, and to be had from any bookseller at 1s. net.

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## TRAINING

Having limited our membership to Pioneers, Seamen, and ex-Soldiers, we are organised on military lines, to provide the chain of authority through which orders can be conveyed and discipline enforced.

Our duty in the field will be to obey orders, but our training must provide for the special duties which a general officer is likely to entrust to trained civilians. These duties may include those of:

- (a) Guides and linguists, for the seat of war.
- (b) Scouts, to find out and report on the strength, condition, movements, and position of a hostile force, and the points from which he can be attacked, as well as on routes and supplies upon a line of march.
- (c) Craftsmen, to help departmental units of the Regular Army.
- (d) Pioneers, to destroy or remove stores, or block routes on the line of an enemy's advance or retreat.
- (e) Irregular horse, to annoy enemy, damage his communications and depôts.
- (f) Men to replace garrisons and thus relieve Regulars for service in the firing line.
- (g) Trained leaders, to raise units for any of these services.

No attempt should be made to instruct craftsmen in their own trade, though facilities may be given to enable them to learn the method in which their trades are carried out by the Regular Army.

In order to provide men for the other duties, the following are the subjects in which they should be trained

by their officers, assisted by members who may be already expert in any of the subjects :

## I.—SCOUTING AND RECONNAISSANCE

INTRODUCTION. By Captain A. Owen Vaughan.

The first need of a general in command of an independent force in the field is to know what he has in front of him: what he has to meet and beat, not only of men and weapons, but of country to be crossed and positions to be taken.

As to the ground, there are usually maps of varying degrees of accuracy and detail, while, as to men and weapons, he took over certain information when he took over his command from headquarters at home. It is now necessary to test and complete both groups of information. But what means are available?

First of all, there are spies. The question of spies is not a pleasant or a settled one, and it may suffice to say that any spy not of the general's own race is an utter scoundrel on the face of things. He is not working for the patriotism which might excuse him, but either for gain or for that love of doing evil which is a disease in some minds. The general, therefore, is bound to be distrustful of the reports of such spies, who may all the while be in the service of the enemy. He is driven to test it, as well as to supplement it by any other possible means. It is mostly for this purpose that mounted troops are trained in the art of reconnaissance.

A reconnaissance is an expedition for the collection

of information by stealth or strength. Whether done by stealth or strength, it is work that calls for the highest possible skill, courage, and resource in all concerned, for it must of its nature be undertaken by a few men, who must deliberately cut themselves off from the rest of the army, and ride, without support or chance of help, against the face of the enemy in his strength.

But reconnaissance, at its best, has the grave drawback that it cannot easily be done without its existence coming to the knowledge of the enemy. Once the enemy finds out that, say, his dispositions as well as his strength have become known, with all the possible plans that they imply, it is obvious that he has only to modify or change those dispositions, and then the information brought in by the reconnaissance becomes an active danger to any general who should act on that alone. The weakness of reconnaissance, therefore, being that of its becoming known to the enemy, the simplest remedy seems to lie in reducing the strength of the reconnoitring party to such a number as may suffice, see without being seen, hear without being heard of, to get to know without being known of. And here the logical deduction is the right one, for the finest collector of the information required is the expedition of two men, one picked man and his partner. But when it comes down to this, the affair is no longer known by the foreign name of reconnaissance, but by the native British name of scouting.

In Cromwell's day the Chief of Intelligence was known as "The Scoutmaster General," a title which would hardly do for the modern Chief of Intelligence, for this latter must deal in spics also. And here it may be well to emphasise the fact—which even some officers seem

sometimes to forget—that the scout and the spy are at opposite poles apart. The spy works by passing himself off as the staunch friend of those he is betraying. The true scout never puts off the marks that he is an enemy. He wears his uniform and carries his weapons, so that, if he is discovered and brought to touch, he may fight it out openly and honourably, escaping with his information if he can, or dying if he must, without a stain upon his honour, and with the respect, if with the hatred, of the foe. Compare that with what happens to the discovered spy.

But if the ordinary reconnaissance requires that every member of it should be one of the best, then how much more is this so in the case with the ideal scout? Courage and resource are not enough in themselves for his work. To those qualities he must add long experience of working in danger, in difficulty, and in hardship. Peril, difficulty, and endurance must have so been his daily life as to have bred an endless alertness of mind, a sleepless habit of observation and instant deduction, a resolute will to face facts as he finds them, such a sub-conscious self-reliance as sees a desperate situation instantaneously simply in terms of what is required to master that situation, and a judgment which weighs any problem, not by other men's theories and formulas, but according as he sees things himself at that moment. And over and through all these things he must have some ideal of some sort which makes him trustworthy.

For, once your scout has left the outposts behind him, and passed into the nearest cover, or into the darkness of the night, what warrant have you of him and his work, save his own honour? It stands to reason that he must have not only brains and courage, but some sort of ideal

to work to, however unorthodox that ideal may seem to the "unco guid," if he is to be the man on whose report armies must march and go into battle, plans of campaign be changed or modified, the fortunes of the race and the honour of the Empire be staked. Of all the men who take part in a war there is not one of whom higher qualities are demanded than the scout. Remember there is no one to witness what risks he runs, or whether he shows heroism or fails of it at a critical moment. He is sent out to get information, usually with a time-limit to conform to, and his report is the thing the general must act upon. It is when one thinks of it like this that the question comes up insistent—"Where shall we look for scouts?"

The answer is clear—the only real training life for the scout is the life of the Frontiersman, of the man who has to deal with wild nature continually. Here, then, is one part, and a part of prime importance, which the Frontiersman may take in a war vital to the Empire.

It may be objected that the raw Frontiersman cannot be brought straight to the general, receive instructions, and forthwith ride out scouting, because he knows nothing of the peculiarities of the country or the people, and nothing of the component elements of an army, the needs and uses, strong and weak points, possibilities and probabilities, of these elements. But there is an answer to that. Where is the country, and where the people, with which we are likely to be at war, without its sprinkling at least of our wanderers who know both well? Let the scout take one of those wanderers as his partner, and he absorbs the necessary knowledge as he goes, learning of the country, its people, and their language, as need arises. As to the necessary know

ledge of the elements of an army, their values and weaknesses, it takes short time to master enough of that for working purposes.

But if the power of reconnaissance is best represented on certain occasions by the scout and his partner, two Frontiersmen, it follows that reconnaissance itself, where it must still be undertaken, is best undertaken by Frontiersmen also. And here, as to reconnaissance.

A scout at his best, and for particular purposes, is the power of a whole reconnoitring party in one man, with an advantage in secrecy which the ordinary reconnaissance lacks, yet he cannot wholly replace reconnaissance as a procurer of vital information. Take, for instance, where the army is following a retiring enemy, or feeling the enemy's set advance; or take the necessary duty of keeping the flanks of an advancing or retiring force to which the scout is attached. Here a reconnaissance can beat a scout, if for no other reason than that it can make its own pace, where a single man, or a pair, might have to halt, hide, or double and dodge to such delay as to render the information no longer of use. Again, though one ride through hell to gather information, and get it, yet it is absolutely useless till the general has it, and here, as the information required is mostly of a definite kind, and may need to be with the general in a definitely short time if it is to be of use at all in the changing dispositions of the forces, the reconnaissance has one vital advantage over the scout. It is obviously easier for the enemy to kill or capture one or two men than a dozen or a score, and even if the reconnoitring party be surrounded, it can still charge the enemy with fairly certain hope that one man at least will get away to the general with the all-important information, in which case the

killing or capturing of the rest is a mere matter for the casualty-list.

Yet out of this instance will be seen a vital reason why even the members of a reconnaissance should be of the same class as the scout; should, in fact, be experienced Frontiersmen; for it is essential that the one man who escapes shall be such a man in every way that he will have absorbed as much information as any other man of the party, and can give it to the general in such a way that the latter is satisfied to act on it with certainty and vigour.

Still further, in the constantly changing circumstances of such advance or retirement, the information should reach the general in as constant a succession of reports as the changing situation needs. Here the scout could not at all do what was needed, because he has no absolutely reliable means of conveying his information to the general without leaving the point of observation. The reconnaissance, however, can detach a succession of men to report any important points of information as they develop. It is clear, again, that this succession of men should be one of experienced Frontiersmen, so as to insure their being men who can be trusted to reach the general, to reach him in time, and also to be able to discuss the information with the general within the necessary limits.

So much for true reconnaissance. But there are also occasions when the scout must work so far from his natural base at headquarters, that a sort of flying base must be established for him, convenient to the field of his operations. This can be effected by sending with him a small force, sufficient to provide, in reason, against the sudden extinction of the whole enterprise by



accidental or merely casual developments of the disposition of the enemy's forces. This force takes up the best position to afford the advanced base imperative for the scout's support, and also provides, if necessary, for conveying the successive reports of the scout back to the army.

Here it will be seen again that no regular troops could hope to compete with experienced Frontiersmen in such a task. In fact, the ideal force here, too, would be composed of men of the scout's own stamp, men who could, at a pinch, second the work of the crack scout by some fairly decent scouting of their own.

Once more, there is the occasion when the general may wish to detach a raiding force to operate against the rear or flank of the enemy. He may do this to keep the enemy busy in position while he himself carries out important developments of his own, brings up stores or reinforcements, or perhaps waits on the movements of co-operating forces in other parts of the field of operations. He may do it simply to hold the enemy in an unfavourable position till he himself can come up and attack him, or to hold the enemy off till he himself can reach a more favourable position or condition to await attack. He may do it to break the force of a threatened attack on himself, or merely to cover a forced inaction of his main force. For any of these, or a dozen other reasons, he may wish to detach an effective flying force to gain his object by, for instance, cutting the enemy's communications, destroying his stores and magazines, threatening important points, delaying reinforcements, or hampering co-operating divisions; establishing, in fact, a more or less temporary guerilla warfare in its most resolute phase, on the enemy's most vulnerable points.

What merely drilled men could compare with experienced Frontiersmen for such work as that?

All this implies that Frontiersmen should be embodied in units of sufficient size, and, once they are thought of as so embodied, with this power of scouting, reconnaissance, flying column, and guerilla work recognised, it will be admitted that, for the authorities to neglect the services of Frontiersmen in need, even in the biggest war, would be criminal.

Further, it will also be granted that the units embodying this power have simply to be multiplied in number, and you get an entity which could also take as splendid a part in set battle as the gathered frontier units, of which the Confederate armies were mostly composed, took in the long war between the Northern and Southern States of America. That war was lit up by a succession of broad flashes of true Frontiersman's work; work that remains the admiration and model of the greatest thinkers amongst the trained soldiers of older countries, but work which can never be repeated except by forces likewise constituted in great part of Frontiersmen.

To sum up, the Frontiersman, brought to the field under a workable scheme, can be not only of value in the greatest campaign, but of such vital value that for a British Army to undertake such a campaign without bringing in as many Frontiersmen as can be had would be a crime of the first magnitude.

But—hang it!—the Council of the Legion is to see that such a crime is made impossible, so one will leave it to the Council.

## TRAINING SCOUTING

The vedettes and flankers of marching troops are described as scouts; also whole régiments of Irregular Horse, and even boys who are undergoing a training in *morale*. For Legion purposes a scout is a man trained in lone self-reliance, and the arts of reading country, tracking, hunting, and bush craft, who has had experience in dealing with dangerous folk, whose fully developed powers of observation have been tested by Intelligence work on active service, and who is still capable, mentally and physically, of performing the duties of a Field Intelligence Officer. There are extremely few of such scouts.

The art of scouting must be based upon an instinct for the craft, and cannot be acquired and perfected save by a long training.

Yet members of the Legion will hardly consider that they have done all they might to fit themselves for the utmost possible service to their country until they have fully studied and mastered this subject, both in books, from lectures, and in practical field work, under the direction of our scouts. On the frontier, as well as the military side of the subject, the easiest available writer is Owen Roscomyl (Capt. Owen Vaughan, L.F.), author of "Old Fireproof," "A Scout's Story," etc. On the purely military side of the subject, General Baden-Powell's shilling manual, "Aids to Scouting," is very strongly recommended, and should be read in conjunction with the Section on Scouting here following.

Beginners, resident in civilised countries, will value a lecture, addressed to the Military Staff at York, by Mr. F. W. Bland, by whose kind permission we pub-

lish the notes hereunder, with a few corrections and additions.

#### NOTES FOR BEGINNERS

*Training.*—In the early stages of training men should work in pairs, commencing in their own town. They should walk round and see everything, the small things in particular, such as the number and prices of objects in shop windows, or peculiarities of people and animals, each man to keep his observations to himself, making his separate notes at the end of the day. Compare two sets of notes, and it will be seen what a lot has been missed. The learners should peg away at this exercise until they can move about town and miss nothing.

A second useful exercise is for one man to go for a walk, and with a bit of chalk, dot here a fence, there a wall, a post, or a paving-stone. His partner must track him by these signs, which should be reduced in size and number with each day's training.

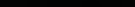
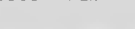
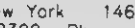
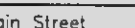
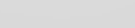
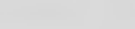
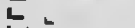
The next phase of training is systematic observation of useful facts: the roads in town, their styles of paving, the way they radiate into the country; the car lines and cables, and how they are easiest broken; how gas and water mains are fed, and how they could be cut. Animals should be studied, and how their tracks look at the various gaits, when ridden, and when in harness. The faces of the passengers should be studied for clues to their nationalities, to the business which brings them out of doors, to their thoughts and motives. The student should get into conversation with foreigners, and it will be seen how much more they know of the town than one's own townfolk.

Not long ago, when the Channel Tunnel project was



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discussed, I found that very few of our people in Leeds knew that we had a gun and cartridge factory; yet every alien I spoke to had complete information on the military possibilities of the town.

Having gained the habit of systematic and close observation, the students, still hunting in pairs, should work by map and compass, making a careful study of the surrounding country. They will find that there is a great difference as the ground varies, in the tracks left by animals. They should study the habits and movements of birds and animals, and the different kinds of soil, the distribution of ridges and valleys, the reasons for each twist and turn in road or track. They should learn the clues for finding points of the compass. (See Pathfinding.) They should judge distance by noticing the time it takes to reach distant and prominent objects. They should note how apparent distance varies with the weather.

In all this the students should note everything without informing each other, each trying to distract the other's attention from work, but to guard his own study from disturbance. A scout who allows anything to distract him from his work is useless. Returning by same route, the students should note the different appearance of country as seen from the opposite direction. They should compare their notes in the evening.

Visiting any strange town or district, students should learn the map first, but on no account ask the way, relying entirely on their own powers of observation for guidance. Advanced students may study the questioning of passengers, but only to gauge the inaccuracy of the average statement. It is nearly always wrong.

Having mastered road work, the students should

take their next course of training across country, studying the types of vegetation produced by each kind of soil and aspect; how different animals and birds leave impressions. A special study should be made of the conduct of birds and animals when startled—for that is the smell of danger on active service. They should practise concealment by walking in hollows and covered ways, swift across the open, absolutely motionless when taking cover for observation. They should practise the use of a small bush or branch in the hand, which can be put up before the head is raised for observation work. They should practise how near they can get to birds, rabbits, or cattle, always, if possible, working up the wind. They should lie down, and with ear to the ground listen for the sounds made by passing vehicles, cattle, or persons, finding at what distance such sounds can be heard, from a given number at such-and-such a rate of speed. They should listen to wires and water-courses and learn their sounds. They should practise listening with the two blades of a knife, one in the ground, the other between the teeth.

The students having learned something of country should try hasty mapping, each taking a different route to a given point—then compare maps made, and check by map of the district. This will train students for a map from memory of the district covered in a day's study.

Having a good knowledge of all these, each student should now go through the course alone from the beginning until he is fully proficient.

So far the study has been made a-foot as preparatory to mounted work, wherein students should select difficult country, and avoid all easy places. In war one often



has to deal with the worst possible country under the greatest possible difficulties. A man who cannot get out of difficulties as well as into them had better stay at home. So streams should be crossed, not by bridges, but by fording (where there are pebbles on the bed, below a sharp bend, or across a rock outcrop), or by swimming. Obstacles should be jumped or broken through (owners permitting). In training a man should learn to take in all details rapidly, and to commit them to memory. He should work in the places he knows least about, learning to dispense with maps, compass, and all other aid, relying absolutely on himself.

All that was learned by day must now be practised at night, when the land looks totally different, and every object unfamiliar. If they are strange to the scout, so also are they to the enemy. The scout in night work should learn to avoid the road, keeping a parallel course, near enough for seeing and hearing. He should move slowly, usually dismounted, for a horse cannot travel rapidly over open-country at night. A scout should be just as well practised and proficient by night as he is by day. It is very trying work, and a scout's nerves are always strung up; but by practice he soon feels at home on the trail at night as much as by day. It is under night conditions that the senses of hearing and smell are most useful, when silence and caution are necessary, and the greatest care must be taken to look back, noting the landmarks for guidance in the retreat.

*Selection of Scouts.*—Apart from trained powers of observation, certain other qualities are essential in the making of a scout. Ideally he should have good health, acute eyesight, hearing, and keen scent, be a thorough horseman and horsemaster, tactful, self-controlled, and

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with a spice of the devil in him. He should be able to read a map, work by the stars and by compass, have a good eye for country, and some knowledge of signalling. He needs field glasses more than he needs weapons.

*Detail in Horse Management.*—A scout should never on the outward journey move quicker than a walk or trot, lest in retreat a tired horse should cost a life valuable to the army. He should be particular of the fit and perfect cleanliness of his saddlery; that the saddle is one to distribute his weight over the largest possible area of the horse; that the saddle is set well aft, which is the first of all precautions in endurance work; that his horses are the best fed and groomed in the whole field force; and that he carries less baggage than any other rider.

*Duties of the Scout.*—Usually his first duty is to find the enemy. Having done so, he will proceed with his actual work, using the fully developed faculties of a detective. He will try to discover what the enemy is doing and his strength, remembering that a skilful leader can make a very large display with very few men. To calculate by the ground occupied is to be misled.

The scout will note carefully the nature of the enemy's position, its front, flank, and rear; how each part is approached, whether under cover or in the open, over easy ground or broken. All obstacles will be stored in his mind, and how each obstacle is commanded from the enemy's position, and at what distance. He should find out if the position is a natural fortification or how protected with permanent or temporary works. He should find out if any guns or men have been pushed out from the front or flanks of the main position, and

whether the ground held is rock or soil. Rock splinters may cause more casualties than direct fire.

All small and advanced parties should be watched and noted, but avoided like the plague, for scout duty is getting information, not fighting.

If the scout cannot see the enemy's force, he should dismount, hide or lead his horse, and read the ground round the position. He should try the roads first. If the troops are fresh he finds, where ground is soft, the gun-wheel tracks clear and well defined, the hoof-prints clear-cut, with occasionally the near-side hoof-marks irregular for a pace or two, due to the urging of the driver's spur causing the horse to slur or make a false step. The number of wheel- and hoof-marks denotes the number of the guns. Waggon tracks are very irregular, because it is difficult to keep an even strain on the whiffle-trees or tongue in driving—hence more whip and side paces. Cavalry tracks will, if ground permits, be away from the road, but in any case the ground beside the road tells most of the story. If the enemy is in good condition and well cared for, there will be few articles thrown away. Fairly hard droppings mean good feeding for the livestock. But these are the signs of distress: irregular wheel-tracks, slurred hoof-marks, too much definition of toe-marks, watery droppings, abandoned stores and accoutrements, dead cattle, burnt waggons and stores. Bearing the weather in mind, the age of the tracks shows the time elapsed since the march.

*The Enemy's Intentions.*—The roads tell the story of the enemy's last engagement in wreckage and new graves; but the line of his march may be seen from the positions held by advanced parties, and the way the waggons point. It may be difficult to find the position of sup-

ports and reserves, but the scout must leave all guesswork to the Chief of Intelligence, and save himself from blame.

*In Reconnaissance.*—The scout can find the enemy's positions and strength by exposing himself and drawing fire, and although this is not recommended, an instance may be used in illustration: Three scouts met at Eden, and in the distance saw a large force holding the side of a kopje. The scouts having tired horses, being in need of remounts, and seeing enemy's stock grazing in front of the position decided to draw fire. So at a few paces apart they rode to within a short distance of the Boer front. Firing is as infectious as measles, and the whole commando opened. The scouts, their own horses being wounded, fired at the grazing herd. A herd when frightened will sometimes bunch round standing horses, so the Boer herd gathered round the wounded horses of the scouts, each of whom got a fresh mount.

*Supplies.*—Supposing the enemy to be in standing camp. The scout having found out the strength of the enemy, his position, condition, and composition, should now try to discover how he is getting his supplies. This can be done by reading the road and the old camp grounds. If these show greasy camp fires, dropped and broken food, such as bread, flour, and meat, empty tins, bottles, match stalks, and cigarette stubs, the enemy is well and recently supplied from a near base. If, however, the leavings are poor, native meals such as maize or rice, few match stalks, or empty meat tins, and a scarcity of bottles, the enemy's supplies are none too plentiful, and he is either far from his base or has lost a convoy. Empty bottles, tins, etc., in numbers grouped close together will often show the position held by the Staff,

and the number may be gauged by the remnants left. After fifty years the broken bottles still show the site of the British staff camp in front of Sevastopol. The position of the water carts may be noted by finding a tract of sodden ground, and the wheel-marks showing well-defined indents at regular intervals will, if the enemy is newly and well supplied, afford reliable evidence as to his strength.

These matters, small in themselves, are the main evidence upon which the scout has to base his report, and pieced together may tell the whole story of an enemy's strength, condition, and purposes. The report should be brief and to the point, but the scout should be ready to answer all sorts of questions. He will be questioned not only as to the enemy, but asked also for information to aid in the attack by his own Field Force. What supplies has the enemy left which can be seized for use? What is the ground like between our position and that which we shall attack? What obstacles in our way? What positions are there for our guns and troops of all arms? Where shall we find sheltered ground for our ambulance, ammunition waggons, and supply columns? Where is the water for our troops and cattle, and which is the best way to it? How can our route to water be sheltered from enemy's fire? Where are the fords? Are they good ground, and easy of approach, sheltered from enemy's guns and small arms? Can fords be made at this or that point on the map?

All this information should be personal nothing being hearsay or chance, and the scout must be prepared to prove everything shown in his report. At the same time the scout should collect, remember, and test all

sorts of hearsay information, taking care to question women, and especially children, using the utmost tact and sympathy of manner. This especially applies to the scouting of towns.

*Scouting Towns.*—One should move very carefully during advance on a town, and from the outside study its approaches and defences, noting carefully the character of the ground over which an attack may be made. It is well for the scout to get into the town and hide himself, utilising residents of his own nationality to gather information. All this can be boldly done in a town in temporary possession of the enemy where troops and residents are strangers to each other, but extreme caution must be used at any permanent base. The scout should note the location of prominent buildings, such as the post-office, banks, and large stores. In towns not occupied by the enemy it is well to make friends with a few people, to draw them out; and, by being kind to the children, win the good graces of their mothers and sisters. But while a lot may be learned by tact and sympathy, one should take care not to be scouted by the women.

I remember in South Africa a Mrs. M——, one of whose daughters was a noted loyalist. These people frequently entertained British officers, and were always very good to our passing troops; but somehow there was always trouble in their neighbourhood, our patrols getting caught and smashed up. A scout sent to find out the reason was especially told of M.'s loyalty, and the great help she could render; holding his own views, he with several other officers accepted an invitation to dinner. On the ride homeward he slipped away from his party, let his horse go, and making his way back, hid himself in a barn.

Just after dark a party of the enemy came to the house and met with great hospitality. By dawn he had traced the enemy to their camp, and reported the position of their laager to his own officer commanding. Women have always played a very prominent part in Field Intelligence work.

*Tact in Dealing with Men.*—A scout should be especially careful when returning to camp with his report to stop all men he may happen to meet, remembering that the man he takes may be seeking to capture him. Take no chances, always have the first pull, approach him as though you were the Commander-in-Chief, and meant it; stand no shuffling or nonsense from a possible enemy; never shoot if you can avoid it, for if one knows his language the stranger may have useful information which with proper guidance he may verify under a strict eye and a ready revolver. It is a grand thing to know in such encounters how wonderfully soothing is the effect of a loaded and well-held revolver on the man you are trying to coax. If you are nervous, so is he, and a bit of bluff goes a long way.

And if you return without any news to report, do not be disheartened. The Commander-in-Chief may be testing, not for information but to see what you are made of for future use.

Much depends on the absolute truthfulness and reliability of the scout, whose report may avert defeat or make victory possible. He should always work as though on him depended the responsibility of the campaign and the result to his country. For it is indeed true that bad intelligence work entails defeat and disaster, while good scouting is the beginning of victory.

There remain a few general rules.

Mere pluck is not worth a dog's bark at this game, although plenty of pluck is required.

If you are in danger go nearer, for in turning back there is a chance of being hit in a place where you would not care to show the scar.

Hear everything but say little ; for there is more learned by the ear than by the mouth.

If the person giving the orders is with you on the trail obey in every detail ; but if alone, obey such part of the orders as seems right, following your judgment for the balance.

INTRODUCTION TO TRACKING. By Ernest Thompson Seton.

*On the Presence of Enemies.*—As a general rule one may say that no animal gazes intently, listens, and snuffs wind without the being some excellent reason, and the scout's business is to find out what that reason is. What the separate animals and their individual methods are, is a question of locality. In all the eastern parts of North America the blue jay is a famous spy and scout. He sees and hears everything, and if it be an enemy, at once gives the alarm cry, *jay, jay, jay*.

Of course he would do this for an owl as readily as for a man. If very small birds *fly to that place* and join in the clamour : it is probably an owl. If, on the other hand, birds or beasts are seen *hastening away*, it probably means that the enemy is a man.

The American crow is about as good as the American blue jay for this. In the far north, whenever we saw ravens circling and settling on some spot, we knew it meant that game had been killed by hunters, or that there was or had been a camp there.



The grey wolf is an ideal scout. He sees everything, and no one sees him. A common device among the Indians was to wear a cap made of a wolf's scalp, with the ears sticking up. This they wear when they peer over a hill to seek the enemy, so that if seen, the scout would be taken for a wolf at its usual tricks. The deception can be made complete by obliterating one's own tracks, and leaving a wolf track near the place in case the hostiles should come to examine the ground.

In case of seeing anything moving, the common practice of all birds, beasts, and scouts is to "freeze" at once. That is, turn to a statue, and wait immovably, no matter how long, until all doubt is dispelled.

I have known deer to do this for eleven to twelve minutes without moving a hair's-breadth.

#### TRACKING AND SIGN-READING

This branch of scouting needs powers of observation trained by practice, and of deduction arising from horse sense. Since any mark left on a trail in passing by man or animal lasts a minute in Piccadilly, or a month in the Sahara, no general rule can define hours or days since a sign or footprint was made. In any given district, however, study the time required to dry up, wash out, or blow away the marks. One sees at a glance if animal passed before or since last rain, windstorm, heavy dew, or flooding of water. Later traffic following or crossing the tracks studied give useful clues, that, for instance, of grazing animals going to water last evening, or of predatory beasts only abroad at night.

*Waggon Tracking.*—In desert grass a waggon can sometimes be followed after many weeks. On hard ground wheels leave no mark, but earths of burrowing

animals will show wheel-edge or hoof-print. At walking pace, nothing else is visible of rail, but at trot or canter one can see that grass bent by passing wheels has remained bent, throwing a different colour or glint from that of upright leaves. Although flowers and new grass grow up through the bent grass, this glint lasts until there is windstorm or rain.

*Tracking Men or Animals.* By A. O. Vaughan.—Always keep glancing ahead along the probable line of trail. Marks invisible at your feet are plain ahead of you, where the line of your sight shoots *along* the tops of the grass or herbage, or the bare surface of the ground, and therefore catches the variations of the light and shade caused by the rouening of herbage or surfaces done by the feet or hoofs you are following. A trail is easiest followed in the early morning, when the light is more delicate, and comes level along the earth.

When a trail is lost on bad ground, try and put yourself in the place of what you are following, and bethink you of what would be the probable line the man or animal would take. Then try ahead to any pass, bridge, ford, bank of river or canal, or spread of ground likely to hold the tracks again. If it is a mounted man you are following, on a long or swift trail, remember he may be looking for a change of horses. Try for any place you think likely to afford such a change.

*Horse Track.* By Evelyn French.—Horse bred in flat country has broad, splayed hoof; in hilly country, small contracted hoof. Shoeless track is blurred, with mark of frog. Shoe of shod horse leaves clear impression. Blades of grass broken by tread wither at

point within two hours in dry country, while imprint blurs rapidly under wind, rain, or frost. Hind shoe longer and narrower than fore shoe. At walking pace, the better bred the horse the farther hind track falls in front of the fore track. Horse lifts a lame foot to full pace, hobbling short with corresponding sound foot. With lame shoulder the foot rests short, toe flicking up dirt as foot is lifted, while the sound foot falls short to relieve it. Horse with lame fore-foot reaches short with sound limb, long with hurt limb. A lame hind track is, as usual, in front of fore track, but sound track goes short of its true reach. Hobble track shows fore-feet close abreast, with hind tracks behind fore tracks, and, where chain hobbles are used, sometimes chain track print between fore tracks.

*Walk.*—Distance from toe of one-foot back to heel of the other fore-foot, 2 ft. 8 in.

*Trot.*—Deeper prints splashing up earth. The rhythm shows a pair of tracks touching each other, or nearly so, and the pairs are about 4 ft. 4 in. apart.

*Canter.*—The rhythm is ONE-fore, hind, fore ; ONE-fore, hind, fore. The ONE represents the hind foot from which horse led off. The fore-feet are 7 ft. 4 in. apart.

*Gallop.*—Fore tracks, 10 ft. 6 in. apart, splashing dirt far. (See "Active Service Pocket Book" of Bertrand Stewart.)

*Horse Sign.*—Hard droppings for health, soft for bad feed. When shed, hot polished surface, which dulls, darkens, dries inside, bits freezing together as they dry, with age, bleaching and breaking to fibrous dust. In some countries scarab beetles quickly cut up and roll off all droppings. Droppings broken open may disclose undigested grain ; an oat, meaning perhaps "our side,"

while a maize grain may mean "enemy." Where horse rolled or rubbed against a post, stray hairs tell his colour. Wet ground with one hind track in middle, reads *horse*; tracks abreast of wet ground reads *mare*.

*Human Tracks.*—Although many savages, and especially savage women, are pigeon-toed, as a rule with unshod folk, savages, sailors, bears, the great toe splays out. Only people used to shoes have great toe bunched with the others. A load on back turns toes inward. Long stride shows good condition. Shambling tracks, weakness; staggering tracks exhaustion or refreshments. Men used to spurs turn out toes much less than, say, marching infantry, and go down steps sideways. Mark of chain or understrap may show. Women leave slightly smaller track, shorter stride, adhere more to trail than a man, talk more when together than men. In lower savage types, women are best trackers.

*Camp Sign.*—Big fire, fuel stored, plenty baggage, bed well clear of ashes = white man. Small fire, no fuel left, scant baggage, bed sign close over ashes = savage. Most men sleep on right side, heart being embarrassed by lying on left. Savages and bushmen usually sleep curled up, paws at breast like baby. White man only curls up on hard ground, resting forward of hip bone, so that it leaves no mark, and on soft bed sleeps all ways. Although some savages sit on their heels, most savages and also Australian stockman squat on toes of one foot, sole of the other. American cowboy sits tailor-fashion; soldiers and police recline. White man usually leaves bed ground clean. A hungry camp has little refuse, a well-fed camp plenty of litter, showing source of supplies, nationality, and whether civil or military. Packers, except Australia, make curved line of saddles and

loads, soldiers straight lines. Damp patches of ground, warm ashes, grains not eaten by birds, dry tent sites in rain, show recent departure. Pads of dogs show claw marks, but pads without claws read predatory cat animals during night after camp was deserted. Heel marks of rifles or other weapons are all different patterns: for instance Lee-Metford has butt trap; Martini, none.

*Rock Surface.*—In nearly all climates rock bears lichens, the breaking of which guides a tracker. Look out for displaced scraps of stone, or tracks where there is earth in the interstices of rock surface.

*When Tracked by Enemy.*—If suspicious of being followed at resting time, remain mounted, sitting side saddle, while horse feeds. His tracks will then be those of a horse at pasture, not of one travelling, and very good trackers will be thrown off the scent. If tracked with dogs, a course through water or frost will destroy all scent. Strips of blanket wrapped round feet of man or horse make the track look very old. To conceal tracks at point where you leave a trail, or leave rock for sand drift, lay blanket and rain cloak alternately for horse to walk on, so that he always steps on one or the other. If certain that you are tracked, make a circle and overlook your own trail from ambush until pursuer arrives. If, escaping from an enemy, you approach a stream, go straight to the bank. Pursuers will suppose that you are going to travel in the water to hide your tracks. They will therefore neglect to study your tracks in approaching the water. Climb back along those tracks, using the blanket trick (reversing shoes no good), until you reach hard ground, from whence to make new departure, or to lie until enemy is

past. The only sure way of avoiding a pursuer is to get behind and follow him until he goes home.

To conceal locality of a permanent camp, avoid entering or leaving it by any one route. When no permanent trail leads to a camp, it is harder to find.

NOTES. By Capt. A. O. Vaughan.

The one safe thing to say of tracking by a white man is that it is a great help, but that whatever information it yields has to be added to, tested, and completed by other means, before a force of any size would move on it. Tracks and ground-signs in general are always watched for by the scout. They often give him the first information of his nearness to the enemy, or of a development in the enemy's movements which he had not suspected till then. They may serve also as a help in testing the reliability of the information acquired by questioning or listening to the people of the district. But that tracking is a subordinate, and not the great matter romancers make it, is proved by one fact. The moment the trail leads one to where there are people who may be safely questioned, that trail is left, and all the information it yielded is tested by that which can be gained from the people. One may take up the trail again, but all the way one is judging its signs in the light of what one has heard. That is to say, whereas a general feels safe in moving upon what the scout has actually seen of the actual enemy, he would do a deal of adding and subtracting, and humming and hawing, before he decided to gamble on information obtained solely by tracking.

Yet, for the importance of ground signs, take the case of a scout who sees a force on the move, but cannot get

near enough to make out the details of that force. He has simply to get behind the force and examine its trail—always, of course, with his eyes jingling to avoid being seen by stragglers—and he will be able to read enough on the ground to fill in a report that will allow the general to pretty well gauge the weight of the force, and the cost, or need, of dealing with it, or leaving it alone.

What a black tracker can do in Australia, a brown one in India, Arabia, or Northern Africa, or what a red one could do in America, are things that need not trouble us here. If we had to defend Australia, India, Egypt, or Canada, from invasion, we should not waste men from Britain by putting them to do what the native or practised Frontiersman there could do so much better. Besides, one has but to compare the conditions there with the conditions on the continent of Europe, to see that what we need most trouble about is sign-reading on roads and in close-peopled countries. And for that men may train themselves in the United Kingdom as well as elsewhere.

The man who wishes to be useful in tracking, needs no elaborate outlay of money, or particular district to practise in. He does not even need the help of others for the moment the idea takes him, he has but to circle back, and cut his own trail a mile or two behind. He'll find a deal of practice in following his own trail from there to where he left it.

No amount of book-teaching will enable a man to set up as a tracker. Nothing but practice can do that. So let a man set to work in any spot or country he finds himself in, and ground himself thoroughly in the craft by practice of any and every kind obtainable there. Then, with what he can read in text-books, added to

what he reads on the ground, using his brains always, he'll soon come to know how very much tracking can do. Still more, he'll learn what tracking alone cannot do—and then he'll naturally go on to add the other branches of scouting, so as to complete his equipment for being of that full use in the field which every man owes to his race. A man will even be none the worse private or trooper in set battle because he could do a little scouting at a pinch.

*Book.*—"Tracks and Tracking," Josef Brunner.

PURSUIT, ARRESTS, AND CAPTURES. NOTES FROM CIVIL MOUNTED POLICE PRACTICE. By Claude Blaikie Williamson, L.F.

*Suspicious Characters.*—A water-gaunt horseman claiming to come from well-watered trail, or the reverse; a teamster with thorn-cut or rock-scratched wheels, claiming to have kept highway; a man with grass-polished boots, claiming to have travelled by dusty path; a man with marks of stirrup leathers, free from dust, on his legs, claiming to have no horse—are probably untruthful. Never doubt his word until you have him covered. Always carry notebook and pencil.

*Pursuit.*—For quick start in the morning, make tea overnight, let it stand five minutes, pour it away from leaves, and in morning it will warm in half time needed for boiling. In pursuit or flight, if overcome with sleep, lie face down with rein round wrist, so that should horse hear anything and throw up his head, the jerk will arouse you. Tobacco ash or cigarette ends on trail denote that fugitive is not in wild alarm, however rapid his gait. *Ware ambush* if fugitive suspects pursuit. On approaching likely place for ambush, take course



parallel to track of fugitive, so as to flank his hiding-place. Glint of gun-barrel may give warning in time for you to take cover. If ambushed by a savage, rush him, because his nerves won't stand the surprise. If ambushed by white man, stalk him. In stalking, use many ruses, such as showing hat on a stick, to exhaust his ammunition.

Approaching district frequented by man to be arrested, disclose to nobody whatsoever who you are or what is your business. Any information given to his possible friends and jackals should be carefully prepared for his consumption.

*Approaching the Patient.*—If dealing with an outlaw or dangerous character, take utmost care to allay suspicion until you are ready for action. On entering any enclosure or building, keep your back to the wall from the beginning, and do not be lured into the open. In arresting on warrant, use all reasonable privacy. If he attacks, use all needful violence; if he shoots, fire to kill; if he runs, stop him, firing low.

*Arrest.*—Act swiftly, gun in position, as you give sharp order: "Hands up!" Keep patient's hands up until you have compelled him to drop any weapon in his hand, and until you have felt his clothing for concealed weapons.

If using irons, handcuff behind back. If not using irons, a kerchief, if not too elastic, is good, giving least pain. If lashing scant, tie thumbs together with strip from clothing. Make sure that all strings or cords used have been thoroughly stretched. If necessary, lash ankles together, and to prevent hopping, lash a stick to whole length of his body; or pass cord round breasts, under armpits, and up over fork of a tree. With prisoner

mounted, lash wrists behind him, and ankles under horse's belly. With prisoner running beside horse, tie wrists behind back and connect with rope to horn of saddle, or off stirrup iron.

*In Civil Arrest.*—Having secured prisoner, warn him that anything he says may be used as evidence against him. If he persists in making statement, take it down at once in notebook, as evidence taken on the spot is better than that remembered. Relieve prisoner of all papers, valuables, or things which would help him to escape, make inventory, witnessed, if possible, and put secure parcel in your vallets.

Once you have warned a man he is a prisoner, watch him well until search is completed, lest he attempt to destroy incriminating evidence by swallowing or dropping.

Remember that prisoner is in misfortune, and not guilty until guilt is proved. If he protests sickness to get irons removed, watch well lest you cure him too quickly.

During halts, watch your arms lest he grab and shoot while you are doing camp work. A tired prisoner gives least trouble in camp, so long marches are good. At night, secure his wrists behind his back, and the lashing to your left wrist. Never secure prisoner's single wrist to your own, placing him on equal terms.

Never lose your temper in making arrests, or show spite in giving evidence.

*By John Mackie, I. F.*—In looking for, or in pursuit of suspect, bear in mind he is probably looking out for you. Be possessed with the one idea to get the drop on your man. When you have held him up, and removed his firearms and knife, render the articles useless by unscrew-

ing locks, etc., lest by chance he gets at them. Take nothing for granted, and be none the less watchful when a prisoner says the game is up, and he will go with you quietly. A common ruse for a prisoner is to complain that handcuffs or leg-irons hurt him, and to beg that they may be eased. Remember, a fox is not in it compared with a desperate man.

A SIMPLE FORM OF ROAD REPORT AND ROAD SKETCH.  
By Captain T. Gayer Anderson, R.F.A.

The following remarks describe the headings under which information is required in a road report, and a method by which a sufficiently accurate and rapid sketch can be made (without instruments) to illustrate and explain it.

The easiest and most accurate way of executing such a report and sketch is by bicycling; but it must be remembered that if a compass is being used, the iron in a bicycle frame may affect its readings, if held too near.

Another easy way is on foot, but this is, as a rule, too slow.

The most difficult way is on horseback. In this case the actual "plotting" of the sketch should be done without dismounting, and so, much depends on whether the horse is trained to stand with a loose rein or not.

As regards instruments. Naturally the use of a compass and ruler would make the sketch more accurate and more easy and rapid of execution; the following remarks, however, generally refer to the most difficult conditions, namely, sketching from horseback and without instruments.

In any case, the sketcher must have a pencil and note-

book (or some sheets of paper on a board). An ordinary pin is also a help.

*The Report.*—The sketcher must notice and find out everything important, and put it down immediately on his sketch, or in his notes. A great deal of information he can get from signposts and milestones, also from the inhabitants; but it must be remembered that whether these are hostile or friendly, their information, may be wrong either purposely or from stupidity, and that therefore it must, where possible, be proved, and failing this it must be accepted with reserve. He should not make out his report till he has finished his sketch. He should then tabulate all the information under any of the following headings which may be necessary. These headings must only be taken as a guide, and used in conjunction with common-sense and initiative.

His writing must be very neat, and all proper names, in both the report and sketch, must be in block capitals (*e.g.* LONDON). His report must be as short, crisp, and clear as possible.

All the following headings should be borne in mind:

1. *Roads.*—Metalled or not, breadth, condition, level or hilly (chief slopes). Information about parallel roads and roads crossing the sketch.
2. *Railways.*—Name, number of lines, amount of rolling stock at stations, etc.
3. *Rivers and Streams.*—Name, breadth, depth, nature of fords, banks, and bottom, and if liable to sudden freshets.
4. *Bridges.*—Material, span, height, etc.
5. *Towns and Villages.*—Name, population, billeting capacity, material of buildings, any important buildings which would do for hospitals, barracks, stores, etc.;

inns, post and telegraph offices, police stations, smithies and wheelwrights' shops, also information about rations, forage, and transport available.

Most of this information can be got from the police station unless the books have been destroyed. It should be tried first, so as to save as much time as possible.

6. *Water*.—For men or horses; number of horses which can be watered at once. Approaches to, etc.

7. *Country*.—Nature of (open, closed, marshy, etc.), type of fences, slopes, woods, open spaces useful for camping grounds, ridges useful for observation or communication, etc.

8. The positions, numbers, and nature of friendly and hostile troops, stating whether camping or on the move. Any demolitions, earthworks, etc., should also be noted.

*The Sketch*.—Out of the following steps, 1-4 should be taken before the sketcher saddles up.

I.—He finds the *unit* of measurement he is going to use.

(a) *On Horseback*.—Measurements, as a rule, are done at the trot. The unit is the distance in yards covered by the horse every time the rider rises in the saddle. He finds this by trotting a known distance (at least a quarter of a mile) at a collected pace, and counting the number of times he rises. This, with most horses, comes to between 500 and 530 to a mile., *i.e.* one rise equals about three yards.

(b) *On a Bicycle*.—The unit is a revolution of the front wheel. Revolutions are counted by tying a piece of rag to one spoke, and measured by getting this spoke perpendicular to the ground, and then *sitting on the bicycle*, and moving it till the spoke comes to the ground again. With an average man and a 28-in. wheel this equals about seven feet.

(c) *On Foot*.—The pace varies from 27 to 33 inches, but it is not hard to get into the way of pacing yards.

N.B.—In making sketches of country without much detail, the unit can be one of time. The sketcher has then to find out how far his horse walks and trots per minute, and make scales accordingly.

II.—He next decides on the *scale*. As a rule, two inches to a mile is a useful scale. The sketcher should know which joint of his fingers is most nearly an inch long. On ordinary ruled paper three spaces equal one inch.

When measuring with a unit which is not a yard (*e.g.* a rise or a revolution) two scales are required:

(a) One to put on the sketch to enable any one to read distances in yards.

(b) One to put on a ruler or doubled-up piece of paper, to enable the sketcher to "plot" down distances in the unit he is using.

For example, say the sketcher decides on a scale of two inches to a mile, and finds that with his horse 515 rises equal one mile.

To make scale *a*:

$$1760 \text{ yds.} = 2 \text{ in.}$$

$$\therefore 4000 \text{ yds.} = \frac{2 \times 4000}{1760} = 4\frac{1}{2} \text{ in.}$$

He draws a line four-and-a-half inches long at the bottom right-hand corner of his sketch, divides it into four, and the left-hand division into ten, figuring it as shown in the example to read thousands and hundreds of yards at two inches to the mile. He writes above it "scale two inches to one mile," or if he has had

to trust to his approximate inch (finger joint, etc.), "scale about two inches to one mile."

To make scale *b*:

$$515 \text{ rises} = 1760 \text{ yd.}$$

$$\therefore 1 \text{ rise} = \frac{1760}{515} \text{ yd.}$$

$$\therefore 1000 \text{ rises} = 3223 \text{ yd.}$$

He draws a line to represent 3223 yards with scale "a" on a separate piece of paper, and divides it into ten, and the left-hand division into ten, thus showing ten and hundreds of rises (this scale goes on his ruler).

N.B.—A scale of rises once made for a horse always holds good.

III.—He next finds out where north is by one of the methods described in this book (see Pathfinding) or by the weather-cock on a church, etc., or by compass, if he has one. He then determines what is the general direction of the road he is going to follow, and puts a *north point* on his paper in such a position that the sketch when made will run up the centre of the page.

With a compass, the needle points to the magnetic north, which, in England, is about  $15^{\circ}$  west of true north. Any of the other methods described give approximately true north.

The north point is shown by a line about three inches long drawn on the sketch, with an arrow head on the north end of it (which is the sign for magnetic north) if the sketch is being done with a compass, and with a star at the head (which is the sign for *true* north) if using any other method and "approximate" written along it (*vide* example).

The making of the sketch depends upon the fact that whenever the paper is turned so that the north point points north, the sketch is *set*, and that then lines drawn in the direction of objects on the ground represent on the sketch the real direction of such objects.

IV.—He sees that all his kit is in order (pencil sharp, etc.), and then he is ready to get to the starting-point and begin the actual sketching.

V.—On arrival at the starting-point—

(a) He chooses a point near the bottom of the page to start his sketch at, and puts in his pin there.

(b) He then “sets” the paper either with a compass by getting its N. and S. line over the “north point” line, and turning the paper till the needle of the compass coincides with the N. and S. line, or by finding out where north is by any method, and turning the paper till the north point points in this direction.

(c) Keeping the paper “set,” he puts his ruler against the pin, aligns it on the most distant point on the road that he can see, and draws a thin line along it.

N.B.—The road need not lie straight between these points; he can put in bends by eye.

It requires much practice to keep the paper “set” while laying the ruler, and it should be checked at least twice.

(d) He then draws in a bit of the road, and puts down all the information he can.

VI.—Having done this, he trots steadily on to the point he laid on counting the rises. On arrival at this point he marks off this number of rises with his ruler scale, and puts in the pin at this fresh point. He then repeats his former procedure. (N.B.—He can set after the first time by laying back on the last point, but it is



not advisable to do this often without checking.) The procedure described is continued throughout the sketch.

If the sketch runs off the paper, or the sheet is finished, he draws a line across the page, and begins again above it, putting in a new north point, and adapting its position to the new direction of the sketch, if necessary (*vide* example).

Any number of pages can be joined by putting them so that all the north points are parallel.

A road sketch always starts from the bottom of the page, and runs up it.

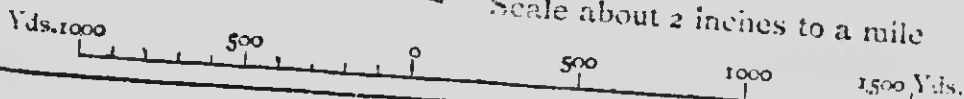
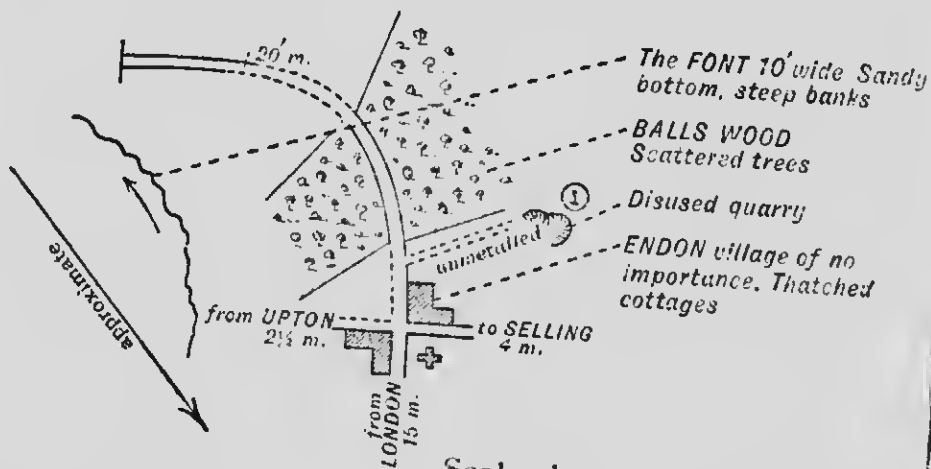
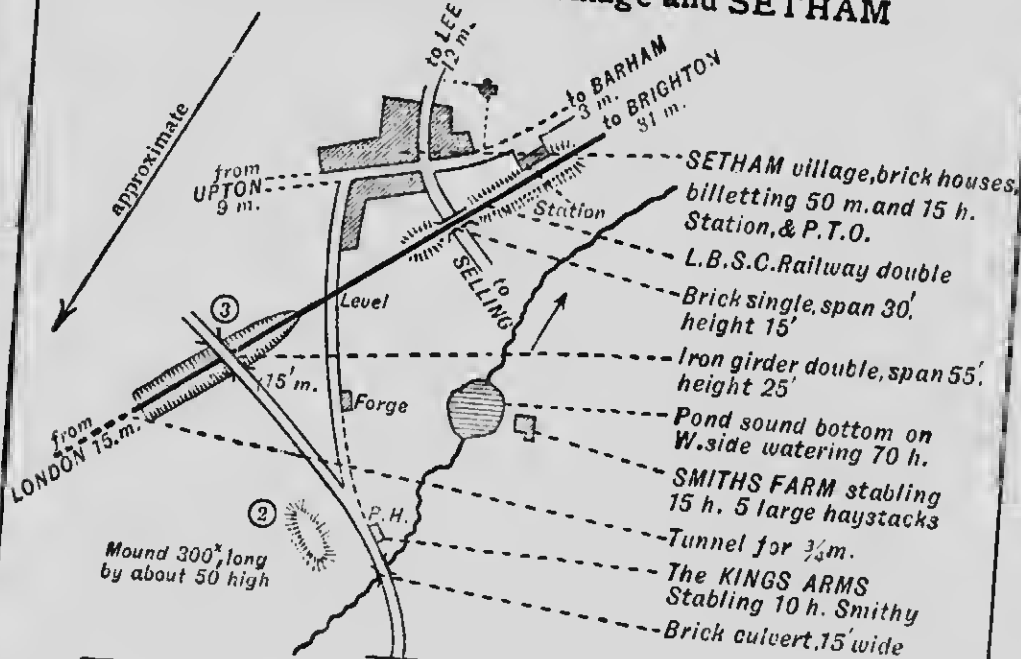
VII. *Detail*.—The sketch must be kept as clear as possible.

Roads, if fenced, are shown by continuous parallel lines, if unfenced, by dotted lines. The breadth of metalling should be given (*e.g.* 20 ft. m.).

All roads and railways coming from the left of the sketch should show the distance *from* the nearest important place, all those going to the right of the sketch, the distance *to*.

Dimensions and particulars of railways, villages, bridges, etc., and the nature of the country are best shown in margin, or by a reference in the report. Villages are blocked in; post and telegraph offices, inns, and smithies and wheelwrights' shops should be shown. No fences should be shown. Woods are shown, and a description given in margin. Hills should *not* be shown (except by adept sketchers), but the chief slopes noted in the margin. Reference numbers in a circle (*e.g.* (3)) should be put against important places referred to in the report. An arrow shows direction of streams and rivers.

# Road between ENDON village and SETHAM



Mounds and abrupt ridges may be shown (*vide* example).

It is better not to try and print on the sketch, but to write small and plainly. All writing on the sketch should be parallel to the bottom, except writing along roads, railways, etc.

Any other points not mentioned above are best noted in the margin.

If available, a map of the country should be used, and no sketch made; but as maps are not always up to date, the detail should be checked with the map, and corrected where necessary.

The example gives an idea of the way detail, marginal notes, the scale, north point, and a break in the sketch are treated.

VIII. *Finishing*.—A sketch should, where time admits, and where ink, pen, and indiarubber are available (*e.g.* at an inn, etc.), be finished in ink, as this enables all unnecessary lines to be rubbed out, and the sketch is then much clearer and more easily understood. Clean soft bread is a good substitute for indiarubber. There should be a heading showing what portion of road the sketch is of. The date of the sketch should be shown also.

See "Military Sketching and Map Reading," by Captain R. F. Legge (Gale & Polden, Aldershot); "Simple Map Reading, Reporting, etc.," by Lieut. and Quartermaster J. V. Laughton (May & Co., Aldershot); "Active Service Pocket Book," by Lieut. Bertrand Stewart.

CONDENSATION IN DESPACHES. By Edgar Wallace, L.F.

Be brief. Don't "have the honour to report." Your message may have to be flagged or heliographed. If you want help, say "Help." Don't explain why you

want it—you can do that at the court-martial. Never mind about grammar; write sense.

When the bomb was thrown at the King and Queen of Spain, I tried to get through a message that told of the attempt, that told of the escape of their Majesties, and the clearing of the anarchist. Yet it was necessary to convey the fact that the outrage was of a serious character, and that a number of people had been killed. It was done in twelve words: "Royal lovers bombarded returning palace miraculously escaped spectators shambled assassin escaped confusion." Ungrammatical and tautological though the sentence is, it conveys everything that was to be said. Spectators shambled isn't even English, but you convey the idea. For the man who desires to learn the difficult art of condensation, there is no better study than that of adverbs. Here are a few three-word messages which, thanks to the judicious use of adverbs, are fairly comprehensive: "Enemy unapproachably entrenched." "Outposts disquietingly inactive." "Bridges shakily deficient." It doesn't matter whether you write grammar, or whether you write English. So long as you can choose words that will convey to the mind of those who have sent you to spy out the land, the exact situation, you have done as well as if you had conveyed the same sense in a carefully written report of one thousand words.

Here is a message helioed from a Boer village by a reconnoitring officer, that is a model of brevity:

"Reconnaissance discovered farmers jubilantly contemplating imminence Commando churlishly sullenly denying information stop initiated arrests Van Hooper commandeered available traction warned inhabitants treasonable intercourses returning."

Here in a few words the officer gave his chief full information : that the enemy was near at hand, that the country was unfriendly, that he had taken the initiative and arrested the leading inhabitant, that he had commandeered all the available transport ("traction" is all-embracing), that he had called a meeting of the village, and had warned them against the result of befriending the enemy. And not only has he done this, but he has, with two lurid and old-fashioned words, painted a picture of the reception he received : churlishly, sullenly, are not words one usually finds in an official report ! Most important of all for the scout or the correspondent to remember is this : Every minute counts. As soon as you get your information, send it off. Don't wait for something to add to it, let it rip. I have seen minutes, nay seconds, wasted at one end of the wire resulting in two days' delay at the other.

Don't make your message ambiguous at the cost of a word. Such words as "and" are never sent, but an "and" properly inserted will make a message clear. Insert "stop" where confusion may come from its omission. Practise condensation by taking a foreign telegram in a daily newspaper and reducing it to as few words as possible.

NOTE. By Capt. A. Owen Vaughan.

If you are not good at written compositions, remember that English is the most inexact of languages, except in the hands of a master. Therefore try your message on the man who is to carry it. Let him read it, and then ask him to explain to you what it all amounts to. You may find that it quite naturally conveys to his mind a different message altogether from what you thought you

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were writing, and you'll be glad to alter it accordingly. In any case, if the man is trusty you'll have to let him know the message correctly, since he may have to destroy the paper if in imminent danger of capture. Therefore make him give you back in his own words the message you've just given him in *yours*. That way you'll get at exactness, or at least you'll stand a better chance of avoiding the ambiguity which brings on disasters.

## II.—SHOOTING

AN INTRODUCTION TO "NOTES OF MUSKETRY." By  
Sir Henry Seton-Karr, C.M.G., L.F.

The great advance that has taken place in the scientific manufacture of small arms during the past quarter of a century, and, in particular, the improvements and inventions that have been introduced into rifle manufacture during the last decade, have, doubtless, largely enhanced the value and importance of the musketry instruction and practice of to-day.

The modern military rifle, for example, the standard small-arm with which the military forces of all civilised nations and great Powers are now armed, is a light and handy small-bore weapon of precision, firing smokeless nitro-compound powder, and projecting a thin nickel-covered bullet with leaden core, somewhat like a piece of slate-pencil in appearance, with great velocity, of extraordinary accuracy, and flat trajectory, for a distance of nearly two miles. The small-arm of to-day is almost as superior to the old smooth-bore musket, the "Brown Bess" of Ramilies, of Blenheim, and of Waterloo—

whose extreme and erratic range was about 200 yds.—as, shall we say, a modern shot-gun is to a boy's catapult. With the old "Brown Bess" the particular individual fired at, at 100 yds. range or over, was the least likely person in his company or regiment to be struck by that particular shot. With the modern weapon a skilled performer can make practically certain of picking off his man up to 200 yds., and can come very near it up to 700 or 800 yds.: From thence, on to 2,000 yds. or more, any quarter of an acre of ground in sight can be accurately sprayed with bullets by a competently directed and well-trained company of riflemen. The experience of recent wars in Russia and in South Africa has demonstrated very forcibly the increased value and importance of the modern rifle as a military weapon, and the changes in field movements and tactics that its increased range, precision, and rapidity of fire have brought about.

The skilled and competent use of the rifle in the field naturally follows from, and depends on, adequate and properly directed musketry practice on the range in times of peace; and in this connection it is satisfactory to note among the signs of the times the steadily maintained interest taken in our great national rifle meeting, held yearly at Bisley, under the auspices of the National Rifle Association; the growth of civilian rifle clubs throughout the United Kingdom, largely as a result of Lord Roberts's advocacy; and also the increasing and widespread growth and membership of the Society of Miniature Rifle Clubs.

The present increased use of the miniature rifle is, to some extent, a new departure. Until a few years ago the Council of the N.R.A. regarded marksmanship with the Service rifle as its main object of encouragement, and

the Service rifle itself as the orthodox weapon. In 1905, however, the British military authorities officially adopted a "War Office" miniature or cadet rifle for instructional purposes, while the rapid growth of the Civilian Rifle Club movement, and the spread of Miniature Rifle Clubs have signified the modern popularity of low-power rifles for purposes of instruction and practice. It is obvious that these weapons can be more widely and generally used than the ordinary Service weapon, owing to lower initial cost, cheaper ammunition, their fitness for youthful instruction, and their convenience for use at short covered ranges in crowded centres of population. In many parts of Great Britain there is practically no alternative between low-power short-range rifle practice and no rifle shooting at all. It is satisfactory to note that the Council of the N.R.A. have now included the miniature twenty-two-calibre military rifle in their official list.

#### RIFLE SHOOTING. By P. S. Kensett, L.F.

It will be understood that the following are simply a few brief notes on a subject which, in itself, might easily run into volumes:

*The Care of the Rifle.*—It is obvious that as the modern firearm is increasing in power and accuracy, so does it require a greater amount of care. The wood of the stock should, from time to time, be well rubbed over with linseed oil to prevent wet penetrating the pores of the wood, which not infrequently results in altering the zero of direction, or elevation, or both. To prevent rust, a little oil should be worked in between the barrel and the stock. A good rifleman is ready at all times to spare a wrap from himself to keep the rifle dry and free



from dust. A damaged "leaf" means a useless weapon, so, when not in use, see that the sight protectors are in position. Wipe the exposed metal surfaces now and again with a greasy rag to prevent rust starting. See that the fore and back sights are well blacked for use. If there is time, wipe every cartridge before using it. One speck of grit on the bullet will cut the rifle; this rough spot will proceed to acquire nickel from each subsequent bullet, and the accurate shooting of the weapon be destroyed. Any grease on the outside of the cartridge will cause the bullet to rise an additional two feet or more at 500 yards. A similar result may occur if there is moisture on the brass case. When at target practice clean the barrel on the spot within a minute of firing the last shot. It is then easy to do. Always leave a coating of oil on the inside of the barrel after cleaning. The explosion of the cordite drives a virulent acid into the steel. For weeks after use this will gradually work out and corrode, on meeting oxygen in the air. This necessitates the following rule: When the rifle is in use, clean and oil not less than twice a week. If the rifle is not going to be used, clean twice a week for a month, once a week for a further month, and then give the inside of the barrel a thick coating of vaseline, or something similar.

*Attitude.*—In the prone position, lay the body at an angle of 45 degrees to the firing direction, part the legs, and obtain a tripod support for the rifle, poise the body on the two elbows, the left elbow being well in advance and almost straight in front of the right elbow. In the kneeling position, the principal requisite to steadiness are stout soled boots, kneel on the right knee, sitting on the right heel, with the left foot pointing direct to the

target and at right angles to the right leg, the left leg being perpendicular, and the bones of the left elbow fitting comfortably into those of the left knee. In the sitting position, adopt the most comfortable attitude, the commonest being to cross the left foot over the right, resting the elbows on the corresponding knees. In the standing position, place the right foot parallel with the firing point, and the left foot advanced about ten inches, and pointing to the target.

*Holding the Rifle.* —Grasp the rifle in the left hand immediately behind the back sight, allowing it to rest on the bones of the wrist at the bottom of the palm, wrapping both thumb and fingers as far as possible, completely round. Hold the grip of the rifle with the right hand, and place the first joint of either first or second finger round the trigger. Bring the butt firmly into the shoulder, and endeavour to get as much as possible of the surface of both hands in contact with the rifle. The sling, which should be attached to the top swivel and brought through the swivel of the middle band and fastened at the other end to the swivel in front of the magazine, should always be used. Adjust it to the requisite length, and let it pass round the left arm, just below the armpit and across the inside of the left wrist. There are other methods and variations, but this is the commonest.

*The Get-off.* —The trigger should not be pulled. As the sights are aligned on the target, the grip of the right hand should be tightened until a pressure has been obtained of about one pound less than that required to discharge the weapon. Cease breathing, and go steadily up until the fore sight almost touches the bull. The effort to hold steady in doing this should in itself give the extra one pound pressure, and discharge the shot

without the rifleman being aware of any effort of his own. No shot is a good one if the rifleman knows he is getting off the trigger. Remember that the first sight is the best sight, and that the eye will not stand the strain for long. If the shot has not been got off whilst the sight is clear, go down from the present and start again. Never hurry the shot. It is impossible to see the back sight, the fore sight, and the bull simultaneously. You can only approximate to doing so. It is more important to see the sights clearly defined than the object at which you are firing. An error in the sights causes a large result in error, an error on the object fired at, a small one. With practice it is possible to hold so steadily that at the last moment the marksman's attention may be confined to the sights. The perfect marksman should neither feel irritation at a bad shot, nor exultation at a good one, that is if he is going on shooting. When overjoyed at a succession of bulls and the competition almost won, acceleration of the heart-beat will throw the shot high left, and lose the prize.

*Back-sights.*—The back-sights in present use are the fixed V, the sliding V, and the wind-gauge V, the straight bar with one or two, or many lines, and the wind-gauge aperture sight. The first is the old military sight, but amongst the crack shots of the present day this is obsolete, and each of the others has a numerous following. It would be invidious to recommend either of them. Every man must choose his own.

*Wind Allowances, etc.*—All riflemen of the present day use the vernier for elevation, and the wind-gauge for direction. The sight is raised or lowered, according to the known or calculated distance. The vernier scale being divided into degrees, these degrees being  $\frac{1}{150}$  of an

inch, and each degree giving an equivalent on the target of one inch per 100 yards, and similarly, the wind-gauge scale is divided in the same manner, with the same results. The marksman has to judge the strength of the wind by the direction and appearance of the flags on the range, but of course this applies to target practice only. In other circumstances, the movements of dust, foliage, heat waves in the air, etc., would have to be considered. The direction of the wind may be obtained by wetting the forefinger, as the evaporation of the moisture will cause cold on the side of the finger against which the wind is blowing. Face the object at which you are firing, and move the back sight to the requisite distance against the wind. If the wind is blowing straight away from, or straight toward the firer, the elevation will be affected thereby, and an allowance of two or three degrees will have to be made, more or less, according to the range. As every score-book contains full information of the necessary allowances, they will be omitted here. Go down for a dull light and up for a bright one. Rain, by cooling the upper part of the barrel, will cause shots to go very high, and must be allowed for. On a hot day, when there are heat waves in the atmosphere (which riflemen call mirage), considerable allowance will have to be made for the illusion thereby created. Watch this, and work against it; in whichever direction it is travelling, up or down, to or from, it will have to be allowed for as if it were wind. It is very liable to occur in light winds, and if it is travelling in opposition to surrounding apparent wind, ignore the appearance, and use your judgment on the mirage alone. In rapid firing, when the barrel is very hot, a local mirage is caused by the local heat, and oil smeared on the top

of the barrel to a great extent will prevent this. Until a man has learnt to shoot accurately he is unable to gain experience of wind and light, because he is unable to separate the effects of these from personal errors: therefore we must all learn to shoot at known distances, and having done so thoroughly, we reach the important subject, from the military or sporting points of view, of judging distances.

JUDGING DISTANCE. Compiled and tested by  
the Editor.

Men should work in pairs, taking an occasional walk in town or country. At ordinary marching pace, 120 paces = 100 yards. Begin with short ranges and work upwards to longer sights.

*First Practice.*—Agree with your partner on a given object, a tree or rock, for example, and see that both have eyes at same height close to the ground. Each having made a guess at the distance, and announced his estimate, a small bet will quicken interest, and pacing the ground will decide the wager. A few practices will show how greatly apparent distance varies between wet weather and dry, between sun and shadow, between day and night. So a sound judgment will develop.

As the distances for testing are increased, much pacing may be saved by using a bicycle. Measure circumference of the fore wheel, tie a string or ribbon to the rim, and, riding slowly, count the revolutions, each equal to so many feet.

*Supplementary Practice.*—To estimate apparent height and length of a distant object, an artist always holds his pencil at arm's length, and measures from the tip to his thumb-nail. Let each learner measure his partner's

apparent height at 120 paces, and with a knife mark where the thumb-nail touches the pencil. Standing at 240 paces, measure and mark again. So, with a mark on the pencil for each added hundred yards, a scale may be constructed, correct for the man who makes it, and for no one else. In actual war, seeing at a distance objects of known height, such as horsemen, waggons, buildings, a stick or a blade of grass at arm's length, measured from tip to thumb-nail, will recall the training, and instantly give the range for sighting one's rifle. (Ed.)

*Finally.*—Riflemen are made, not born. It is probable that not less than 80 per cent. of young men have all the qualities required to become crack shots. It is not a matter of a special gift—a very little practice will make the average man a marksman. It will take from two to ten years to make a man a crack shot. A little coaching from an experienced man, in ten practices, will be the cause of as much improvement as five times the amount without. Hundreds of good shots are lost through despair at not achieving immediate success, and too frequently the cause of failure is the condition of the rifle.

*Advice to Beginners.*—Get a good rifle. Get it tested by a crack shot. Get all the hints you can. Observe what those around you are doing and using, and get all the practice you can. Buy a score-book, study the information it contains, and record your own experiences for future reference. (P.S.K.)

A good manual for musketry training is "How to Shoot, the new method of learning rifle-shooting," by E. J. D. Newitt. Supplementary are the following notes by J. T. Sturgeon, L.F.

It is a great mistake for an instructor in rifle-shooting to be too dogmatic. One man shoots best by one method and another man by another method; and the instructor should be most careful to find out the individual characteristics of each separate pupil, and train him accordingly, provided, of course, that there is nothing radically wrong about that pupil's methods.

Just as nearly all men are either right- or left-handed, so most men are either right- or left-eyed. A left-eyed man will generally shoot best left-handed, as soon as he has trained his left hand into giving him a steady let-off. The eyes may be tested as follows: Take a ring, or the handle of a key, and hold it steadily about eighteen inches or two feet from the eyes. With *both* eyes open, look through the ring at some small object across the room, getting it into the centre of the ring. Then, without moving, close the left eye. If you still see the object through the ring you are right-eyed, but if it appears to have moved to one side, you are left-eyed. For a further check open the left and close the right eye. The reason is that, although both eyes are open, you are really looking through the ring at the object with only one eye, and you unconsciously use the stronger eye. You can easily train yourself to shoot left-handed by snapping at a mark on the wall of your room.

Always, where possible, use the sling. There is no greater assistance to steady shooting; especially when, on active service, a man may have to shoot when he is tired out, or weakened by semi-starvation and want of sleep.

## REVOLVER SHOOTING

The notes on revolver shooting are mainly compiled by Capt. C. E. F. Mouat-Biggs, L.F., from Mr. Winan's "Art of Revolver Shooting" (which see).

Always clean revolver immediately after shooting. Best quality cotton wool, absolutely clean and dry, is the best cleaning material. Carry a wire cleaning brush.

A revolver is dangerous to handle, as the muzzle moves round a very small arc, and the first object in learning is the use of this weapon with safety to one's self and to others. Never take up any revolver without opening breach to see if it is loaded.

Whether loaded or empty, never point the muzzle in any direction where it would matter if it went off by accident. When shooting at an object always keep your revolver pointed towards it when preparing to shoot, viz. run no risks of shooting yourself or any one else.

Always bring your revolver up straight on your object by shortest and quickest route, neither flourishing it above your head nor letting it point over your shoulder, or holding it at arm's length down by your side. Half-cocking with one hand must be practised with an empty revolver till it becomes easy. Never use two hands with a double-action revolver. Stand nearly square, not sideways. The trigger should always be squeezed gradually, the final act of the squeeze should take place just as your front and back sight are aligned on the object. Never pull your trigger. Always leave one chamber in revolver unloaded and your hammer down on the empty chamber. When on horseback, learn to half-cock your revolver with one hand.

Each man must learn to sight his own revolver. No



one can do it for him because (1) the *individual factor* which, in this case, chiefly means the amount of throw or jump a revolver gives in any particular individual hands; (2) *Sights*. This varies with different revolvers and grips in different hands; (3) The amount of sight each individual sees or thinks he sees; (4) The charge, cartridge, weight, and shape of bullet used—all these things do not very much affect rough general shooting, but for very close shooting for highest possibles in competitions they mean everything. The sighting of a revolver is very simple, and only requires a little patience and the knowledge that you are holding absolutely steady.

*How to Sight a Revolver.*—Remember it is no use using a rest, because the throw of the revolver is different from that when using the hand only.

*Ways of Sighting.*—There are two ways of sighting—the best is that to use after feeling sure that your foresight is too tall, which fact is shown by the group of bullets being low on the target when you align the tip of the foresight and the “U” of the backsight together. Take your usual aim and fire a series of shots, then, if the group is a good one, the centre of the group gives the exact shooting of the revolver with your own method of sighting. The one thing to be avoided in testing your revolver is correcting your aim so as to try and get the hits nearer the bull.

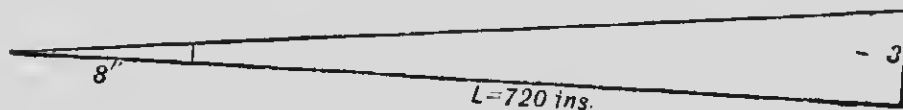
*Test Example.*—Now, if you are sighting, say, for 20 yards, namely, 720 inches range, you have a simple proportion sum, namely, range equals 720 inches.

Distance exactly measured from near edge of the backsight to near edge of foresight, say eight inches

Centre of group of hits, say two and a half inches

under the bull, namely, three inches below the centre of the bull.

Then, as range is to sight radius, so is error on target to height of sight, all, of course, reduced to same denomination.



Just working out the simple example given above: Range 720 : 8 (the length between the backsights) :: 3 (the distance from centre of bull's eye) : Tc. (target centre).

$\frac{8 \times 3}{720} = \frac{1}{30}$  in., which amount has to be filed off the foresight.

*Final Remark on testing Revolver.*—Remember in dealing with the foresight everything is exactly reversed as regards backsight, namely, the higher the foresight the lower will the bullets hit. The arithmetic saves an enormous waste of time and cartridges, but be careful not to file away the complete theoretical amount. When you get the group just under the bull, then drop mathematics, and with your file very carefully make the final nice adjustment, which no one but the shooter can do.

For shooting at game, in self-defence, or in war, use a white foresight, as it shows more clearly against objects met with.

*Targets for Practical Shooting.*—In this case targets

should be black, the bull's eye white, and white a foresight on revolver.

20 yd.	.	.	.	4-in. bull.
50 yd.	.	.	.	7-in. bull.
100 yd.	.	.	.	12-in. bull.

*Order of Accuracy of different-sized Bullets in practical Shooting.*—In experiments I carried out by request, firing 300 rounds with each sized bullet, namely, '476, '455, and '450, I found the order of accuracy for practical shooting was in same sequence, and corresponded with the length of engagement of bullet in barrel of revolver, namely :

- '476 two-thirds of its own length.
- '455 half of its own length.
- '450 less than half of its own length.

Extreme distance in experiments 130 yards. Intermediate distances, 20, 50, and 100 yards.

*Shooting from Horseback.*—Before doing this the weapon must have been thoroughly mastered. Horses learn to stand fire very soon.

Shoot a light charge some distance off and then come gradually nearer. Never shoot close past the horse's ears till it has been thoroughly seasoned. (C.E.F.M.B.)

*Legion Side Arms.*—As shoulder bandoliers impair freedom of the lungs in fighting, the Legion has adopted a waist bandolier of leather, cut on the curve, split lengthways to make it more supple. As dirty cartridges stick, the usual single loop is replaced by two loops, one on each section of the belt, so that only a portion of the dirty cartridge is against the leather. The large plain brass buckle, borrowed from the Royal N.W. Mounted Police, is the easiest to slip on and off. The holster is of the Texas frontier pattern, affording a wide chafing

surface against the body. An open bottom, so that dust falls through instead of collecting. Pressure of the body prevents weapon from jumping. There is no cover, lest the hand be impeded in reaching the gun. Many Frontiersmen replace the cover with an edging of fur to prevent dust falling into the holster, and to keep out wet. The belt is worn loose over left hip, so that the holster hangs down right thigh. A lanyard may be worn.

Any '45 revolver possessed by a member may be worn as side arms. Side arms are not carried, except for duties requiring arms, and by authority of the Commandant.

### III.—SIGNALS

SIGNALLING. By D. H. Bernard, L.F., Master Mariner.

Semaphore has a distinct advantage over Morse for day signalling, providing you can see your man—it is a decidedly quicker method of communicating. Of course the more elaborate system is by fixed semaphores, such as are usually fitted to the bridges of His Majesty's ships, and to shore signal stations. These fixed semaphores are provided with indicators, *i.e.* a small arm projecting to the right or left of the fixture—from whichever side this is pointing the signals must be read.

Pointing to the Right, messages read from right to left.

    "    "    Left,    "    "    "    left    "    right.

Bear this in mind, otherwise you will make a hash of it.

Failing a fixed arrangement, use hand-flags, and if these are not available, two handkerchiefs, two caps, pieces of deal board, or, if you are pressed for time, your natural semaphores, the arms.

Seek a background that will contrast with your flags, handkerchiefs, caps, boards, or arms as much as possible, taking care that if you are standing in strong light your background should be in the shadow. Another important point to remember in time of war is *concealment*. Use common-sense. Conditions are too varied to lay down any hard-and-fast rules.

To be able to read correctly in a strong light, keep yourself and your telescope shaded. In war time, if there are more than two in your party, *i.e.* one man signalling, one man "telescoping," the others should act as sentries to look out for "snipers," and should they be suddenly surprised, *destroy all messages*. "Chew them up," if you can't burn 'em. By hand methods, all signals should be made and read from *right to left* (in semaphore).

Don't fool the receiver by making numeral signs; they can be spelt out in full far quicker, to say nothing of avoiding confusion.

It's a waste of time to put in full-stops and commas; any man gifted with ordinary brains should know where they ought to go. You hardly ever see them in a post-office telegram. Perhaps you can send faster than the receiver is able to read. This you will find out after the first few letters; act accordingly, and go slower. Before starting make the alphabetical sign J., bringing your flags, arms, or whatever you are signalling with, close to your body after completion of each word.

Keep your temper and your flags clear.

*Morse (Day).—By Flag.*

A Morse flag has a longer handle than the semaphore flag. If you haven't the real article, a handkerchief tied to a "longish" stick, or the barrel of your rifle, makes a very good substitute. *Re* concealment and background, use the same ideas as in the preceding notes. You can work from left to right, or right to left, according to your position, and the direction of the wind. Call up by waving flag from side to side. Stand square-facing the man to whom you are signalling; don't let your flag droop, or he will get fogged. Keep as upright as possible. Make a pause between each word or group, and when finished, rest your staff on the ground, and conceal the flag with your hands. A good signalman requires much patience. Here is the whole secret of "flagging" Morse when you have learned the code.

In clear atmosphere a large flag can be read 7 miles.

" " small " " 4 "

*Heliographing.*—1. You can fool the enemy in time of war by placing a looking-glass on a distant hill and "morsing" with it from under cover.

2. If you do not know the direction to call up your next station, traverse the body of your heliograph, and flash the duplex mirror with your hands.

3. If you meet any difficulty in fixing the legs of the instrument, get anything that will hold earth or small stones to bury each leg, and fasten a weight on to the anchoring hook.

4. Point the signal mirror at right angles to an imaginary line half-way between the sun and your object; the light will reflect on it if the angle is less than

120°, but if the angle between the sun and the object is greater than 120°, use the duplex mirror.

5. To prevent instrument getting out of order carry slung across the shoulders.

6. If the instrument is broken past repair, use a lamp-shutter before the mirror.

7. By flashing a bullseye lamp at night into the mirror Morse can be worked.

8. An ordinary looking-glass or a piece of tin makes a good substitute for the proper instrument. If the tin is dirty, dull, or rusty, clean it by rubbing it in earth or sand.

9. In a clear atmosphere, under best conditions, signalling can be effected 70 miles distant with the ordinary instrument.

10. Care should be taken to keep the heliograph dry and free from dust. After use, clean it well before repacking, and, if damp or wet, use an oily rag.

*International Code Signalling.*—There are 2 burgees, 5 pennants, and 19 square flags in the code.

When about to signal, hoist answering pennant under ensign. When this is recognised by ship or shore-station, the answering pennant will be hoisted, and then lowered to half-mast to await your communication. As each signal is understood, this is hoisted close up and lowered again; if not understood, it will be kept half-mast. If more than one ship or station is in sight, and the signal is intended for a particular vessel or station, the four-flag signal corresponding to ship or station should be hoisted where best seen. When about to signal, open code book by tape in the centre, and look up first letter in the principal word of the signal, under the initial letter of the general vocabulary; this is the

index to the code. If any of the signals in the code were hoisted upside down they would still be recognised, but remember that if a national ensign is hoisted upside down it is a signal of distress. Before commencing to signal, write down your message with corresponding flags, and prepare them as much as possible. If you have a double set this is easily done, and avoids confusion.

*Morse (Night).*—Always turn your lamp towards person addressed. To attract attention, make a series of short flashes until the man addressed replies; if you think he is unable to do so, send your message after a moderate pause. If you know more or less for certain (*i.e.* in time of war) that a man is watching for your signal, don't fool away time, flash it out at once. If you wish to do this under cover, get an ordinary looking-glass, and place it in such a position that it will face the man or station; shelter yourself well and Morse into the glass, or even better still, get a lamp-reflector or bright piece of tin in lieu of glass, as snipers could fire at it a long time without doing much damage. Mind, if you are obliged to practise this method, get far enough away from the reflector, and keep yourself well covered; shell and bullets are apt to spread a bit, especially if they hit a hard surface. If you have not got a proper Morse lamp, use your cap over an ordinary lamp. A shutter-spring can be easily made by winding a piece of entanglement or ordinary wire round the barrel of your rifle.

## SEMAPHORE

*Semaphore Signalling in a Week*, a method of self-instruction and practice in "Sending" and "Reading" (a pack of cards), by Captain W. J. Younger, Q.R. .B.,



Royal Scots., Price 3*d*. (George Waterston & Sons, wholesale stationers, Edinburgh and London.)

Semaphore signalling affords a means of silent communication over considerable distances. Letters are formed by placing the arms in different positions as shown on the cards. The person sending the message is described as the "sender"; the person receiving it as the "reader." The system is used by Navy and Army.

"Sending" may be learnt by imitating the positions shown on the key card. It will be observed that the arms, in making the letters, are placed only in positions as shown in the accompanying diagram. These different positions are 45 degrees apart, and in good semaphoring the correct intervals must be maintained.

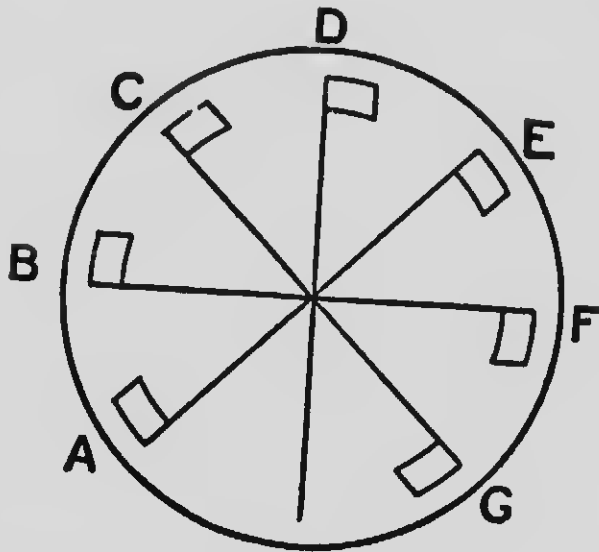
The simplest method of learning the alphabet is by circles, thus :

- 1st circle, A to G (with one arm only).
- 2nd circle, H to N, omitting J. (In this circle the right arm remains at A, while the left revolves to the other positions as shown on key card.
- 3rd circle, O to S (right arm at B).
- 4th circle, T, U, V, and "Annul" (right arm at C).
- 5th circle, "numeral sign" J (or alphabetical sign) and V (right arm at D).
- 6th circle, W and X (right arm at E).
- 7th circle, Z (right arm at F).

Another series of circles will help to fix the alphabet in the mind.

- 1st circle (the arms being separated by 45 degrees), H, O, T, numeral sign, W and Z.
- 2nd circle (the arms being separated by 90 degrees), I, P, U, J, and X.

- 3rd circle (the arms being separated by 135 degrees),  
K, Q, Y, and V.
- 4th circle (the arms being separated by 180 degrees),  
L, R, and "Annul."
- 5th circle (the arms being separated by 225 degrees),  
M and S.
- 6th circle (the arms being separated by 270 degrees), N.



It will also be noticed that the following groups of letters are the reversed positions of each other, viz. : A and G, B F, C E, H Z, I X, J P, K V, L and Annul, M S, O W, Q Y, T and figure sign, while the letters R, U, N, and D are neutral.

Figures are made by using the same signs as for letters A to K, omitting J.

The numeral sign is used to indicate that the signs

which follow are figures, not letters. At the conclusion of the figures the alphabetical sign J is sent to indicate a reversion to letters. The "Annul" is used to cancel mistakes in sending.

Sending can be learnt quite easily by one person alone, but reading usually requires the assistance of another person to read from. These cards have been devised to obviate this necessity, and to enable a person to learn to read by himself in the following manner :

Lay the key on the table, and hold the cards face uppermost in the hand.

Compare the exposed card with the key to find what letter it represents, and then deal it on the table and read the next card.

When all the cards have been dealt, shuffle and read over again in a similar manner.

When the signs have become familiar, discard the key, and call out the letter each card represents as it is exposed. The pace of dealing out the cards must be gradually increased until the reader is able to deal out the cards and call the letters as rapidly as possible. When this stage has been reached, it will be found that a signaller "sending" with flags or his arms can be read quite easily.

Small flags or handkerchiefs being held in the hands enable the reader and sender to converse at much greater distances. Reader and sender should move about till positions are found giving the best possible background. When beginners are learning to converse, one "calls up" by making letter J and waving both arms; the other answers by making letter J. Sender then commences message, making the letters of each word in succession, moving his arms directly from the position of one letter

to that of the next, the duration of the pause on each letter being adapted to the proficiency of the reader. Between each word sender brings his arms down to the "ready" position. Reader answers each word by letter T, unless he cannot understand it, in which case he sends R (meaning "Repeat"). Sender complies, etc.

When greater proficiency is attained, sender continues with his message without waiting for any acknowledgment between words. If reader fails to read any word he sends R, then sender will discontinue and send J. Reader then sends the last word he has understood, and sender proceeds with his message from there.

It may be convenient for the reader to have some one writing down the words as he spells them out. It will then be found necessary to pronounce the letters, *t, a, b, m, s, p,* and *v*—*toc, ack, beer, emma, esses, pip,* and *wic*, to distinguish them from similarly sounding letters, and it is therefore advisable to pronounce these letters in this way from the commencement.

These directions are sufficient to enable any one to make a practical use of semaphore.

#### ORDERS BY SIGNAL.

The following signals are to be employed to represent the words of command mentioned :—

SIGNAL	TO INDICATE
(a) Arm swing from rear to front below the shoulder, finishing with the hand pointing to the front.	"Advance" or "Forward."

SIGNAL.	TO INDICATE
(b) Arm circled above the head.	"Retire."
(c) Open hand raised in line with the shoulder, elbow bent and close to the side.	"Walk" or "Quick time."
(d) Clenched hand moved up and down between thigh and shoulder.	"Trot" or "Double."
(e) Circular movement of hand below the shoulder, as in turning the handle of a small grinding machine.	"Gallop."
(f) Arm raised at full extent above the head.	"Halt."
(g) Body or horse turned in the required direction and arm extended in a line with the shoulder.	"Incline."
(h) Circular movement of the extended arm in line with the shoulder in the required direction.	"Shoulders" or "Head of column change direction," or in line of squadron columns; heads of squadrons right or left.
(i) Arm waved from above the head to a position in line with the shoulder, pointing in the required direction.	"Troops right (or left) wheel."

## SIGNALS

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SIGNAL	TO INDICATE
(j) Arm waved horizontally from right to left and back again as though cutting with a sword, finishing with the delivery of a point to the front.	1. Squadron column (from line). 2. Form line of squadron columns (from column or line). 3. Form line (from line of squadron columns).
(k) A low point delivered first to the right and then to the left.	"Rally."
(l) Two or three slight movements of the open hand towards the ground.	"Dismount" or "Lie down."
(m) Two or three slight movements of the open hand upwards (palm uppermost).	"Mount."
(n) Arm raised as for "Halt," and then pointed to the ground.	"For action, dismount."
(o) Arm at full extent over head and waved a few times slowly from side to side, bringing the arm down at each wave on a level with the shoulder.	"Extend."

*Note.*—This signal denotes extension from the centre. If the extension is to be made to the right, finish the signal by pointing to the right. If the extension is to be made to the left, finish the signal by pointing to the left.

- | SIGNAL   | TO INDICATE   |
|--|---|
| (p) Arm extended above the head for "halt," and hand moved rapidly right and left.   | "Mass" if at closed order, or "Close" if at extended order. |
| <i>Note.</i> —This signal denotes "Close on the centre." If it is desired to close on the right, finish the signal by pointing to the right. If the close is to be on the left, point to the left. |   |
| (q) Arm swing from rear to front above the shoulder.   | "Reinforce."  |
| (r) Weapon held up above, and as if guarding the head.   | "Enemy in sight in small numbers."                          |
| (s) As in (r), but weapon raised and lowered frequently.   | "Enemy in sight in large numbers."                          |
| Weapon held up at full extent of arm, point or muzzle uppermost.   | "No enemy in sight."  |

The whistle will be used—

- (i.) To draw attention to a signal about to be made —"a short blast."
- (ii.) To denote "Cease fire"—"a long-drawn-out blast."
- (iii.) To denote "Rally"—"a succession of short blasts."
- (iv.) To denote "Alarm"—"a succession of alternate long and short blasts."

Signals such as "*Halt*" or "*Incline*" should be maintained. Signals of movement, such as "*Advance*" or "*Shoulder*," should be repeated until it is clear that they are understood.

(Quoted from *Army Red Book*.)





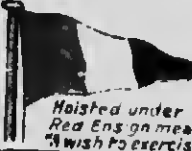




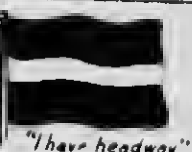

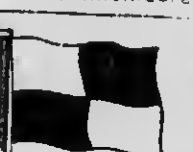



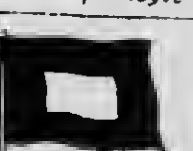


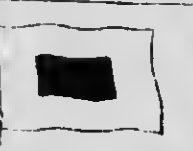








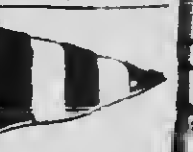
# SIGNAL REMINDER.

ALL METHODS.

*This Signal Reminder (James Brown & Son, Glasgow) is here incorporated by courtesy of the publishers and by the generosity of Mr. D. H. Bernard, L.F., who waives his royalty.*



*International Code Flags and Special Significations.*

			
<b>A</b> <i>H.M. Ships on Full Speed Trials.</i>	<b>B</b> <i>Powder Flag.</i>	<b>C</b> <i>Affirmative "YES"</i>	<b>D</b> <i>Negative "No."</i>
			
<i>Hoisted under Red Ensign means "I wish to exercise"</i> <b>E</b> <i>Alphabetical Signal No. 1.</i>	<i>Alphabetical Signal.</i> <b>F</b> <i>Guard Ship (No. 2) (H.M. Navy).</i>	<b>G</b> <i>Alphabetical Signal No. 3.</i>	<b>H</b> <i>"I wish to communicate."</i>
			
<b>I</b> <i>I have no Clean Bill of Health.</i>	<b>J</b> <i>Semaphore Flag.</i>	<b>K</b> <i>"I have Sternway."</i>	<b>L</b> <i>Cholera, Yellow Fever, or Plague</i>
			
<i>Numeral Signal No. 1 (H.M. Ships) Medical Guard.</i> <b>M</b>	<i>Numeral Signal No. 2.</i> <b>N</b>	<i>Numeral Signal No. 3.</i> <b>O</b>	<b>P</b> <i>"Am about to Sail."</i>
			
<b>Q</b> <i>Quarantine Flag</i>	<b>R</b> <i>"Do not pass ahead of me."</i>	<b>S</b> <i>International Pilot Signal.</i>	<b>T</b> <i>"Do not overtake me."</i>
			
<b>U</b> <i>"My Engines are Stopped."</i>	<b>V</b> <i>"My Engines are going Full Speed Astern."</i>	<b>W</b> <i>"All boats return to the Ship."</i>	<b>X</b> <i>"I will pass ahead of you."</i>
			
<b>Y</b> <i>"All ships of Convoy are to rejoin Company."</i>	<b>Z</b> <i>"I will pass astern of you."</i>	<i>Pilot Jack.</i>	<i>Code Flag or Answering Pennant.</i>

*Dist*

*N. 4.*

*H.M. Service*

*Brief*

*A. B. to Code over*

*" "*

*" "*

*" "*

*" Under*

*Four flag hoist Spelling Tab on top. E H indicates Vessel. E indicates (N.B.)*

*1*

*2*

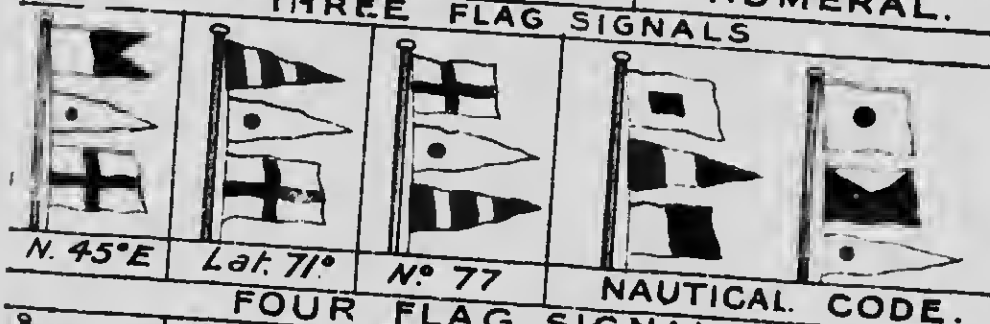
*3*

*re.*

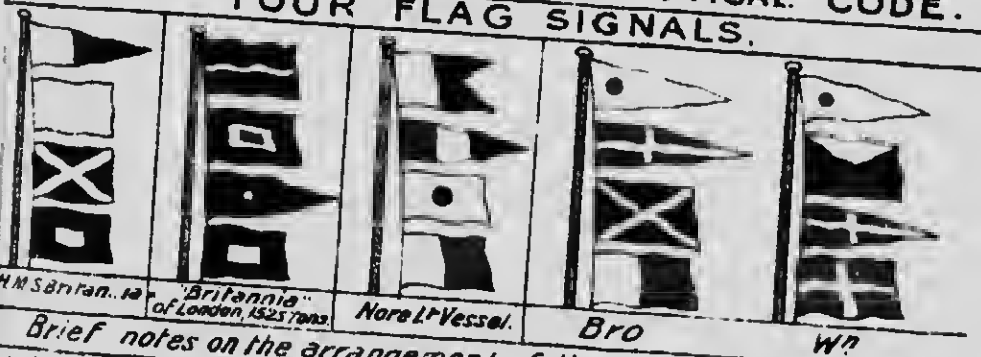
## TWO FLAG SIGNALS.



## THREE FLAG SIGNALS



## FOUR FLAG SIGNALS.



Brief notes on the arrangement of the International Code.

A. B to Z Y. Urgent Signals.	A. B. C. to A. S. T. Compass.
Code over A. B to D. H. Latitude.	A. S. U. to A. V. J. Money.
" " D. I to K. P. Longitude.	A. V. K. to B. C. N. Weights & Measures.
" " K. Q. to Q. L. Time.	B. C. O. to B. D. Z. Decimals, etc.
" " Q. M. to T. S. Barometer.	B. E. A. to C. W. T. Auxiliary Phrases.
" " T. U. to Z. Y. Thermometer.	C. X. A. to Z. N. P. General Vocabulary.
" Under U. A. to Z. Y. Numeral.	Code over any one flag. Urgent.

Four flag hoists, Burgee on top - Geographical. (N.B. This includes Lighthouses and Vessels)  
 Spelling Table - Con top. Men of War - G on top. Merchant Ships - any flag from H on top. E hoisted under the Red Ensign at the mast head of one of H.M. Ships indicates that she wishes to exercise signalling with a British Merchant Vessel. E hoisted singly at the mast head of a British Merchant Vessel indicates a wish to exercise signals with a British Ship.  
 (N.B. To be hoisted down when signalling commences)





























## SPECIAL DISTANT SIGNALS



International Code Hoists. Distant Signals, etc.

Code Sign 421. Alphabetical 422. Numeral 423. Full Stop 2. Finishing Sign 432.

Semaphore and Morse Code











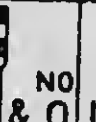

















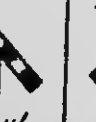
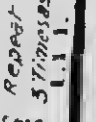
 A 1	 B 2	 C 3	 D 4	 E 5	 F 6	 G 7
 H 8	 I 9	 J	 K 0	 L	 M	 N
 O	 P	 Q	 R	 S	 T	 U
 V	 W	 X	 Y	 Z	 Annul	 Alphabetical

Numeral

**SEMAPHORE TIPS.**

A to G 1 FLAG | W to X CHANGES FROM F  
 H to N 2 FLAGS | Z " " G  
 O to S CHANGES FROM B " " "  
 T & U C ALSO Y & ANNUL  
 V, J, & NUMERAL " D. A TO K NUMERAL.

**HAND FLAGS AND SEMAPHORE ALPHABET etc.**

 A & 1	 B & 2	 C & 3	 D & 4	 E & 5	 F & 6
 G & 7	 H & 8	 I & 9	 J	 K & 0	 L
 M	 N	 O	 P	 Q	 R
 S	 T	 U	 V	 W	 X
 Y	 Z	 Alphabetical	 Numeral	 Annul	 Full Stop

Care should be taken when using these Signals to select a good Back-ground

A  
B  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P  
Q  
R  
S  
T  
U  
V  
W  
X  
Y  
Z



Pilot Jack Table for reporting Vessels of War Sighted

<b>B 1</b>	<b>H 2</b>	<b>O 3</b>	<b>R 4</b>	<b>T 5</b>	<b>U 6</b>
<b>V 7</b>	<b>W 8</b>	<b>Y 9</b>	<b>Z 10 or 0</b>	<i>Large Floor</i>	<i>Small Floor.</i>
<i>Battleships.</i>	<i>Large Cruisers.</i>	<i>Small Cruisers.</i>	<i>Armed Merchant Vessels.</i>	<i>Submarines.</i>	<i>Torpedo Boats or Destroyers.</i>
<i>Troopships.</i>	<i>Hospital Ships, Store Ships, etc.</i>	<i>Colliers.</i>	<i>Unknown.</i>	<i>Japanese.</i>	<i>Russian.</i>
<i>French.</i>	<i>British.</i>	<i>German.</i>	<i>American.</i>	<i>Italian.</i>	<i>Austrian.</i>
C.D. Argentine. D.C. Belgian. D.E. Brazilian. D.F. Bulgarian. D.G. Chilian.	E.C. Chinese E.D. Columbian. E.F. Danish E.G. Dutch. F.C. Mexican.	F.D. Peruvian. F.E. Portuguese. F.G. Siamese. G.C. Spanish. G.D. Turkish.	G.E. Uruguayan. G.F. Venezuelan.	Flags relating to numbers principally red " " " Fleets " Blue " " " Nationality Pennants	

**Key to Numbers and Fleets**... First Letter of each Word in the Following Sentences:—  
 "1 Battle. 2 Held. 3 Off. 4 River. 5 Thames. 6 Unique. 7 Victories. 8 Won. 9 Yesterday. 10 or 0 Zero.  
 An Important Jeopardy. Kaisers, Large Merchant Navy; proceeding quickly South exhausted.  
 The Pilot Jack indicates that the above table is being used and according to its position  
 in the hoist indicates the direction Men of War were Steering.

**PILOT JACK HOISTS.**

1st Flag War Ships Steering N  
 2nd " " " " S  
 3rd " " " " E  
 4th " " " " W

If wishing to detail, Date, Time, or position, Select Flags from Int. Code.

**EXAMPLES.**

	Sighted Warships Steering North.	
	German	Chilian
	Six.	Seven.
	Battleships.	Sighted Warships Steering East.
		Small Cruisers.

The Nautical Telegraph Code is used by all Officers in the Mercantile Marine.

E  
I  
S  
H  
A  
U  
V  
T  
M  
O  
N  
D  
B  
1  
2  
3  
4  
5

E	● Englishmen	R	● ■ ● Rowlocks
I	● ● Invariably	W	● ■ ■ When
S	● ● ● Support	L	● ■ ● ● Loose
H	● ● ● ● High	P	● ■ ■ ● Play
A	● ■ Authorities	J	● ■ ■ ■ Jangling
U	● ● ■ Unless	F	● ● ■ ● Frictions
V	● ● ● ■ Vindictive.	G	■ ■ ● Galloping
T	■ The	Z	■ ■ ● ● Zig-zag
M	■ ■ ■ Managing	K	■ ● ■ Knights
O	■ ■ ■ Owners	X	■ ● ● ■ Xpeditely
N	■ ● Never	C	■ ● ■ ● Capture
D	■ ● ● Destroy	Y	■ ● ■ ■ Your
B	■ ● ● ● Bills	Q	■ ■ ● ■ Queen
1	● ■ ■ ■ ■	6	■ ● ● ● ●
2	● ● ■ ■ ■	7	■ ■ ● ● ●
3	● ● ● ■ ■	8	■ ■ ■ ● ●
4	● ● ● ● ■	9	■ ■ ■ ■ ●
5	● ● ● ● ●	0	■ ■ ■ ■ ■

*BERNARDS Method of learning the Morse Code.*

# "FLAG MORSE."

## BRIEF INSTRUCTIONS FOR SIGNALLING.

1. Keep upright, stand square facing the man or station to whom you are signalling, and call up by waving flag from side to side. Be careful not to let your flag droop, and work from left to right according to direction of wind and your position.
2. Seek a background that will contrast with colour of your flag, or use a flag that will contrast with colour of background, and have staff long enough to see beneath the flag.
3. Here is the method of "flashing" when you have learnt the Morse Code.



LEFT TO RIGHT.



RIGHT TO LEFT.

4. To make a short flash or dot the flag is moved from A to B.
5. To make a long flash or dash the flag is moved from A to C.
6. A pause equal to the length of a long flash is made at position A between each letter, word, or group.
7. A letter should be made in one continuous wave of the flag without pausing.
8. When receiving, lower your staff and conceal flag with the hands.
9. Send "Special Sign" VH as one letter at end of message.

E  
sq  
sig  
Lo  
Sn

## SIGNALS

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*Navy Method of Learning Morse Code.*—Initials stand for letters of alphabet arranged in best order for learning their code signs.

- Every	— Time
-- I	— — Make
--- Signals	— — — On
	---- High
-- Answer	— . Not
--- Until	— . . Distinguished
---- Very	— . . . Bad
----- When	— . . . . Guessing
	----- Commences
--- Receive	— . . . Kindly
---- Long	— . . . . Yarns
---- Flag	— . . . . Quickly
----- Patiently	— . . . . Xercise
	----- Judicious
	----- Zeal
— I	----- 6
-- 2	----- 7
--- 3	----- 8
---- 4	----- 9
----- 5	----- 0

## SCOUT-SIGNS

The first text on this subject appeared in the *Daily Express*, London, April 1908.

The scout-signs are being worked out by the Kent squadron of the London Command. The first set of signs was devised by Sergt.-Instructor Campbell, of the London Command, considerably extended by Lieut. Snowden Ward.

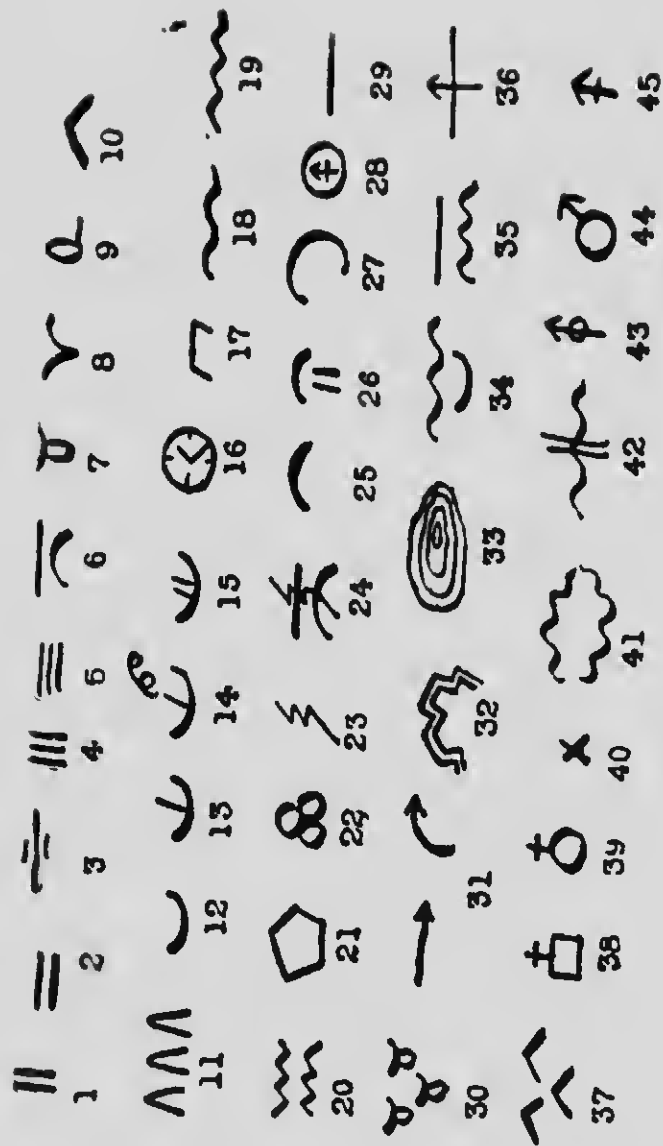


They are symbols, to be scratched or drawn in the sand or mud, cut in the turf, "blazed" on trees, or written on a scrap of bark, chip, or paper, and hidden by a scout who knows that he is followed by a party with whom he wishes to communicate. They are simple picture-symbols, taken from common usage, from the gipsies or tramps, from the calendar and zodiac, and from the conventions of map-makers, with additional signs invented to meet the necessities of the case.

Three principal uses are intended: (1) to guide a comrade or a party that is following; (2) to give information as to food, fodder, billets, etc., obtainable in various directions when a party is marching, and not in the neighbourhood of the enemy; (3) to give military and other information to a fighting force operating near the enemy.

In every case where the road-signs are used for anything more than bare direction, a "sign-reader" will accompany the party for which the information is left. He will have practised regularly with the scouting and sign-writing party, and it is found that as a result of working together constantly a reader learns the "writing" of a particular scout so accurately that forgery is impossible.

1, Infantry; 2, Cavalry; 3, Gun; 4, Infantry reinforcements; 5, Cavalry reinforcements; 6, A bridge; 7, Horned cattle; 8, Sheep; 9, A tree; 10, Roof (house or barn); 11, Tents (camp or bivouac); 12, Boat; 13, Sailing boat; 14, Steamer; 15, Large ship; 16, Clock (the time); 17, Horse (remount or transport); 18, Fresh water; 19, The sea; 20, Mouth (food for man); 21, Hay stack (horse forage); 22, Cairn, indicates hidden message



not far away ; 23, Destruction (thus, 24 means bridge destroyed or mined) ; 25, The Embrace (meaning our own, thus 26 equals our own infantry or allies) ; 27, Surrounded or defended ; 28, Our own scout (see 45) surrounded or in danger from the enemy ; 29, Surface of the earth ; 30, Two over one, equals multitude—in this case a multitude or herd of cattle (see also 37, a multitude of roofs, which means a village) ; 31, Direction signs ; 32, Entrenchments ; 33, Contours (hills or mountains).

Signs can be used in combination, as already shown by 24 and 26. 34, Boat under water, indicates a (ferry or other) boat sunk ; 35, Water under earth (well or spring) ; 36, Drawn across end of a lane means that scout has not investigated that lane, and that party following is not to take it, but that he suggests sending a man along it to investigate ; 37, A village ; 38, Church with tower ; 39, Church with spire ; 40, Church, hall or public building without spire ; 41, A lake ; 42, Water fordable (infantry shown as partly above and partly below the surface) ; 43, This direction has been searched and proved blank ; 44, Mars, indicates fighting in progress ; 45, Our own scout (see also 28) used to indicate the direction which the scout has taken when he leaves the line that his party is to follow.

#### *Blazes and Twig Signs*

A branch thrust into tree or bush of different species—enemy seen or suspected.

A twig, double-pointed, blocks the road.

A twig, single-pointed, directs along the road in which it lies.

A twig with leaves—enemy. Leaves left whole—mounted men. Leaves half torn—infantry.



Narrow notches in bark of twig—infantry. Flat gouges—cavalry. Two over one—multitude.

Cleft stick—ambush suspected.

Stone on three others, or on horse droppings—a cairn—hidden message not far away.

Blazes on tree trunks or twigs broken and left hanging indicate direction taken. Line (vertical) on top rail of gate—gone through here; and its position, in centre, or right, or left indicates direction; straight forward, or bearing to right or left.

All the above are so simple that any intelligent enemy might easily conjecture their meaning, even if he did not know it. There are many cases in which this is no disadvantage, and where simplicity and legibility are the most important points. There is, however, extensive use for secret alphabets. These are not fixed, but each scout-party is expected to devise its own code for the purposes immediately in hand, and to change it frequently.

Long messages may be written in scout-signs; and there are symbols for many abstract subjects, such as distance, time, etc. For instance, here is a message (see sketch).

This reads: "One mile along the road there is a church with tower, on the right; behind it is a village with ample provender for the horses, and meat food in the form of sheep and cattle under a barn or cow-house. There is also a supply of well-water (sign shows water below surface of the earth). Half a mile farther is road to left, along which the scouts have travelled without finding enemy or anything worth reporting. At two and three-quarter miles is a road to the right, along which, at five and a half miles, is an unbridged river flowing in direction of arrow; no ford, but a ferry-boat, sunk, on

the farther side, which is guarded by the enemy with a force of all arms, including one gun (or one battery)."

"Blazes" and night-signs are of great importance in guiding and in night-scouting. In the simplest form, a "blaze" is merely a gash cut in the trunk of a tree, or a small branch or twig half-broken and left hanging. In guiding by these means the rules are few and simple. A straight line is followed until a distinct blaze marks a change of direction; every blaze should be on a tree that is visible from the position of the last one, and when direction is changed, the first blaze or two should be specially distinct, and not far apart. By using broad blazes and narrow slits in various combinations of numbers and relative positions, it is possible to work out a long code of signals that can be cut on the barks of trees or in the turf or sand.



#### IV.—TACTICAL EXERCISES

Commands should keep themselves closely in touch with the training of the mounted forces, with which we hope for the honour of serving in time of war. Until we understand the strategy of general officers commanding, and the tactical methods of a Field Force, we can render little or no effective aid to His Majesty's troops. The best journal on the work of mounted troops is the *Cavalry Journal*, published by the Royal

United Service Institution, in Whitehall (quarterly, 10s. a year). By the courtesy of the editor we are permitted to reproduce the following exercises, which will suggest practical methods in Field Training :

Information, however valuable, when gained by scouts extended over a wide area, *only becomes useful when it has been communicated to the officer commanding the main force*, and therefore special steps have been taken in training a number of men (usually about twenty) in each regiment to act as despatch riders ; these are partly horsemen, partly cyclists, whose training fits them for finding their way by map or otherwise over long distances in unknown country at a fast sustained pace, and, when necessary, from one moving body to another.

*Horsemastership* is practically taught by sending out men in pairs on long-distance patrols of at least 120 miles to find their way by day and by night and to report on certain points within a given time. Each scout takes an untrained comrade on long-distance patrol.

*Riding*.—Paper chases, by paper dropped sparingly, or small articles such as buttons, pipes, etc., blazes on trees, hoof-tracks, etc., will develop observation of small signs.

*Judging Distance*.—A special development is being made in the art of practical judging distance, since upon this depends so very much the efficiency of every man, both as a marksman and as a scout.

*Scouting Practice*.—A pretender to the throne has appeared with a force at Reading, but getting the worst of it, decides to escape to Spain, having arranged for a ship to pick him up somewhere between Bournemouth and Lyme Regis. He and his escort, three men, may assume any disguise, but must ride troop horses. Lieut. Woodhouse, 14th Hussars, enacted the pretender, and

started from Reading; five officers and eighty-one scouts went out to stop his getting away. These were given 2s. a day to keep themselves and horses for five days. Scouts were spread over the country and correctly reported the escort at Winchester, but could not find the pretender, who travelled alone chiefly by night, and spread false reports through his escort. Two of these were captured on the 16th. He was eventually captured disguised as a farmer on the 18th by Captain Van de Byl, after a ride of 148 miles. He kept communication with his scouts by visiting pre-arranged spots, where notes were hidden for him, or telegrams at certain offices.

*Treasure Hunt, Scouting Practice.*—Assumed rebellion in North. Sympathisers in South try to send a cart containing treasure to them. Troops in centre, aware of this intention, endeavour to prevent it. Lieut. Osmond Williams, 19th Hussars, with about 30 scouts, was given a cart containing box of "treasure."

All troops sent out parties of patrols and scouts to waylay him. After a most adventurous journey of some 300 miles he eventually got safely through, working chiefly by night.

*Spying.*—At manœuvres three spies were authorised on each side—in any disguise so long as they did not dress as women. This gave a very practical turn to the scouting, etc., and also taught all ranks to avoid talking about the plans of the operations, though they were fully informed about them.

*Scouting and Spying.*—The inhabitants of York rebel, and besiege troops in barracks. A relieving force from the South endeavour to send a despatch into barracks through the rebels.



Lieut. Malet and a few scouts represented the despatch party, while Captain Gosselin with 18th Hussars represented the rebels. Corporal Walter, one of the rebel scouts, disguised himself as a fisherman and went on his bicycle about the country until he found the party of despatch riders. He overheard some of their conversation, and finally found them, dressing up one of their numbers as a girl. He telegraphed the news into York. Pickets watched all roads and railways. Private Brewer, of the despatch riders, dressed as a girl, with despatches in a band-box, arrived by train at York, and passed the picket (of his own squadron), but was recognised and arrested by Captain Lichtenberg.

The civilians at York entered into the spirit of the exercise with great interest, and passengers by train good-humouredly submitted themselves to examination by pickets, etc.

*Surprise Practice.*—A party of rebels were reported some fifteen miles from York; the regiment was ordered out to surround them in the night, and capture them. It endeavoured to do so, but failed to get more than three.

More rebels with a pom-pom meantime, taking advantage of the fog, laid an ambush for the regiment returning to York, but although nearly successful, two scouts of the regiment discovered their presence and gave warning just in time.

*Scouting Practice.*—To find the missing letter. A letter for each squadron was hidden at a spot fifty miles from barracks; a list of hints and clues was given by which a man might find his way; four scouts from each squadron were allowed to compete, mounted on bicycles. A prize of £2 to the first scout to find the

letter for his squadron, and to hand it to the squadron commander in barracks.

*Despatch Riding.*—Competitors, four men from each squadron—to take a message about eight miles—Walking 2 miles; swimming 40 yards; running 1 mile; riding  $1\frac{1}{2}$  mile; cycling  $1\frac{1}{2}$  mile; rowing 2 miles.

*Rules for Reconnaissance Competition:*

Object: To attain efficiency in horsemastership, scouting, and despatch-riding, under pressure akin to that of active service.

	Men.	Horses.
Team.—1	Officer . . . . .	1
	3 Scouts . . . . .	3
	1 Cyclist . . . . .	0
	1 Pack-horse leader . . . . .	2
	<hr/>	<hr/>
	6	6

Task: To carry out a three days' patrol of, roughly, 25 to 35 miles a day, starting at a certain hour and ending at a given place. Finding way by map.

Reports: The commander of the patrol to report on certain points, and to send in his report by despatch-rider.

A general idea and the points for his reports will be given to him by the umpire at starting each day, and the latter will, as a rule, be connected with his halting station; or, if connected with the march, will be of such nature as not to involve delays in marching.

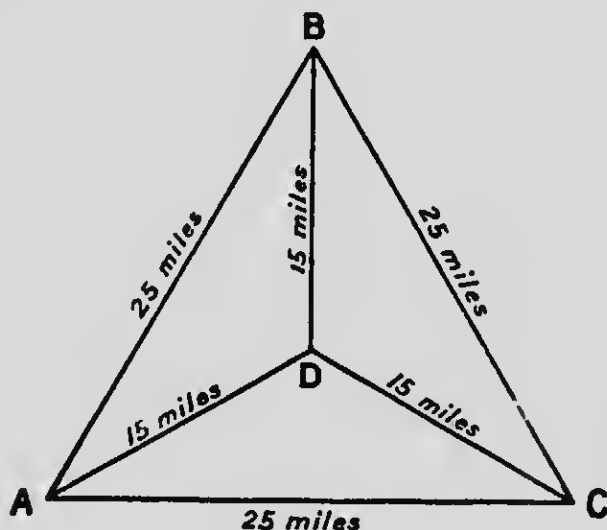
Supplies: Shelter tents, blankets, and cooking utensils to be carried on pack-horse. Bivouac each night. Food and forage to be previously laid down at stations—the

patrol being supposed to live on the country. Forage and food may be carried on the horse if desired.

Kit: Field service marching order with revolvers instead of rifles. Regulation saddles.

Course: Triangular or more sided course according to number of teams competing.

Say three teams start—the course will be a triangle of three sides about 25 or 30 miles each between stations A, B, C, and a run to the centre spot D of about 15 miles, thus:



No. 1 Team start at A  
 No. 2 " " B } at, say, 9 a.m. on a certain day,  
 No. 3 " " C }

and go to next station; and thence the following day (or during the night) to the next, and on the final day they go to the third station, *i.e.* their original starting-point, and thence to D, thus putting in about 40 to 50 miles on the last day.

## TACTICAL EXERCISES

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On the fourth day each team has to go over a jump course of ten fences at D. This is to ensure useful class of horse being employed, and no over-riding on previous day.

Stations should preferably not be at towns or villages.

Despatch riding: The officers have certain objects to report on each day, assisted by their scouts: they send in their reports on the following day by one of their scouts to D. He remains at D after handing in his report. On the third day they send it forward to D by cyclist, from the last station they reach.

Condition: Condition of horses to be tested by veterinary officer on arriving at D, and record taken of their temperature, pulse, respiration, soundness, injuries, and general working efficiency, etc.

Umpires at stations also to note the general condition of the horses on arrival and on departure, with power to deduct marks or disqualify for bad condition.

<i>Marks</i>	Total.	Total Aggregate.
Each report	50	150
Time.—Average pace up to 6 miles per hour. Anything over does not count. Anything under loses 5 marks per decimal point below the rate of 6 miles per hour. This includes time taken in sketching or investigating, etc.	100	100
Condition of each horse on arrival at D.	30	210
Jumping each horse (except pack-horse).	15	90
Cyclist: 1 mark for every 15 minutes in advance of his patrol on arrival at D.		

Deductions to be made for breaking any rules, or for injuries to horse, etc.

Enemy: To enforce real scouting a flagged enemy or hostile picket should be stationed at one or more points on the course. This must be looked out for, and, if possible, avoided and passed by the patrol, making a detour out of sight of it. Marks to be deducted according to number of men seen by the enemy's picket, and their nearness to its position.

Umpires: Umpire at each station to time hours of arrival and departure; and to watch for and note irregularities, etc.

Chief umpire and veterinary umpire will be stationed at D.

Officers acting as umpires should not belong to any of the regiments competing.

Scoring forms should be supplied to the umpires, also a list of kit that should be carried by each competitor and a list of the horses to the veterinary umpire with a form for reporting on their condition.

## V.—DEMOLITIONS

BY LIEUT. R. A. SMITH, M.I.E.E., L.F.

The demolitions to be briefly treated here relate to such destructions of an enemy's material as irregular troops might be called upon to perform with the simplest appliances.

The most useful and portable destructive agents are high explosives, and some rules may be given for their handling and employment; all forms of material may,

## DEMOLITIONS

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however, be destroyed, or tampered with to render less useful, without explosives. But this field is so large that no rules will suit all cases, the operator must use his own ingenuity and act according to circumstances. We can only give here a few general hints, with a few special applications.

## EXPLOSIVES

The explosives most likely to be available are gun-cotton and dynamite. Gunpowder is comparatively a weak explosive, particularly if untamped; too bulky and inefficient to be of much use in hasty demolitions. Cordite, tied tightly in bundles, may be exploded as if it were gun-cotton.

*Gun-cotton.*—Of the two former, gun-cotton is the safer to be handled by mounted men. It is served out in slabs  $6\frac{1}{8}$  in. square, and  $1\frac{1}{8}$  in. to  $1\frac{3}{8}$  in. thick, each usually weighing either  $1\frac{1}{2}$  lb. or  $1\frac{3}{4}$  lb., and must be carried *wet*. When issued it contains 20 per cent. of moisture.

If thrown on a fire it will burn viciously, but will explode only when powerfully detonated. Dry gun-cotton is much more easily detonated than wet, in fact wet gun-cotton requires a priming charge of dry gun-cotton to detonate it; therefore amend Cromwell's dictum to "Trust in God, but keep your gun-cotton wet." If a slab be soaked in water for two or three minutes it should keep damp for a week. Gun-cotton may be cut, sawn, or bored, quite safely if both tools and material be kept wet.

*Primers.*—Some dry gun-cotton must be carried in the form of primers, which are circular discs of dry gun-cotton coated with paraffin wax to resist moisture,

weighing either one or two ounces, having a hole in the centre for the insertion of detonator, the outside being shaped to fit one or other of the two round holes of different size which will be found in the wet slabs, the larger hole—two inches in diameter—being for the 2-oz. primer. The object of the holes is to facilitate the fixing of the primer, which would otherwise have to be tied on to insure good contact.

The object of the primer is to provide a sufficiently heavy detonation to explode the wet gun-cotton; the primer being itself of dry gun-cotton is detonated by the explosion of fulminate of mercury in a tube fired by a fuse.

If a primer should get damp it must be dried before being used, which is best done by exposing to the air of an ordinary living-room for a fortnight or so; but in cases of emergency it may be dried either in the sun, or before a fire out of the range of sparks.

It is understood that a new form of slab is under consideration, and for demolition purposes the one-ounce primer is the only one used. The two-ounce primer is intended for use with land mines.

*Detonators.*—The detonators served out to be used with safety fuses are known as No. 8. Each consists of a brass tube about 3 in. to 4 in. in length, painted red; one end, which contains 35 grains of fulminate, being tapered and closed, and this end must be tightly fitted into the hole in the primer; the other end—protected by a paper cap—is open for the fuse, which latter must be cut off square at the end, with the powder showing, and most carefully inserted till in contact with the quick match which passes through the wooden plug that holds the fulminate in position, and when it is in place

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the fuses

the upper portion of the tube should be bent sufficiently to prevent the fuse from falling out. Do this before applying the detonator to the primer, and in all operations be careful not to handle the taper end, the slightest deformation might cause explosion. If the detonator doesn't fit the primer exactly, wrap paper or something round it if too small, or enlarge the hole in the primer if too big; *but don't enlarge the hole with the detonator* or force it into position; use only a wooden peg for enlarging. Detonators and primers should be treated with caution and respect.

*Fuses* are of two kinds: slow and fast.

1. The slow is generally known as Bickfords, or "Safety Fuse No. 9." It burns at the rate of 3 ft. to 4 ft. per minute, is waterproof, and will burn under water; it is smooth outside and black in colour. Always test a few inches from each coil before using, as at times it deteriorates, and old material may burn too rapidly.
2. Quick-match, or instantaneous fuse, burns at the rate of about 30 yards per second; it is orange-coloured and has a rough surface, by which it may be distinguished in the dark. Its use is for the firing of two or more charges simultaneously.

When joining two lengths of safety fuse, or joining safety to instantaneous fuse, make a scarf-joint, *i.e.* cut in slanting direction and bind together with the cores in contact, first sprinkling a little powder on the joint, taken from a piece of quick-match; or a more satisfactory plan—particularly if there are several instantaneous fuses to be fired—is to dip all the ends into one small quantity of gunpowder, which may be contained in a match-box, little bag, or piece of cloth tied tightly round the fuses.



A substitute for safety fuse may be made by wetting ordinary gunpowder, and packing it into any kind of tube. This will burn at the rate of about 2 ft. per minute.

A substitute for instantaneous fuse may be made by taking a long, narrow strip of calico or similar material and sewing the long edges together, so forming a tube which may be filled with dry powder; this would burn at from 10 ft. to 20 ft. per second.

Safety fuse is not easily lighted by a match; a glowing cigar, pipe, or fuze is better, or the end may be split with a knife and a little bit of quick-match from the core of the instantaneous fuse inserted and tied in, or the head of a wax match pressed into the cone will facilitate lighting.

*To Fire Gun-cotton.*—In order, therefore, to fire a charge of gun-cotton, we have first to ignite the slow fuse from a match, or preferably a pipe, which in turn fires the instantaneous fuse (if more than one charge is to be exploded simultaneously); the fuse, quick or slow, as the case may be, fires the detonator, which explodes the dry primer; that, in turn, explodes the slab. *The slab must be in contact with the rest of the charge and the object to be destroyed.*

In laying a charge take precautions to prevent sparks from the fuse setting fire to the gun-cotton. A covering of green grass, sand, or earth will do. Also take care, if using instantaneous fuse, that the detonator is anchored with a stone or tied in its place, else the rapidity of combustion of the fuse may jerk the detonator out of position.

*Dynamite* has a more powerful local shattering effect than gun-cotton, but its effect is not so wide-spread, and

it is therefore not so useful for the destruction of bridges and heavy masonry.

Dynamite is plastic, and is usually supplied in parchment cartridges containing 2 oz. each. It will freeze at 40° F., and when frozen will remain in that condition even at high temperatures. When frozen it becomes slightly lighter in colour and brittle, and is not so easily exploded. It requires to be thawed slowly and with *great care* by being put into a mug or pannikin suspended in a larger vessel of hot water. The water should not be warmer than one could bear one's hand in. When the dynamite becomes plastic it is ready for use.

*To Fire Dynamite.*—The detonator No. 8 may be used, making a hole for it in the dynamite cartridge with a peg of wood the correct size; but the usual form is a copper cap about  $\frac{7}{8}$  in. long, which may be pressed into the primer. Or if a powerful percussion cap be fitted on the end of the fuse, and that inserted into the primer, and the latter placed on the top of the dynamite cartridge, it will produce the same effect.

If dynamite is being used in crevices, bore holes, or auger holes, the cartridges may be inserted intact or the material loose, but in either case it should be squeezed in gently with a *wooden* rammer, little by little. If more than one cartridge is being used, each one must be in contact with the one next to it.

NOTE.—The detonator suitable for gun-cotton can be used with dynamite, but the dynamite detonator will not detonate gun-cotton.

*Tamping* is the covering or confining of the explosive with a mass of the heaviest material to hand, which retards the rapid expansion of the gases generated, and

so increases the violence of the explosion about 100 per cent.

Tamp whenever possible by covering the charges with earth, sand, clay, stones, or sandbags, according to position and circumstances.

*Charges of Gun-cotton.*—The following table of charges for hasty demolitions will be found on page 119 of the "Field Service Pocket Book," 1907:

#### CHARGES FOR HASTY DEMOLITIONS

NOTE.—*The charge is in lbs.*

B, length to be demolished in *feet*.

T, thickness to be demolished in *feet*.

t, thickness to be demolished in *inches*.

(In the case of iron plate only.)

In the presence of the enemy increase the charge by 50 per cent.

#### GUN-COTTON (untamped)

*If the charge is tamped, decrease by one half.*

<i>Object attacked</i>	<i>lb.</i>	<i>Remarks</i>
Brick arch, haunch or crown . . .	$\frac{3}{4}BT^2$	Continuous charges; the length of breech B not to be less than the height of the wall to be brought down.
Brick wall, up to 2 ft. thick . . .	2 per ft.	
Brick wall, over 2 ft. thick . . .	$\frac{1}{2}BT^2$	
Brick pier, over 2 ft. thick . . .	$\frac{2}{3}BT^2$	
Hardwood, stockade or single . . .	$3BT^2$	In a single charge outside. For a round timber, charge $3T^3$ . Trees up to 12 in. diameter. For a round timber, charge $3T^3$ . Where the timber is not round, T (smaller axis).
Hardwood, necklace . . . . .	$3BT^2$	
Hardwood, auger hole . . . . .	$\frac{3}{8}T^2$	

## DEMOLITIONS

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<i>Object attacked</i>	<i>lb.</i>	<i>Remarks</i>
Stockade of earth between timber up to 3 ft. 6 in. thick	4 per ft.	} Single charge.
Heavy rail stockade	7 per ft.	
Fort gate	50	} On chase near muzzle. } At bottom of bore ; water or sand tamping. } Against the web near a chair one-third of a 2-lb. slab is most convenient. } t is in <i>inches</i> . } In one charge in centre of tower.
Field- or siege-gun . . . . .	1½	
Heavier gun . . . . .	4	
First-class steel rail	½	
First-class iron rail	2/3	} t is in <i>inches</i> . } In one charge in centre of tower.
Iron plate . . . . .	3/2Bt <sup>2</sup>	
Frontier tower, stone and mud	16 to 30	

*Necklace.*—A necklace is made by stringing discs of dry gun-cotton together on a string or wire and tying it tightly round the object to be cut, so that all the discs are in contact with one another and the Object. This is useful for cutting trees, etc.

*Concentrated Charge.*—A plan that is recommended for firing a concentrated charge is to lash the slabs tightly in contact with one another along the surface of a board, which may then be lashed to the pier or crown of a bridge or a stockade, or whatever is to be demolished.

If a hole be bored through the board the fuse and detonator may be arranged to pass through from the back of the board, and so the slabs are protected from being accidentally set on fire by the fuse.

*Continuous Charge for Brickwork and Masonry.*—Brickwork and masonry are best destroyed by cutting horizontal grooves at the base for the explosive and firing it as a continuous charge. The effect may be increased if the charge be laid against the wall under

the ground line, and the earth replaced and heaped over it.

If the wall is less than 2 ft. thick, the formula given under "Charges" will hardly apply, but, as a rough rule, use in a continuous charge 2 lb. of gun-cotton per foot run of breach, which must not be less than the height of the wall.

### BRIDGES

*Steel Girder.*—Girder bridges may be destroyed by fire if so placed that sufficient heat be generated to make the girders white-hot, when they will probably not be able to sustain their own weight.

The best way of destroying steel bridges is to cut the girders themselves with gun-cotton. Attack nothing but main girders, and always at such points that the weight of the material may complete or aid the process of destruction: for instance, assume a girder supported at the two ends only; more damage would be done by cutting the girder close to one of the ends than by cutting it in the middle, while, if it have a central support, comparatively little damage would be done by cutting close to the ends, as the central portion would be balanced on the central support and might not fall, but, if cut close to the *central* support, one half of the bridge would fall.

There is another point to be noted, that in cutting near one point of support the girder is usually of lighter section, which, in larger bridges, is increased towards the middle; less explosive is therefore required to cut near the ends.

*Arranging the Charge.*—A single girder is composed of top and bottom horizontal flanges and vertical web; the latter may be open lattice. To make sure, all three

should be cut, but if short of explosives, cut the flanges, or at any rate the bottom one which is in tension. All members composing an open web should be cut where they interfere with a complete cleavage.

The charge for cutting each member should be separately calculated from the formula for iron plate, and the charges bound or wedged up tightly to each. It is essential that the explosive should be in actual contact with *the whole length of the line to be cut*, and the charges must be fired simultaneously.

*Cast-iron Bridges.*—Arched cast-iron bridges are destroyed by cutting the arch along two lines simultaneously to break away the crown in the form of an inverted keystone.

*Suspension Bridges.*—If the piers are of light construction, cut all the cables at both shore ends, if possible, so that the weight may bring the pier down; but if the bridge be of permanent and solid construction, cut all cables in the middle. If flat-link cable, use explosives as per rule for iron plate; if wire cable, measure the circumference in inches, multiply the number by itself and divide by 24, the result will be the number of pounds of gun-cotton or dynamite necessary.

If the cable be very large, divide the charge into two and lash tightly to the cable on opposite sides, firing both simultaneously.

*Brick Bridges.*—If of single span, brick bridges may be attacked either by one charge distributed across the arch, under or over the crown, or by demolishing both haunches; the latter is the more completely destructive, but requires time. The amount of explosive may be found from the formula in the preceding table.

If the demolition must be done very hastily, the charge

may be lashed to a board and suspended under the crown in contact with it across the width of the bridge or strutted from below, but if the road metal or ballast can be removed from above the crown, half-charges may be laid if the material be replaced.

A bridge of more than one span is best attacked by binding the charge to a pier, the amount of gun-cotton required in pounds being found by taking two-thirds of the multiple of the length of the pier in feet by the breadth in feet squared.

#### DEMOLITIONS OF BUILDINGS

Buildings are better demolished from the inside by placing charges of gun-cotton low down in corners. For amounts of charges apply rule as to walls. Fire simultaneously.

If walls are being attacked from outside, the charge may effectually be placed against the wall below ground level; the material removed for this purpose should be replaced to tamp the charge.

When demolishing by burning, it is sometimes difficult to get a fire hastily started: a few dry gun-cotton primers wrapped in paper, placed in position, and the paper lighted, will burn fiercely enough to ignite even slightly damp material.

#### DEMOLITIONS OF GUNS

To destroy a field or siege gun, detonate a slab of gun-cotton on the chase. Tamp with sandbags, if possible, to increase damage. For larger guns increase the charge.

Another method is to place a charge in the barrel, close to the breech, and tamp by filling with sand, wet

if possible. If explosives are not available, remove the breech lock, and burr the threads of all screws.

## RAILWAY DEMOLITIONS

No destruction of railway plant or material should be undertaken without precise instructions; as the possibility of requiring the railway for our own operations must always be considered.

Railway demolitions may be directed against (a) the permanent way alone, or (b) permanent way and rolling stock.

(a) If orders are given to destroy as much permanent way as possible, bridges and culverts would be treated with explosives (see Bridges), rails torn up, and sleepers burnt.

To break up a railway line, a heavy, long-handled hammer is the most effective tool; a few blows on the nut of a fish-plate bolt, directed parallel to the rail and at right angles to the bolt itself, will quickly shear it, so that the head can be knocked out with an improvised "drift."

In Great Britain rails are set in "chairs" by wooden wedges, which are easily knocked out by the hammer; but almost everywhere else flat-bottomed rails are used, held to the sleepers by dog-spikes, bolts, or clips; these, however, will all yield to the hammer treatment, but a crowbar or long lever is useful.

Burn the sleepers in piles, using them to heat the middle of the rails. When hot, the rails should not only be bent, but *twisted*; remember, a bent rail may be straightened with a "Jim Crow," but a twisted rail must be rerolled before it can be used again. Where there are "points" for sidings, steel tie-bars will be found, which may be used as levers to assist in the twisting.



To cut a rail, lash about eight ounces of gun-cotton (say half a small slab or one-third of a large one) tightly to the web of the rail to be cut, next to a chair or fastening, and detonate in the usual way.

To break off the outer lips of chairs is a very rapid way of destroying a line where it is laid on chairs, as the rails would spread and be unusable for traffic till rechaired; in this case the fish-plates should *not* be touched, as they will cause the enemy further delay in rechairing.

If a large number of men are available, an exceedingly rapid demolition can be made by undoing the fish-plates of both rails at two points, and turning the whole track bodily over between the points of severance. One man is required for every two feet of track, and if the track is well ballasted, one man with a lever or crowbar to each three men lifting is necessary to break the sleepers out. To remove and carry away points, crossings, or any other special track work, would be harassing to an enemy and might spoil his use of the line, while it would be at once reparable upon our own reoccupation.

*Train-Wrecking.*—(b) It is not so easy to wreck a train as it looks, for under war conditions railway lines would be carefully patrolled, speeds reduced, and dummy trucks pushed ahead of engines to explode mines; but, if the routine of the line-inspection and train service be known or noted, it may be possible to do a considerable amount of damage by derailing a train.

The damage done will depend largely upon the situation of the derailment and the speed of the train. A curve on an embankment, or the approach to a bridge will make the most dangerous spot.

In order to make successful derailments under varying

conditions, it is well to have some knowledge of the first principles underlying the operations.

A train rounding a curve is subjected to two forces tending to throw it off the metals. One is centrifugal force, which acts outwards in the direction of the radius, and which tends to lift the train off the wheels on the inside of the curve, and turn the train over outward. The other acts tangentially, and is due to the momentum of the train; this tends to make the train run in a straight line and leave the curve.

The first of these forces is counteracted in laying down the line by lifting the outer rail of the curve, so that the vehicles are tipped inwards and have their centre of gravity brought nearer to the inner wheels; the principle being the same as the banking up of a sharp turn on a cycle track.

It is obvious that there is a limit to the amount of superelevation which can be given to the outer rail: viz. it must not be banked up so high that the train will fall over towards the inside curve when stationary or when travelling at a very slow speed. It is also obvious that for any given curve and superelevation there is a maximum speed at which a train can pass round the curve without being thrown over: which will depend upon the weight and centre of gravity of the rolling stock.

The second tendency is counteracted by the flanges of the wheels pressing on the outer rail, and so guiding the train round the curve, and on sharp curves "guard rails" are usually provided between the rails, so that the reverse side of the flange of the inner wheels may also take part of this work.

From the foregoing it will be seen that if the superelevation of the outer rail on a curve be reduced, or—what

is the same thing—if the inner rail be elevated above the outer rail, a train passing quickly round the curve will be thrown over to the outside, and the higher the super-elevation of the *inner* rail, the slower need be the pace of the train to effect this result. The amount of super-elevation found in the outer rail to make the curve safe will be some guide to the amount to be given to the *inner* rail to make it dangerous. This elevation is given by levering up the inner ends of the sleepers and putting stones and ballast under, along the sharpest part of the curve. If scouts report that the line is patrolled in sections by cycle trolleys or small tank locomotives at slow speeds and the trains are run at fairly high speeds, it is quite possible so to tamper with the line, as above indicated, that the slow-moving patrols would pass safely and not notice the alteration, while the fast-moving train would be derailed.

The removal of an outer rail on a curve—and also the guard-rail if there is one—will derail a train at any speed, but it is likely to be noticed by the driver, who would pull the train up in time. If these rails be loosened by knocking off nuts of fish-plate bolts and removing the bolts and fish-plates, also knocking out wedges and breaking off the *outer* lip of chairs, if laid in chairs, or breaking off heads of dog-spikes if flat-bottomed, and the rails, though loose and detached, were left in position, the damage would be less obvious, and quite as effective if several consecutive rails were so treated.

To derail a train on a straight line, remove fish-plates from both rails at a point, and with levers or crowbars shift one or both ends of the track bodily to one or other side till there is a lateral space of not less than two inches

## DEMOLITIONS

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between them through which the flanges of the wheels on one side of the train will pass.

*Rolling Stock.*—To render a locomotive useless but reparable, remove feed injector, or pump valves, boiler fittings, connecting rods, pistons, or other parts. To destroy, detonate a slab of gun-cotton against the inside of firebox.

A Lee-Metford bullet will penetrate an ordinary boiler shell.

The axles and sole plates of carriages may be cut by explosives, or the carriages may have their springs removed.

### DEMOLITIONS OF TELEGRAPH LINES, ETC.

Demolitions of telegraph lines and the like may mean the wholesale destruction of a great length of line and removal of material—which would require a considerable force to carry out—or may mean the interruption of service on an enemy's line such as might be accomplished hastily by one or two men, and we will deal here with the latter phase only.

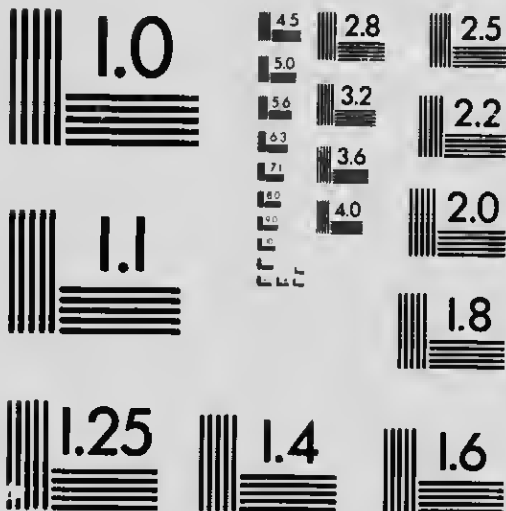
The most hasty—and an effective—interruption is to shoot off a few insulators. The insulator would be hit in the neck on the side where the line wire is bound in, the line wire itself, or the binding wire, may be cut by the bullet, but in any case if the porcelain insulator is shattered and falls to the ground, the line wire, if uncut, will be left in contact with the iron bolt which carried the insulator, and so make a partial "earth," and a number of these, particularly in wet weather, will make the circuit difficult or impossible to work.

If, however, the wrecking party have the time and



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opportunity, a much more skilful plan may be employed. First let the wrecker leave his horse at some distance from the line where its spoor would be concealed, and remove his own boots—to leave no tracks—and climb one of the posts to the cross-arms. He should then scrape the wires clean close to the insulators and join all the wires together with a fine binding wire—copper is best, but ginger-beer-bottle wire will do or any fine wire—carefully training the wire round the insulators and down the bolts and along the top side of the cross-arms, at the same time making connection to the “earth wire,” which is usually found running down the posts if they are of wood. If it can be done, colour the binding wire with paint or chalk to the exact shade of the insulator where the latter is crossed, taking every precaution to make the interference as difficult as possible to detect by any one riding past on inspection. Having regained his horse without leaving any evidence of his having visited the line at that point, the operator should make a detour, and again approach the line, this time bringing down a post or number of posts, by fire or cutting, and cut all the wires.

Make another detour to a point farther from the most probable direction from which a repair gang would come, and here approach carefully and again climb a pole to make another fault by substituting a piece of whip-cord for line wire. With a piece of *cord* make fast to a wire a few inches out with a series of half-hitches and strain tightly to the insulator, then cut the wire close to the insulator and bend the end over quickly, so that it does not pull through the string fastening.

No kind of *metallic wire* will do ; string only must be used. If the operator has no wire clippers, or file, any

thin bladed knife, such as an old table-knife, hacked along the edge by another knife, makes an excellent metal saw.

The effect of these operations would probably be that when the breakdown of the line was reported a repair gang would set out and, finding the destroyed post, would rectify the damage and return; or if provided with field instruments and testing set, on finding the communication still interrupted, would have to search for the further breakdown; and the string might possibly be discovered; but, if skilfully done, it would be necessary to climb and individually examine each post, to discover the "short circuit" caused by the fine binding wire, which would occasion a much greater loss of time and annoyance to the enemy than if quite a large section of the line had been destroyed or removed.

When demolishing a section of aerial line, break all insulators and carry away as much of the wire as possible, as the repair gang may not bring out sufficient stores to replace the loss, and so have to return for more.

In many places, particularly on the Continent, telegraph and telephone wires are often laid underground: in such cases test boxes exist at regular intervals and may be discovered by numbered marks of wood or stone, placed at regular distances. If these be detected a cross-cut or trench should be dug about three feet deep at right angles to the direction of the cable. If the cable be found it should be cut, but the ends of the wires should *not* be short-circuited, and should be carefully *protected* from contact with the earth or anything else when filling in the trench again, as an earth-connection would assist the enemy in locating the fault. The surface damage should be made good and hidden.

When scouting an enemy's outworks, where electric



contact mines have been laid and the scout should happen upon the connecting cables, they should be cut ; but in this case each pair of wires in the ends leading to the enemy's control should be *carefully joined together* and protected from the earth, as it is almost certain that closed-circuit high-resistance fuses or detonators have been fitted to the mines, and these will be tested regularly for continuity ; if, therefore, the above precautions be taken, and the severance of the cables carefully hidden, the enemy will not be made aware that the mines have been put out of action.

## VI.—HYGIENE

BY E. WYNSTON WATERS, L.R.C.P.E., L.R.S.S. (Ed.),  
F.R.S. (Ed.), L.F.

*Health of Expeditions—Civil and Military.*—The death-rate from dirt exceeds that from fighting. Dirt is the home of many parasites which are dangerous to life. Therefore it should be a maxim to avoid dirt in every possible way.

Impure water often contains very small living bodies, which, if swallowed, are liable to produce diseases which are often fatal. The boiling of the water kills these deadly little bodies, and renders the water quite wholesome.

The ground on which men have often to camp may contain a very deadly little germ, which, should it enter a wound, will produce convulsions and death (many deaths from this cause during the Crimean war). Therefore, when possible, sleep on a bed ; and, if no bed is avail-

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able, cut dried grass, covered with a waterproof sheet, will prove satisfactory.

Men become weak and bloodless through defective nourishment, which may be the fault of the cook, or, more probably, the commissariat.

In this bloodless condition a man is very liable to die should he be attacked by a severe illness; in short, his power of resistance is so diminished that he is unable to withstand an attack.

Needless exposure to cold and damp should be avoided, and a suitable and properly selected camping and personal equipment will overcome the difficulty.

To sum up, the health of an expedition can be pretty well guaranteed, provided the following few simple rules are attended to :

- (1) Pitch camp, when possible, on dry, sandy soil. Always select an elevated spot.
- (2) All water for cooking and drinking purposes to be previously boiled.
- (3) Sleep well off the ground, *i.e.* on a bed or cushion of dry grass.
- (4) Wear clothes that suit the climate.
- (5) The cook to be taught how to know when tinned meats are unfit to eat, *e.g.* bulging of top of tin, and, when opened, faint smell of decomposition.

In organisation it is vital that the principal health and medical officer should have high authority, and immediate contact with the officer commanding. Lest the ambulance officer should intercept sanitary or health reports, he should be made subordinate to the principal medical and health officer.

*Books.*—See Journal of Royal U. Service Inst. Feb. 1907. Journal of R.A.M.C. Dec. 1906.

## VII.—IDENTIFICATION OF WAR-SHIPS

BY HAROLD R. INGERSOLL

Identification of war-ships is the art of being able rapidly and correctly to distinguish war vessels from merchantmen, and to determine their nationality and class.

All mariners are in a sense accustomed to the identification of vessels, generally in the trade or class to which they belong. Thus, most bargemen can give the names of a number of barges which, to the outsider, appear to be exactly alike. The art, however, as applied to war-ships is somewhat different. The bargeman can identify the craft of his line, because he is accustomed to seeing them, and he knows them from one another by reason of certain characteristics which are not apparent to the casual observer. In the case of war-vessels, we find the system reversed, for we have to pick out ships we perhaps have never seen. The system is the same; it is done by noticing the characteristics and features peculiar to each ship, only, whereas in the first case we get these points from the ship itself, in the latter, information concerning them has to be supplied. It is plain that to wade through a mass of verbal description of ships to determine what vessel it is in sight, would be a slow and cumbersome task; the vessel would probably be out of sight before the chief features had been found. In order that these things may be found out rapidly, and with a greater amount of success, silhouettes of each class of ship are made (Plate I.). This system,

first originated by Fred. T. Jane, presents an outline view of the ship as she would appear on the horizon or at a distance. The silhouettes are prepared from plans, photographs, and, where possible, from the ship itself, and, although a correct representation is aimed at in all cases, allowance must be made for minor alterations and differences. Individual ships of one class often have small variations from the others. Rig may be altered, ventilators removed or added, and what appears at a distance to be a solid superstructure will on closer view resolve into a network of boats, ventilators, guns, etc. Also side turrets, guns, casemates, and other fittings, which do not appear in the profile of the ship, are not given. Judge, therefore, by general appearance, and be guided by reason in detail. Common-sense will tell the mariner this. It is impossible, in the limited space available, to do more than give an introduction to the art, and a few explanations as to how the silhouettes are to be worked. The Legion hopes before long to be able to issue a complete set of silhouettes and information to the members of the Maritime Divisions.

We must first learn to distinguish war-vessels from merchantmen, and, to aid in this, examples of various craft are shown on Plate I.

*War-vessels and Merchant Ships.*—The masts of a steamer hull down will often indicate her profession. The fighting ships, except a few cruisers with three, have either one or two masts, while the merchantmen have two or more, except tugs and some small coasters with one. In coasters with one the funnel is usually right aft, where it is never seen in a war-ship, while a four-masted steamer will always be a merchant ship. A

vessel having masts, one of which is between the funnels, may safely be put down as a fighting ship.

The following *Auxiliary Ships* are exceptions to this :

*Petroleum*.—An ordinary tank steamer with three masts and funnel right aft.

*Hecla*. *Sea-going T.B. Depôt*.—Has four masts, one funnel between main and mizzen.

*Assistance*. *Repair Ship*.—Very much like tramp, but has fore-mast with two derricks *and a top*. The after-mast is short—raised structure on forecastle.

*Cyclops*. *Repair Ship*.—As above—a top on fore-mast—small structure on forecastle, two pipes or projections forward of chart house—one on boat deck and one on stern.

*Tyue*. *T.B. Depôt and Aquarius*.—Water ship, very much like merchantman. *All* the above ships and any other tenders taken over by the Navy may be known by their being painted "service grey" all over. Usually merchant ships have different colours for funnels, superstructures, and hulls.

The masts of a liner or trader are lighter than those of most war-ships, and are usually placed apart from the 'midship structure, near the hatches, and are decorated with derrick booms, for cargo work. The liner has a crow's nest, or lookout platform, low down on the fore-mast; but she can be distinguished from a war-ship with light masts, as the latter will generally have searchlight platforms on both masts. In the *Chateaurenault* (Plate I.) we have a vessel which might easily be mistaken at a distance for a liner; she was designed that this might be so, but her funnels and guns betray her.

Apart from the fact that she has searchlight platforms on each mast, the war-ship may be known by either of these features: heavier masts, or semaphores, as in *Brennus*, Plate I.; the "fighting tops," as in *J. de la Graviere*, or tripod masts, as in *St. Vincent*, or by girder masts, as in the new American ships. These masts are



JURIEN DE LA GRAVIERE FRENCH CRUISER. NORTH GERMAN LLOYD LINER.

WHITE STAR LINER.

CUNARD LINER CARMANIA.

APOLLO CLASS BRITISH CRUISER.

PROBABLE DESIGN OF BRITISH ST VINCENT CLASS

BRENNUS. FRENCH BATTLESHIP

WARSHIPS AND LINERS.

PLATE I.

Maxwell R. Ingemann.  
June 27, 1908.

in reality small towers built up of girders in lattice-work fashion.

The heaviest masts are usually seen on the heaviest and most powerful ships, but there is a tendency in the later ships to reduce the top hamper, and keep only searchlight platforms on the masts; these sometimes having screens round them, may often look like tops, and will pass as such in distinction to "fighting tops." There may be one, two, or three tops and searchlight platforms on each mast. The masts are in or at the ends of the central superstructure, nearer the funnels than in merchant ships, and abaft the bow turrets, and forward of the stern gun turrets. They are usually upright, whereas the trader or passenger ships are often raked aft. A vessel with her masts close up to her funnels may safely be put down as a war-ship.

The funnels of battle-ships and most large cruisers are upright, where raked it is not so much as a liner or a small cruiser. There are only a few war-ships of any importance with one funnel, and these generally have one mast and low freeboard, such as the *Jagd*, Plate VIII.; others have two masts, such as the *Hela*, Plate VII. These have no fighting tops, nor have the two Dutch and two Russians, which have one funnel. The others may be known by the fighting tops.

The passenger-carrying capacity of the liner is shown in its general appearance of bulk—it looms large out of the water—and has a long and high midship superstructure, with several promenade decks. Contrast the *J. de la Graviere* with the North German Lloyd liner on Plate I. Even the *Chateaurenault* is without the promenade decks of the liner, although her designer meant her to be mistaken for one.

In the purely cargo boat, the central superstructure is small; the fore-castle head and poop are raised, while the masts are close to the hatches, and have appliances for working cargo. Ventilators are near the funnel, and sometimes on the break of the fore-castle and poop.

Compare these features with the fighting ship, with her mast bases crowded with char-houses, bridges, and other structures; a glance at her masts should suffice to tell the mariner that the vessel having these does not carry cargo. In the cruiser, where speed is the chief concern, and armament fairly light, the bulk is fairly evenly distributed along her length, not heaped up for half her length in the centre as in the liner, or divided into three as in the cargo-boat. If she has a superstructure amidship; for boats, etc., this is not so high as the liner's, or as short as in the cargo-boat. If the fore-castle is raised, as in *Warrior* (Plate V.), it extends to or beyond the fore-funnel aft to the mainmast. The poop is never raised. Again, the bows of the merchant ship are nearly, if not quite, straight, and they have counter-sterns. The bows of the fighting ships often curve outward, a very few are straight; some of the new Japanese ships have cut-away bows and sterns; the usual war-ship stern slopes outward. Compare these points in the typical liners on Plate I. with those of the war-ships shown.

The next to consider is the difference between battle-ship and cruiser. The former is heavier, shorter, with more beam, less freeboard; the guns are concentrated near or in the superstructure or citadel, which is situated round the masts and funnels. They have a heavier and more formidable appearance than the cruiser, which is more like the liner, less the promenade decks. Usually



more objects are to be seen on the outline of a cruiser than on a battleship. Briefly, the difference between the types may be summed up shortly :

*Battle-ship*.—Appearance of power, weight and guns concentrated around funnels and mast, equivalent to one-third of length where height is greatest, ends low.

*Cruiser*.—Appearance of speed, even top line, weight distributed along deck line.

*Liner*.—Appearance of bulk, big freeboard, high midship superstructure, equal to about half length.

*Cargo Vessel*.—Small midship superstructure ; ends may be raised.

Distinctions as to nationality. In this, the most important part, we must confine our attention to the nations of whose ships silhouettes are given, viz. British, French, and German.

Starting with the battle-ships, it should be remembered that *all* British battle-ships have two funnels, moderate ram bows, and, except *Swiftsure* class (Plate II.), are without the curved crane.

Turn to Plate II. and compare the *Deutschland* and *Lord Nelson* classes : look at their bows. In the *Nelson*, note the typical British pattern, which is seen with hardly any variation in all classes. Note the German curve ; with the prominent scroll it appears with but slight modification in all German battle-ships, except the *Brandenburg*, where it runs into more of a beak (Plate III.). Look at the lower top on the masts and note the roof to it ; all German battle-ships and armoured cruisers have these. The tops on German and French ships are circular, projecting equally on the fore and aft side of the masts. In the British ships the covered tops, usually the fore upper and main lower, project

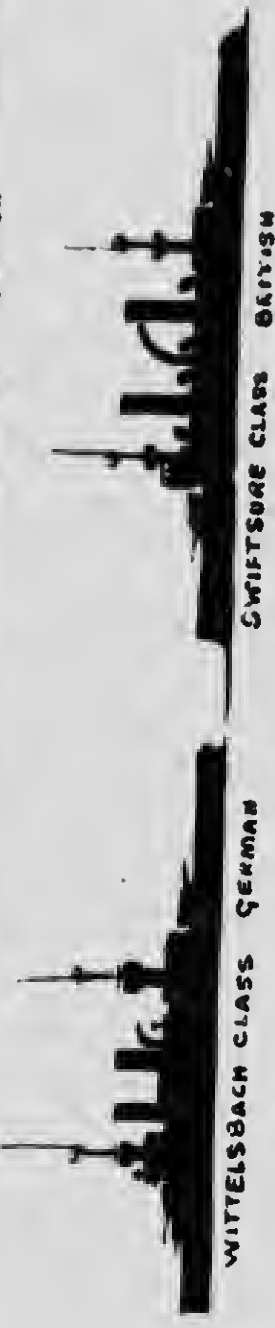
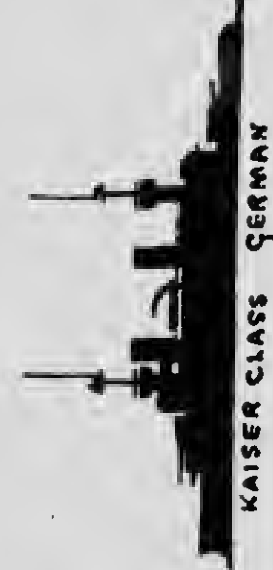


PLATE 2

BATTLESHIPS

Wardell Hayward  
June 21, 1908

more on the after-side of the main mast, and on the fore-side of the fore-mast, except in the *Lord Nelsons* and *Dreadnoughts*, where the top is at the lower masthead, and is circular. The uncovered tops on the other ships are sometimes circular. Canvas curtains hang from the roof to edge of tops in British vessels. Some French ships have them, often in form of a searchlight platform. The German battle-ships, except *Brandenburg*, have the lower part of the mast heavy, surmounted by the largest top half-way down the lower mast. The *Lord Nelson* has her masts moderately stout, with the top high up. Later ships, such as the *Dreadnought*, are like this. The other British battle-ships have a top low down without the roof. Notice the three semaphores on the top-masts; all German ships have these, and some French. British ships usually have none. Contrast the funnels of the two ships. The *Deutschlands* and *Braunsweig* have three, the British always two on battle-ships. Then look at the German's shape; in two sections with the narrow part at the top. British funnels are always plain, so that if a variegated funnel is seen you may be certain that it is not on one of our ships. Next mark well an important characteristic of the German vessels: the large curved crane. These are seen on all their battleships except *Brandenburg*, generally two, one each side, although only one may be shown on the silhouettes. These may be partially obscured by a funnel, but enough is generally to be seen to know what they are. Except in the two *Swiftsures*, these cranes are not carried on British ships; they have instead straight boat derricks, as shown on the *Lord Nelson* class; but can be known from them by their masts, for difference in which compare silhouettes. The *Brandenburg* has derricks, but



KAISER CLASS GERMAN



DREADNOUGHT BRITISH.



BRANDENBURG CLASS. GERMAN.



MAJESTIC CLASS. BRITISH.



REPUBLIQUE CLASS. FRENCH.



FORMIDABLE CLASS. BRITISH.

PLATE 3.

BATTLESHIPS.

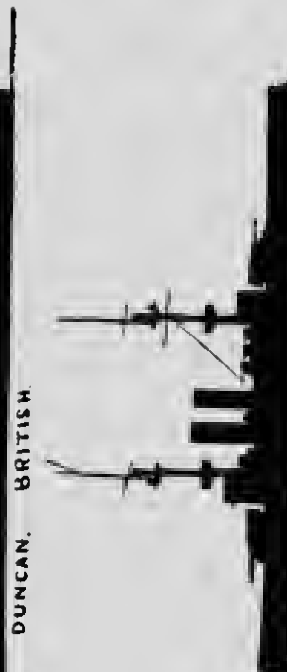
Harold R. Ingersoll.  
June 21, 1908.

she may be known by her bow being more pronounced, by the roof to her tops, and the central turret, showing in a break in the superstructure. The aftermast in the *Lord Nelson* is a tripod, like a three-legged sheers. The *Dreadnought* (Plate III.) has two of these, and the new *St. Vincents* will probably have two tall ones, while we shall not see them in German or French ships till 1910, if they adopt them then. Ventilators on German ships are not conspicuous, but in the *Swiftsures*, *Majestics*, and some *Formidables*, and *Canopuses*; they are features which show up. On Plate III. the bow gun turret of the German *Kaiser* class is mounted on a raised superstructure, from which projects a smaller gun. The French battle-ships *Suffren* and *Massena* have this feature, but no British ship has it. The *Kaiser* class are being reconstructed, and the heavy military masts as shown are being replaced by pole masts, with search-light and range-finding platform.

Turning to our *Majestic* class, we have what appears to be a class of one-funnelled ships; this is not so, for they are placed abreast, instead of fore and aft. The *Royal Sovereign* class have them like this, but wider apart, so wide, in fact, that unless the ships are seen dead beam on, they will appear to be placed fore and aft. You may know these ships from the *Majestics* and others by the absence of turrets over the big guns, which are mounted on open barbets (see Plate IV.). Of the *Dreadnought* little need be said; her two short funnels, with the big tripod mast between, and her two after-gun turrets, with a little tripod mast between them, make her conspicuous among all other battle-ships, until the *St. Vincents* are afloat. But this ship might, at

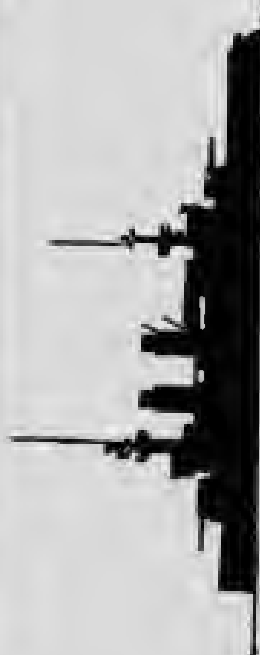


IENA FRENCH



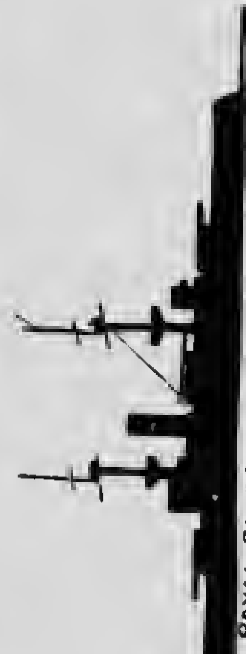
DUNCAN. BRITISH

CANOPUS CLASS BRITISH



CHARLEMAÏNE CLASS FRENCH

MASSENA FRENCH



ROYAL SOVEREIGN CLASS BRITISH

PLATE 4.

BATTLESHIPS

Harold R. Ingemoll  
JUNE 21 1908

a good distance, in hazy weather, be mistaken for a destroyer. The *Dejence* and *Warrior* classes of armoured cruisers (Plate V.) resemble the *Dreadnoughts* slightly, but can be known from them by their masts, for difference in which compare silhouettes.

The French *République* class on Plate III. shows the latest type of French battle-ship. The bow in this case is after the German pattern; the gun turrets are unlike those in ships of the other nations. The foremast only is heavy and has tops; the after one, being solely for signalling purposes, is light. All new French ships have this system of masts. The funnels are peculiar, with double rings looking like two top-hats, one above another; they are in two groups 2-1. All the later big French ships have their funnels like this, and many of the older ones have queer shapes, by which they may be known. The British and German ships' funnels are plainer and neater. Note the projection in front of the after-funnel. French ships usually have these things, galley funnels, towers, etc., sticking up promiscuously.

The three French ships shown on Plate IV. show the many distinctions between them and the British and German *Iena*, shown on Plate IV., is under repair, and may be for some time, but the description and silhouette apply equally to *Suffren*. They are usually more bulky-looking for their size, and look more top-heavy. The *Suffren* appears to be far larger than the *Duncan*, yet the latter's displacement is 14,000 tons against the former's 11,861! Her bow line is moderate; the pronounced "beak," which is so often thought to be the characteristic of their snips, is seen now only in the older ships as in the *Massena*. The *Suffren*, it has



PLATE 5.

ARMoured CRUISERS  
AND  
TORPEDO DEPOT SHIPS.

Harold R. Ingemann  
June 21, 1908



already been pointed out, has a raised superstructure under the fore-turret, as the German *Kaiser* has, but her bulky appearance and double top on the fore, without the roof and the big steam pipe abaft the fore-funnel, should serve to identify her. This ship has curved cranes, but smaller than the German pattern; they are generally absent or quite small in French ships; *Massena* has very small ones. The two tops high up on the fore, and one top low down on the main, as shown on the three ships on Plate IV., are not seen in British or German ships.

Ventilators are not prominent, if seen at all in the French battleships, except in the *Massena*. *République* and later French battle-ships have a large square vertical engine-room ventilator between groups of funnels. Here we have another pattern of funnel, and pronounced ram bow or "beak."

*Brennus*, Plate I, has three semaphores on her fore topmast, but she can be known from the German ships by the absence of the crane and by her aftermast being light, and having no tops. French ships often have a considerable tumble home; their beam is greater on the water line than at the deck. British and German ships are nearly wall-sided. This ends the battleships as illustrated.

*Armoured Cruisers, Plates V. and VI.*—On Plate V. we have three British and three German ships. The depôt ships on the lowest line may be passed over.

Glancing at the German ships, we see that they all have funnels in two sections, the upper being smaller than the lower half; the funnels are in one group, as in the British ships, except the *Invincible* class. The curved crane as in German battle-ships is a prominent



JULES FERRY CLASS FRENCH.



JEANNE D'ARC FRENCH.



POTHAUA FRENCH



CHARNER CLASS FRENCH

PLATE 6.

ARMoured CRUISERS.



DEVONSHIRE CLASS. BRITISH.



CRESSY CLASS. BRITISH.



ARROGANT CLASS BRITISH.



COUNTY CLASS BRITISH.

Harold R. Ingensoll  
June 21 1908.

feature, which the British ships are without, also the French (see Plate VI.), except a small pattern on the *Jules Ferry* class. The bows are strongly curved like their battle-ships; the sterns in both are much alike. Again we see the roofed top marking the German ships, while steel covers with canvas curtains are seen in the *Defence* and *Warrior* class. The forecastle of the British ships is higher and is raised, extending to the foremast, in the *Defence*, *Warrior*, and other classes.

The *Invincible* class of British "battle-ship cruisers," as they are sometimes called, are somewhat like the *Dreadnoughts*, but they have two tripod masts of equal height, and three funnels in two groups, 2-1; three turrets show up as in the *Dreadnought*, but instead of a small tripod mast between the two after ones, the after-funnel, mast, and some superstructure are there instead.

The two big French cruisers shown on Plate VI. differ from the German and British ships in their funnels; these, as in their latest battle-ships, are in two groups, and of peculiar design; they have also the heavy foremast with tops and the light main. Note the projections as seen also in the battle-ships. Ventilators are prominent only in the *Charner* class, hardly visible in the *Pothuau*, and not at all in the others. On the British side the *Cressy* and *Arrogant* have them in evidence; the *Drake* (Plate VII.) has canvas wind scoops instead of the ordinary ventilators. The *Fürst Bismark's* funnels are of British pattern, but her bow, tops, cranes, betray her nationality.

Of the protected cruisers on Plates VII. and VIII. little need be said if the methods employed in the preceding pages be applied to them. The bows of the *Bremen*

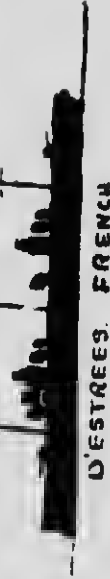
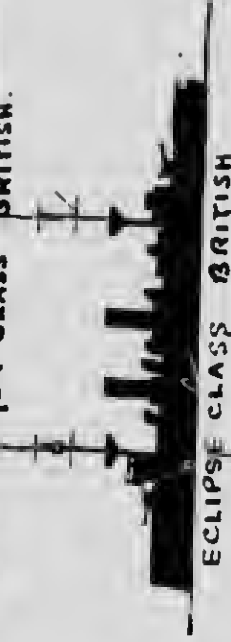
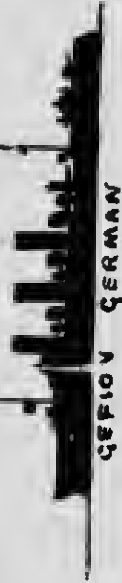
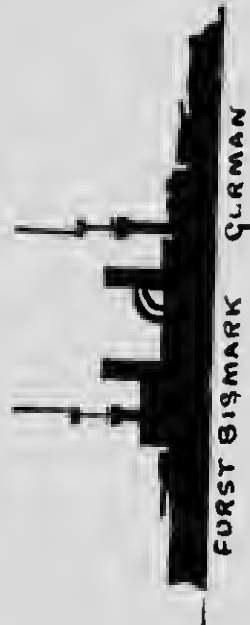


PLATE 7.

ARMoured CRUISERS  
AND PROTECTED CRUISERS

Harold R. Ingemann  
June 21, 1908.

and others, except *Hela*, *D'Estrées* (French), *Comet*, and *Jagd*, mark them sufficiently; but the four latter having bows alike, the latter must be picked out by other means. *Hela* has one funnel, *D'Estrées* three masts, one between funnels; *Comet* one mast between two funnels, and *Jagd* one funnel and one mast, which is abaft it.

*Destroyers*.—The British *River* class are high forward and low aft, with one mast before the first funnel.

All 30-knot boats, except five Clydebank boats of *Brayen* class, have mast before funnels; also the 27-knot *Wizards*, the *Zebra*, *Zephyr*, and *Fervent*, the *Ardent* class, the *Hornet*, and the *Handy* class.

The "Coastal destroyers" or torpedo-boats 1-36, and Nos. 98-99, and 107-117 have masts before funnels. Other torpedo boats have masts abaft funnel or funnels.

French destroyers are not so high forward, have rounded sides and a flying bridge from end to end; they are untidy-looking by reason of the profusion of boats, ventilators, etc., on deck; a contrast to the neat appearance of the German vessels, which are marked by an absence of ventilators, rails, and gear on the decks.

The colour of the ships is liable to change, but the end in view is the same—to present a bad target for the enemy. At present, the large British ships are grey, and destroyers black, but the *River* class of latter are grey. The French ships are also grey; their torpedo craft are light grey. German ships are grey, some of their destroyers black, others dark brown. But what may be invisible in one kind of weather may be prominent in another.

The descriptions given have been necessarily brief, and must not be considered as an attempt to describe

the ships in so many words, but simply as a guide to show where to look for distinctions. To excel in the identification of war-ships, the powers of observation must be cultivated. It is not to be expected that every ship's appearance should be committed to memory, but certainly the general distinctions between ships of the various nations should be remembered. This can only be done by a careful study and comparison of the silhouettes, by contrasting each detail of one ship with the corresponding detail in the other. Don't be in a hurry to learn the distinctions between classes of ships, until you are able to tell their nationality; when this can be done with a fair amount of certainty, then take up the classes.

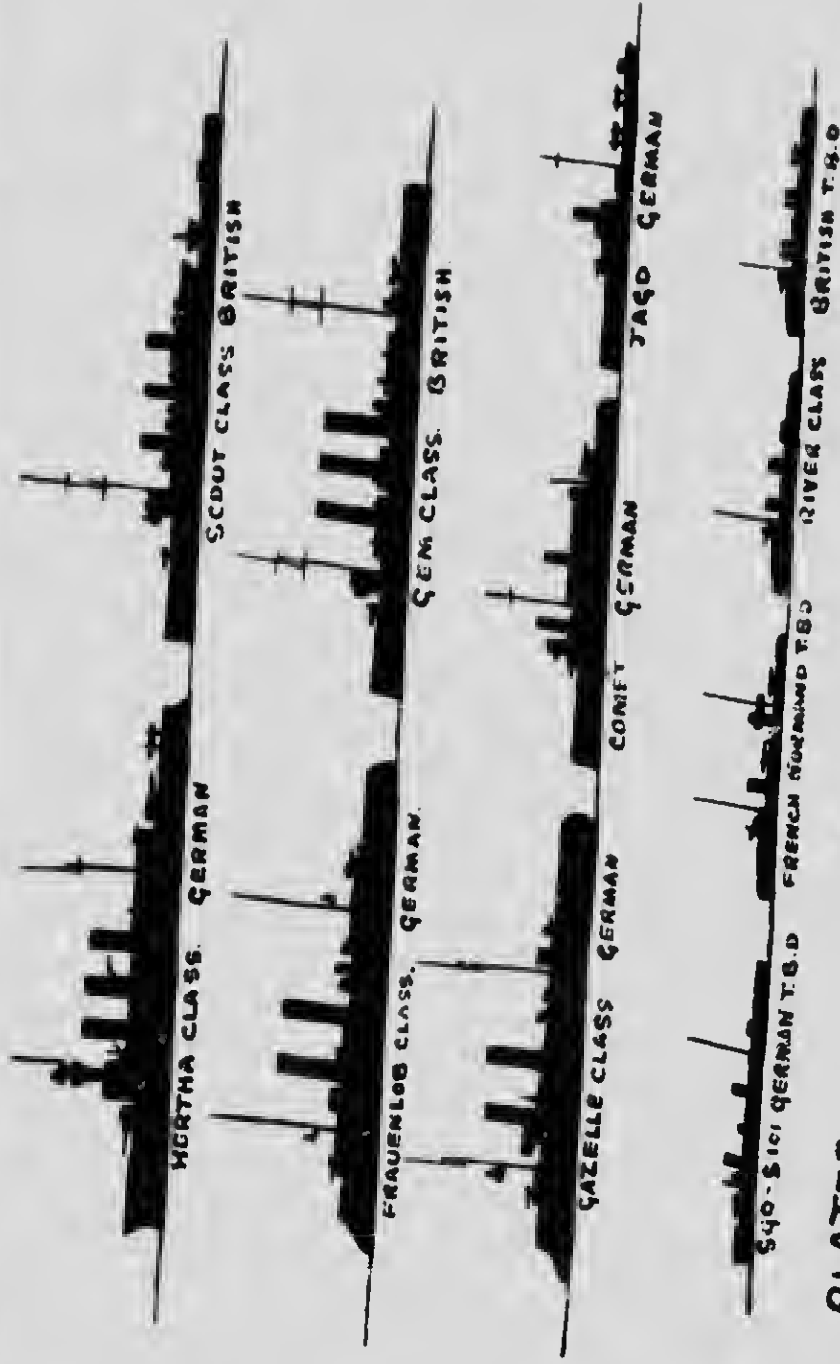
In actual work, each man will have a complete list of silhouettes to refer to, and the method of using it is simple. Assume the silhouettes accompanying this article to be a complete list. A vessel is sighted at a distance. How many masts has she? Two. What kind? The foremast has two tops on it, the main is light. Good! She must be the *République*, *Brennus*, *Jules Ferry*, *Jeanne d'Arc*, or *Hertha*. How many funnels? Three, in one group! She's the *Hertha*. If she had two she would have been the *Brennus*, and so on.

When you have identified the vessel, note carefully the date, time, course, speed, and position. If you sight a fleet, the battle-ships will either be in single line or in two or more lines; the cruisers in peace time would steam apart from them; in war they would be spread out all round and out of sight. In all probability, you will see an isolated cruiser first, and if she is an enemy you'll be wise in getting away as rapidly as you can. Hence, for your own safety, you must be

efficient in recognising war-ships. If, however, a fleet is sighted, it is important to know of what class of ship it is composed, as this information will enable the Navy to know which of the enemy's fleets it is. Note if the fleet seen is accompanied by transports. In war time when information has been obtained it should be communicated to the nearest war-ship, fleet, or shore station without delay. In war time only, a merchant steamer or scout desirous of communicating information to one of His Majesty's ships should use the signals set forth in the British Signal Manual, and steam rapidly towards her to within semaphoring distance. The information should afterwards be reported to the officer commanding the branch of the Legion at the first port entered.

In peace time, identify all war-vessels and fleets seen; note all particulars, and report to first man-of-war met at sea or in port, also to the Legion Commandant at first port entered, to any vessels commanded by members of the Legion, and to shore stations of the Legion. Practice in peace will make you efficient and useful in time of war.

The faculty of observation, being the chief factor of success in the Identification of War-ships, should be cultivated at all times. The absence of war-ships need not retard progress in this direction. Apply the general principles of this article to other vessels, motor cars, or human beings. Make it a rule to look for points of difference or recognition in all objects or living beings you meet. By thus increasing your power of observation, you will not only make yourself an efficient Maritime Scout, but you will acquire much information which at times may prove extremely useful.



PLATES.

SMALL CRUISERS, SCOUTS  
AND DESTROYERS

Wendell R. Ingemoll  
June 21, 1909



## DRAUGHT OF VESSELS SHOWN IN SILHOUETTE

*British*

SPEED.	CLASS.	FEET.	SPEED.	CLASS.	FEET.
21	Dreadnought	31	23	Defence	28
18	Lord Nelson	27	22·3	Warrior	27½
18·5	King Edward	27	23	Drake	28
18	Formidable	29	22·3	Devonshire	25½
17·5	Majestic	30	19	Arrogant	24
19	Swiftsure	24¾	21	Cressy	28
19	Duncan	27¼	20	Apollo	18
18·25	Canopus	26½	21	Challenger	21¼
17	Royal Sovereign	30	19·5	Eclipse	23
25	Invincible	26	25	Scout	14
20	Vulcan	24¾	25	River, T.D.	12

*German*

18	Deutschland	25	22	Scharnhorst	25
18	Braunswieg	25¾	21	Roon	25¼
18	Kaisers	27½	21	P. Adalhent	25¼
18	Wittlesbach	28	21	Frauenlob	17¼
17	Brandenburg	26	19	Hertha	23
15	Siegfried	18¼	19	Gazelle	17¼
22	Hela	15¾	23	Bremen	17½
24	Comet	13¼	24	Pfiel	13¼
20	Gefion	21½	29	90-101 T.B.D.	9
19	Fürst Bismark	27			

*French*

18	République	27½	19	Pothaua	22½
18	Massena	27	21	D'Estrées	11
18	Iena	28½	18·5	Charner	19¾
18	Charlemagne	28	23	Chateaurenault	22½
17	Brennus	27½	19·9	Foudre	25
23	Jeanne d'Arc	27	19	Friant	23
22	Jules Ferry	26½	28	Normand, T.B.D.	10
23	J. de la Graviere	22			

Commandants, Legion of Frontiersmen, are requested to place themselves in communication (during peace time or during war) with officers commanding the coast defence of their district, and to forward to him the information supplied by maritime members.

The method of reporting war-vessels to ships of H.M. Navy by means of flags is that contained in the British Signal Manual, but this may probably be extended in order to allow of the class of vessel being reported. Until then, report details by semaphore. Efficiency in signalling is a most important adjunct to the identification; it's no good being able to get information if you can't transmit it.



## VIII.—CONDUCT OF IRREGULAR HORSE

BY COLONEL S. B. STEELE, C.B., M.V.O.

Please dispel any impression that in commanding a body of Irregular Horse in the field I must have adopted some means not usual to military men; but as

far as I know, I have always endeavoured to adhere as strictly as possible to military *principles*, whether commanding a corps of Regulars or Irregulars. They are both composed of men; both require discipline, strict discipline, tempered with justice. The Regular does not care who commands him as long as he is well led; the Irregular before joining wishes to know who is to command him. The Irregular is selected, and is already, if mounted, a horseman, and in Canada or the other Colonies would be already a well-trained horseman, and have a very good knowledge of country and of the expedients of travel; that at least is the sort of man who was selected for Lord Strathcona's corps. Very few of the men were under twenty-five years of age, and the majority over thirty; in fact, several of the best were more than forty years of age, and were well used to hard work, range-riding, patrolling, surveying, prospecting, freighting, and farming.

The officers were mostly trained in the Royal North-West Mounted Police, the Army, or in the Royal Canadian Military College; every troop had a sergeant of several years' service in the Mounted Police, or in some Regular organisation, who knew all duties well, and it naturally dropped into the work quite easily. In promoting men I gave first preference to Royal Military College graduates, who were well accustomed to surveying, engineering, and exploring in Canada, and then Mounted Police Non-Coms., Army and Canadian permanent Force: *N.C.O.s* who had lived or mixed with the sort of men who composed the rank and file. The regiment was organised in twelve troops of fifty men, each under a lieutenant, assisted by a troop sergeant. Such troop was raised in a certain locality, and known as the

"Moosomin Troop," "the Macleod Troop," "the Fort Steele Troop," etc., so that there would be a generous spirit of emulation fostered in it, and that the great difficulty, usual in such corps when hastily raised, would not exist through the absence of knowledge of one another. Each man knew well, by reputation at least, all of the men of his troop, and, if possible, an officer was selected from the same place. This latter was difficult, but was a great success when carried out. The majors commanding squadrons had in A and B ten years' commissioned rank in the Mounted Police. The third (C) was for a time, at first before he took ill, commanded by a surveyor, who had a gold medal from the Royal Military College, Kingston, and had gone through one campaign. The captains were two Mounted Police inspectors, one a major in the Royal Scots of Canada, who had lived on the plains, the adjutant a trained soldier, the quartermaster a sergeant-major of twenty-six years in the Royal Northwest Mounted Police; the transport officer a trained man, Canadian farmer and freighter, with one campaign to his credit; he was the best that I have yet known.

The machine guns were three Maxims and one Vickers-Maxim (pom-pom), commanded by a Royal Military College graduate, who is a big-game shot, and was in the field the best machine-gun officer I have met. He has a large stock ranche and farm.

The second in command was a Mounted Police officer, of twenty-seven years' service, and five in the 9th Lancers, accustomed to the prairie, the Klondyke winter and summer. Each man was trained on the ship in the constellations of the Southern Hemisphere, had "Aids to Scouting" in his pocket, and was carefully

lectured and instructed in all scouting dodges, ambushes and ambuscades, the care of horses, and in everything that could be of use to him. A fortnight of hard work amongst the kopjes at the Cape, and several hundred miles of marching through Zululand and Natal, in battle formation, made all ranks very fit.

My greatest difficulty was to keep the men up to the mark in the care of horses in the field.

The roads being hard, I never marched on them, even when in reserve. This prevented laminitis.

The reason so few casualties took place in so many days' fighting was owing chiefly to the material of which the regiment was composed, which, it must be admitted, was exceptionally good, partly to careful leading, as well as to some good luck. A large number of casualties might have occurred had care not been exercised; the regiment was exposed as little as possible, and advantage taken of every fold in the ground or ridge when it was moving to the attack. When covering flanks and under fire, it was made ubiquitous, stalking the enemy from every nook and height; the glasses of all officers, N.C.O.s and men being in constant use to find chances to work. On advance guard many casualties were avoided by orders to the effect that the kraals around farmhouses and houses with white flags on them were searched for enemies by the *support*, the advance party, which in open country would cover miles of front, would *make good the ground beyond* the houses, dongas, etc., to be searched, the flankers being on the alert; no file of advance party to go very close to a kraal or farmhouse in passing, but to move quickly by; then the supporting troops would search all suspicious places, and often found in the houses and kraals, Boers who had intended to fire

on parties approaching directly towards them, but who, when captured, stated that they were waiting to surrender. Many casualties in other corps were caused by the advanced parties moving direct and searching houses, and by the men neglecting to keep their eyes on the watch. The men of the S.H. kept their eyes on the move, right, or left, and in front, not only protecting themselves, but their comrades; and if they shared the front, right, or left with another corps, they had a lookout for *them*, and often saved them from casualties.

Sickness was avoided by having cold tea to drink on the march; the water was boiled as long as possible—at least thirty minutes.

The equipment was of the very best quality; every man was supplied with a lariat 48 ft. long. This came into use catching loose horses and mules, and dragging them out of bogs or quicksands, assisting guns up hills and through deep ground.

Many things were done and precautions taken which are now laid down as military rules. In night marches, no pipes or cigarettes were lighted, nor matches struck, and the only casualties which took place which should not have occurred were through errors over which we had no control; six of the death; could have been avoided had the rules of the corps been carried out when we lost the men on the heights of Badfontein (Crocodile Valley).

In addition to the usual lines of advance, etc., a body of special scouts, under a sergeant named Nelles, was constantly on the move in the advance or on the flanks, particularly during night marches, which were numerous.

Implicit obedience was insisted upon, and the object of every day's work explained to the men on parade,

and best methods of carrying it out were suggested, and all alternatives.

The regiment received nothing but praise during the whole time it was employed ; and it was repeatedly asked for by commanders of columns, and as time went on it became, if possible, more efficient.

The commanding officer impressed upon all ranks that the honour of their country was in their keeping, and that all must uphold it. A kindly leaning towards the other soldiers was insisted upon, and proved of value. A courteous demeanour towards the inhabitants of the country had a good effect. More information was obtained for that reason. (S. B. S.)

NOTE.—Drill does not instruct guides, scouts, craftsmen or pioneers in the performance of their duties ; but is needed for the collective training of Irregular Horse, and of garrison regiments. Legion units of ex-soldiers for combatant services will train as mounted infantry.

PART IV  
MORALE

INTRODUCTION

BY THE RT. REV. BISHOP H. H. MONTGOMERY, D.D.  
*Prelate of the Order of St. Michael and St. George*

EVERY member of the Legion has read, of course, the record our great Englishman, Alfred Lord Tennyson, wrote of the fighting pioneers of old, their noble deeds, and the anguish of King Arthur over the falls of some who failed.

The Order of the Knights of the Round Table has never died out, though the records of thousands of them are only kept above. They have been such splendid fellows, so kind as well as brave, men of their word: the sort to whom the township turns at once when it is in trouble; so handy and alert; terrible when roused, yet all women trust themselves to such without fear, and children run up to them and place their own hands in their grip.

I have known savages who had hardly ever seen a white man show no fear of them, just as dogs accept some men as friends, without any introduction. I have known such men do a harder thing, calming down the resentment of a tribe brutally treated already by bad



white men. For years others have not spoken their own tongue, or seen a white face: living almost unharmed among tribes of dark skin, they have won such respect from them that one can only deem it worship.

And so you are bent upon forming a ring round the Empire of such men as these. A grand defence it will be, and we may sleep at peace guarded by the noble character as well as by the strong arm and keen eye.

Welcome, gentlemen, to your places at the Round Table. There is enough work to do to satisfy a glutton. Form your ring, hold the outposts, and keep the lonely watch. If you die, no matter. There is a Watcher above, pen in hand. When the call of the Empire sounds, you will know your duty. Wounded enemies and prisoners will learn what British chivalry is; women and children of the foe will come over to you for protection even while you fight: and when peace is restored again the enemies of yesterday will enrol themselves under you. I do not believe that the ideals already created by the best men of the Empire can be raised higher, whether in the Army or Navy or in Pioneering; but it is always possible to carry on King Arthur's work.

Gentlemen, I uncover before you. Pass on to your posts. I remain uncovered from exceeding respect for the aims you have set before yourselves, and I await "The Idylls of the Legion."

## I.—ADMINISTRATION

BY LT.-COL. SIR FREDERICK LUGARD, K.C.M.G.

You ask me to give you a "few definitions as to the fundamental principles which actuate the work of a

British Administrator," in order that the Legion of Frontiersmen may be better able to assist the Authorities.

I am somewhat at a loss to know how to answer this question in any concise way which would be of practical use. The fundamental principles of straight-dealing, loyalty, etc., you are as well acquainted with as I am.

In dealing with subordinates, especially British, I believe in thoroughly trusting those who show themselves capable and energetic, and allowing to every man the maximum responsibility he is able to carry. Interference with a loyal and capable man who is doing his best, and doing it well, only discourages him.

In dealing with natives, consistency and continuity of policy are essential; vacillation fatal. Sympathy with their point of view, and a study of their language and customs, give the Administrator great influence over them. Be rather more ready to reward good work than to punish bad, and always maintain the prestige of the ruling race. That is best done by compelling them to admit to themselves that their rulers are more capable than they are themselves, are never deficient in physical courage, and have much greater moral courage. In dealing with Foreign States, a British Administrator considers it his duty to act in all circumstances with absolute straightforward integrity. Even though he may think that a foreign officer in a period of strained relations is not "playing straight," he considers it beneath his birthright to stoop to the methods of which he may suspect him, and it never pays to do so. Above all, never accept reports of the conduct of foreign officers as being true until you hear their own admission, or convincing proof. More friction has been

caused on our frontiers by hasty belief in seemingly true reports by natives—who say they actually saw the matters they report, but who have either exaggerated or lied to please you—than by any other means.

## II.—THE EMPIRE MOVEMENT: HOW FRONTIERSMEN CAN AID

BY THE EARL OF MEATH

The objects of the Empire Movement should commend themselves to Frontiersmen, who, in their own persons, are proving that they believe in the watchwords of the Empire Movement, viz. "Responsibility, Duty, Sympathy, and Self-sacrifice."

Frontiersmen, if true to the principles of the Legion, are daily exemplifying the meanings of these four words, which it is the object of the Empire Movement to engrave on the hearts of all British subjects, especially of the young.

The movement desires to awaken the peoples who constitute the British Empire to the serious duties which lie at their door. It urges British subjects to love and fear God, to honour the King, to obey the laws, to prepare to advance the highest interests of the Empire in peace and war, to cherish patriotism, to regard the rights of other nations, to learn citizenship, to follow duty, to consider duties before rights, to acquire knowledge, to think broadly, to practise discipline, to subdue self, to work for others, and to consider the poor and the suffering. Frontiersmen can be of the greatest possible service in furthering this movement. Will they help it?

Will they use their influence in support of a reasonable discipline in the training of youth, both in the home and in the school, remembering that no nation can be permanently strong which declines to be united by the fortifying cement of discipline? Scattered as Frontiersmen are throughout the length and breadth of the Empire, they can be of the greatest possible service in bringing a knowledge of the movement to the distant portions of the King's dominions, and in dissipating erroneous ideas concerning its objects and aims, showing that they are far removed from those which are popularly known under the name of "Jingoism," and pointing out that it is unconnected with party, class, creed, or colour, but is as comprehensive as the Empire itself. If so, will they provide themselves with the literature of the movement, to be obtained from the Secretary, at 83, Lancaster Gate, London, W.?

In many ways which will occur to them, Frontiersmen may aid in promoting a movement which is calculated to raise up in the future a generation alive to its Imperial duties, and worthy of the great responsibilities which Providence has thought fit to place upon the shoulders of the British race.

Who will help?

### III.—THE EMPIRE ON THE SEA

BY THE LORD MUSKERRY

When this country has got into serious difficulties in the past owing to the mistaken policy of the Government of the day, it has been the patriotism of her sons that has

been the means of extricating her and bringing affairs to a satisfactory settlement. It is the salvation of this country that this spirit of patriotism still exists; one very tangible proof of its doing so being the formation of the Legion of Frontiersmen.

As the frontiers of the British Empire are the seas, all our sailors may be regarded as Frontiersmen; but unfortunately there are a great number of foreigners in our mercantile marine—in fact, some ships are manned entirely by aliens, and this must be regarded as a serious menace to the safety and welfare of the country. Members of the Legion can give most valuable service by doing all in their power to eliminate the alien element as far as possible from our ships, and by encouraging young Britishers to take to a seafaring life, so as to replace them.

As far as captains and officers are concerned, they have made a step towards improving their condition and nationalising the merchant service, by forming the Imperial Merchant Service Guild, and I would earnestly advise every certificated British officer to join that Guild at once, as it is only by forming a united body that they can command influence. By the combined efforts of the Guild and the Legion we may hope to see the scandal and danger of a British ship commanded and manned by aliens done away with. Few people on shore know how much these Islands depend for their food supply on the ships of the merchant navy, and that any interruption in this supply would mean starvation in a week or two. Did they know this, then they would realise the great danger of the foreign element in our merchant service. As I said before, it is in the power of the members of the Legion to give great

help towards remedying this evil, and I trust they will do so.

Best wishes for the success of such a patriotic organisation as the Legion of Frontiersmen.

#### IV.—THE CITIZEN IN DEFENCE

BY A. J. DAWSON

*Editor of "The Standard of Empire"*

As I see the great problem of Imperial Defence, the more vital and essential half of the value of the Legion of Frontiersmen lies outside its material weight as a military asset.

There is something terrible in the picture of our tiny islands, packed to overflowing with citizens who claim to rule lands which stretch to the ends of all the earth, 90 per cent. of whom know less of the arts of self-defence than could be gathered from study of the Naval and Military Tournament. The awakening is not easy for such a people. It is want of thought, and long-living of the sheltered life, rather than want of heart, which accounts for their seeming indifference to the urgent problem of our defence. Conscious cowardice, conscious meanness, are foreign to the British character. But as to the unconscious kind, the burden of it lies heavily upon England at this moment. Its existence must be realised before it can be removed. And here, while peace is with us yet; here, as I see it, is a magnificent field for the energy, the patriotism, the ability of the Frontiersmen. Here is the nucleus, the idea, of a great citizen organisation of men bound together in the

cause of national and imperial defence, and in the task of helping all the manhood of our race to realisation of the duty they owe in this matter to God, to King, to country, and to their womenkind. Now, by sheer force of personal example and personal influence, they may do something for Great and Greater Britain, for our House as a whole, for which our children and our grandchildren will have cause to thank them, for which history will honour them.

Our people are more in need of the advantages to be gained from discipline, self-denial, and a clear sense of grave responsibility than anything else. The lesson which, I believe, Frontiersmen could help to teach is, that the able-bodied man who declines to undergo any form of military training is not quite a complete man. England expects and needs that every able-bodied man should do his duty, and fulfil honourably the responsibilities of citizenship, instead of thinking only of its privileges. It is the Frontiersman's duty, I think, quite apart from inspiring wholesome emulation in the breast of every adventurously inclined youth, studiously to conserve and deserve the serious respect and regard of all mature, thinking citizens.

*Book.*—"The Message," by A. J. Dawson.

## V.—GAME PRESERVATION

BY F. C. SELOUS

In the days when Daniel Boone and David Crockett first made their way into the State of Kentucky, that beautiful land possessed a wealth of wild life that was

truly astonishing. Great herds of shaggy bisons and magnificent antlered wapiti roamed at will through the more open stretches of country, whilst every woodland track was alive with white-tailed deer. Farther west, again bison and antelope were encountered in countless thousands on the great plains, and the mountain ranges also harboured very large numbers of many kinds of noble game. Northward, too, in Canadian territory, every part of the country once teemed with wild animals—moose, cariboo, wild sheep, wild goats, wapiti, bison, antelope, and deer—each species in its own chosen habitat. But to-day wild life has almost absolutely ceased to exist over vast areas of these once richly stocked hunting-grounds. And the same deplorable story has to be told of much of the African continent, as well as of portions of India, Ceylon, and many other countries. Only seventy years ago vast herds of many different species of wild animals roamed over the open plains of the Cape Colony, the Orange Colony, Bechuanaland, and the Transvaal. They are represented to-day by a few small herds preserved on settlers' farms. In spite, however, of all the careless and wasteful slaughter which has taken place, there is still much wild game in existence to-day in many widely separated parts of the world, notably in certain parts of Africa and in the far north-west of North America—Alaska and the Yukon territory of Canada.

How to preserve all the species of beautiful wild creatures which exist in the world to-day from ruthless slaughter and speedy extermination is surely one of the most pressing problems of the day. Where a wild country is suitable for settlement by Europeans, there is only one way in which to preserve wild game from



extinction, and that is by the timely formation of national parks, within the boundaries of which all wild life shall be sacred. But even in the wildest and most inaccessible territories, where climatic conditions make it very unlikely that white men will ever be able to settle, game may very easily become exterminated if no thought is taken for its protection. The worst exterminators of game are savages armed with modern rifles, and white skin and meat hunters; the first being animated by an insatiable lust of slaughter, and the second by the greed of gain. In some parts of Africa the natives are well controlled, in others not at all; but I think that in most parts of that continent which are under the British flag very successful efforts are now being made to preserve the game from indiscriminate slaughter at the hands of either white men or natives. In Alaska and the Yukon territory of Canada a public spirit among the white residents for the effective preservation of their game, has still to be aroused. It is true that the presence of European sportsmen—who, if they are good sportsmen, will not do much harm, as they will only kill a few old males—is resented by many of the residents. But their attitude seems to be, "We'll kill as much game as we like ourselves, but the game is ours, and we don't want it to be killed by outsiders." Of course, trappers and prospectors must kill game to supply themselves with daily food; but it is to be hoped that, the present state of the world being what it is, these men—fine, brave, manly fellows, almost without exception, as I can testify—will begin to think a little of their responsibility to those who will come after them, and will make up their minds never again to kill game wastefully, but, on the contrary, as sparingly as possible.

To kill game for food in a wild country is not only excusable, but an absolute necessity; but what can be said for the man who kills egrets or birds of paradise for their plumes, or exterminates great colonies of penguins for the sake of the oil their bodies contain? Such a man should be treated as a criminal, for he is robbing the world of some of its most beautiful ornaments. The killing of egrets for the sake of their plumes is a particularly callous and brutal proceeding. For as these birds only possess these ornaments in the breeding season, the destruction of the parent birds involves the death by starvation of their helpless nestlings. I fear, however, that as long as fashionable ladies persist in wearing egret plumes in their hats, so long will men be found to supply the demand.

## VI.—MARRIAGE, WILLS, BAPTISM, DEATH AND BURIAL ON THE FRONTIER AND AT SEA

BY E. R. BARTLEY DENNIS, ESQ.,  
*Of the Middle Temple, Barrister-at-Law*

1. *Marriage.*—The Foreign Marriages Act, 1892, and the rules and orders made under it sum up the law as to British marriages outside the United Kingdom.

*General.*—Section II. constitutes Marriage Officers by or in whose presence the marriage may be celebrated. Generally these are Ambassadors, Consuls, etc., and the commander of a British war-ship if authorised by Admiralty instructions. Inquiry should be made of the

above persons, who furnish all necessary information. One of the parties at least must be a British subject.

*Naval.*—A marriage may be solemnised on a ship of war by the commander. This applies in the case of most large war-ships. But no marriage is to be celebrated on such war-ship by the commander if it is in a port or place where there is a marriage officer on shore appointed under the Act of 1892.

*Naval and Mercantile.*—In addition to the above, a marriage by an episcopally ordained clergyman of the English, Roman Catholic, or Greek Church, performed on one of His Majesty's ships on the high seas in foreign territorial waters or port, is valid. (See Dicey, "Conflict of Laws.") Similarly, a marriage by such a clergyman may take place on any other British vessel, *i.e.* transports, passenger and merchant vessels, etc., on the high seas, but not if the ship is in a foreign port, as a private vessel in a foreign port is subject to the law of that port. In no case whatever can the captain of any ship other than one of His Majesty's ships, make a valid marriage, nor can any person not authorised by the State, nor any person except one of the clergy above mentioned; and a subsequent marriage on shore will not legitimise any children born before such celebration.

*Ex-territorial Places.*—This right to be married by one of the above-mentioned clergymen extends to every place in a foreign country where by treaty or the comity of nations it is made ex-territorial, *e.g.* the house of an Ambassador. But in such places there will also generally be the facilities mentioned above under the Foreign Marriage Act, and a clergyman will be unnecessary.

*Military.*—Marriages may be solemnised within the British lines by any chaplain or officer or other person

officiating under the orders of the commanding officer of a British Army serving abroad, and they are as valid as if solemnised within the United Kingdom (s. 22). One of the parties at least must be a British subject.

In addition to this enactment, marriage within the lines of a British Army of occupation, whether peaceable or hostile, in a foreign country has always been valid if one party was subject to military law, and a priest of the Church of England officiated.

*Settlers and Travellers. Settlers, etc.*—Settlers in a new country where there are no laws carry the common law of England with them. They can therefore be married by an episcopally ordained clergyman of the English or Roman Catholic Church, without any of the formalities prescribed by the statutes at present in force in the United Kingdom. It is, I think, probable that a marriage between two British subjects cast away on a desert island, or apparently hopelessly hemmed in, in a savage country, might be held to be valid, on it being clearly proved that they took each other by word of mouth to be man and wife, and if so, their children would be legitimate. This is still the law in Scotland if the marriage declaration takes place in the presence of witnesses, and was, I think, in early times the law of England also. Under the above circumstances witnesses would, of course, be out of the question, and, being impossible, might be dispensed with.

A word of warning as to a British subject marrying a foreign woman is necessary. If, according to the law of her country, she is not competent to marry, *e.g.* on account of the absence of consent of parents (France), difference of religion, or other causes, the marriage probably will be void in that country, and may not be

recognised in the English Courts. It is therefore important to ascertain that the woman is competent to marry.

2. *Wills. Soldiers and Seamen.*—Any soldier being in actual military service, and any mariner or seaman being at sea, may make a will by word of mouth (Section II. of the Wills Act, 1837) to any one, and that person can give evidence of how the testator wishes to dispose of his property. This applies to all personal and movable property of every kind, including stock, shares, debts due to the testator, and leasehold property, but it does not apply to freehold property. If the testator wishes to leave his freehold property, he must make a will in writing, attested according to the requirements of English law, otherwise the freeholds will go to his heir-at-law if he has one, and if none, to the Crown. All such persons who are over fourteen years of age may make such a will.

“*In actual military service*” includes all persons in the service of the Crown, when under orders to go on an expedition against the enemy, from the moment they start from their homes to go to any place where the troops are to assemble for the purpose of going abroad, and until the expedition is over, and even after it is over if he die from a mortal wound received on the battle-field.

It does not include soldiers merely quartered in barracks, whether abroad or at home.

“*Soldier*” includes officers, surgeons, etc., and “*Seamen*” includes captain, purser, surgeon, etc.; in fact, the whole of both professions are included. The will may of course be in writing if there is opportunity to write it. It would then be better to get some one to write his name as witness to it; but this is not necessary.

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No particular form of words is required, but the words used must of course be intelligible, the shorter and simpler the better, *e.g.* "I, John James of the — Regiment, leave all I have to my wife."

*Desert and Savage Countries.*—I think that a will of personal property would be good if made by a person on a desert island, or in a savage country, if written on any substance in such a manner as clearly to record his last wishes.

*Shipwreck.*—This might also apply to shipwreck.

3. *Death. In Camp, etc.*—When a man dies in camp or on an expedition, his friend or one of his officers should take charge of his property, especially his papers, medals, etc. He should find out, if necessary from his papers, the name of any relation, and should communicate the fact of the death to that person. He should break the sad news as gently as possible. The following example will show that this advice is necessary :

"Dere Sur. The coyotes has et yure sun's hed off.  
(Sd.) Bill."

This thoughtless mode of expression no doubt caused the father an unnecessary and cruel shock.

It is better not to give details of the manner of death in the first letter, if it came about under dreadful or painful circumstances, but it is well to state that he has had Christian burial.

The private effects must be forwarded to the nearest known relation at the earliest opportunity, together with notice of the will if one has been made.

*Presuming Death.*—If a man is lost in the wilderness and he cannot be found, the next-of-kin, or the executor,

if a will has been made, can apply to the Probate Court in England, and it is the duty of his leaders and comrades to state the facts as to his disappearance, in order that the Court may decide whether he may be presumed to be dead. If satisfied, the Court will give leave to presume that he is dead, and will grant power to administer his property or his will according to the circumstances. The above applies where a man falls overboard at sea, and he is not recovered, or over a precipice where the bottom is unexplorable, or where the circumstances of the disappearance of the man's body are such that he ought to be deemed to be dead, e.g. ship going down with all hands.

When a member of an expedition is killed, lost, or has died, it is a wise precaution for the leader to procure the signatures of those present, or, in a large party, of several of the officers, to a statement that will help him to prove himself free from blame. It is commonly supposed that where there is suspicion of murder, and the body of the person cannot be found, no one can be tried on the charge of murdering him. This is not completely true; it is a rule of *caution* only. A person may be tried for the murder; but it would not be safe to convict him without clear evidence that the body, which must be clearly identified, is or must be actually dead.

4. *Baptism*.—In the absence of a minister of any Christian denomination, any person being a Christian may baptize an infant, and use the words of the Prayer Book of the Church of England, or any other accepted Christian form of baptism. If no form of words is known, it will probably suffice to say:

“I baptize thee [naming it] in the Name of the Father, and of the Son, and of the Holy Ghost,” sprinkling a

little water on the forehead, and making the sign of a cross on it with a finger, and giving the child a name as its Christian name. He should then write out, and sign and date an account of the christening, and send it to Somerset House for registration.

5. *Burial*.—In the absence of a minister of any Christian denomination, any one may read the Burial Service of the Church of England, or any other recognised form of Christian Burial Service, at the grave.

If no form of words is known, it will be better than nothing to offer up such simple prayers as may occur to the persons present.

## VII.—OFFICES OF THE CHURCH

In ships and camps where there is no chaplain, there is sometimes urgent need for the celebration of Christian rites. A mother may seek baptism for her dying child; lovers may desire marriage, perhaps in presence of death, in the interests of children born or hoped for; or the Burial Service be spoken for the dead. It is the right and duty of the master or leader to perform such offices. Although there are slight differences in the text, and the rubric appears in many languages, nearly all branches of the Christian Church share the same ancient and beautiful observances in Baptism, Marriage, and Burial. But as the wording of the service may not be remembered, and a copy beyond reach, the vital sentences are here copied from the Anglican use in the Book of Common Prayer:



*At any of the Services below, the leader or master reading in place of a Priest, the men present will stand uncovered, and will repeat the Lord's Prayer, as follows :*

**O**UR Father, which art in heaven, Hallowed be thy Name. Thy kingdom come. Thy will be done in earth, As it is in heaven. Give us this day our daily bread. And forgive us our trespasses, As we forgive them that trespass against us. And lead us not into temptation ; But deliver us from evil : For thine is the kingdom, The power, and the glory, For ever and ever. Amen.

#### Baptism.—

¶ *Then the Priest shall take the Child into his hands, and shall say to the Godfathers and Godmothers,*

Name this child.

¶ *And then naming it after them . . . . if they certify that the Child is weak, it shall suffice to pour Water upon it, saying,*

**N**. I baptize thee In the Name of the Father, and of the Son, and of the Holy Ghost. Amen.

**W**E receive this Child into the congregation of Christ's flock, \*and do sign *him* with the sign of the Cross, in token that hereafter *he*

*\* Here the Priest shall make a Cross upon the Child's forehead.* shall not be ashamed to confess the faith of Christ crucified, and manfully to fight under his banner, ag 'nst sin, the world, and the devil ; and to continue Christ's faithful soldier and servant until his life's end. Amen.

## Marriage.—

¶ *If no impediment be alleged, then shall the Curate say unto the Man,*

**M.** **W**ILT thou have this Woman to thy wedded wife, to live together after God's ordinance in the holy estate of Matrimony? Wilt thou love her, comfort her, honour, and keep her in sickness and in health; and, forsaking all other, keep thee only unto her, so long as ye both shall live?

¶ *The Man shall answer,*  
I will.

¶ *Then shall the Priest say unto the Woman,*

**N.** **W**ILT thou have this Man to thy wedded husband, to live together after God's ordinance in the holy state of Matrimony? Wilt thou obey him, and serve him, love, honour, and keep him in sickness and in health; and, forsaking all other, keep thee only unto him, so long as ye both shall live?

¶ *The Woman shall answer,*  
I will.

¶ *Then shall the Minister say,*

Who giveth this Woman to be married to this Man?

¶ *Then shall they give their troth to each other in this manner.*

*The Minister receiving the Woman at her father's or friend's hands, shall cause the Man with his right hand to take the Woman by her right hand, and to say after him as followeth.*

**I** **M.** take thee **N.** to my wedded wife, to have and to hold from this day forward, for better for worse,

for richer for poorer, in sickness and in health, to love and to cherish, till death us do part, according to God's holy ordinance ; and thereto I plight thee my troth.

¶ *Then shall they loose their hands ; and the Woman, with her right hand taking the Man by his right hand, shall likewise say after the Minister,*

I *.V.* take thee *M.* to my wedded husband, to have and to hold from this day forward, for better for worse, for richer for poorer, in sickness and in health, to love, cherish, and to obey, till death us do part, according to God's holy ordinance ; and thereto I give thee my troth.

¶ *Then shall they again loose their hands ; and the Man shall give unto the Woman a Ring, laying the same upon the book with the accustomed duty to the Priest and Clerk. And the Priest, taking the Ring, shall deliver it unto the Man, to put it upon the fourth finger of the Woman's left hand. And the Man holding the Ring there, and taught by the Priest, shall say,*

WITH this Ring I thee wed, with my body I thee worship, and with all my worldly goods I thee endow : In the Name of the Father, and of the Son, and of the Holy Ghost. Amen.

Burial.—(Except for the unbaptized, the excommunicate, or those who have laid violent hands upon themselves.)

¶ *Then, while the earth shall be cast upon the Body by some standing by, the Priest shall say,*

FORASMUCH as it hath pleased Almighty God of his great mercy to take unto himself the soul of our dear *brother* here departed, we therefore commit

his body to the ground, earth to earth, ashes to ashes, dust to dust; in sure and certain hope of the Resurrection to eternal life, through our Lord Jesus Christ; who shall change our vile body, that it may be like unto his glorious body, according to the mighty working, whereby he is able to subdue all things to himself.

¶ *Then shall be said or sung,*

**I** HEARD a voice from heaven, saying unto me, Write, from henceforth blessed are the dead which die in the Lord: even so saith the Spirit; for they rest from their labours.

¶ *Then the Priest shall say,*

**T**HE grace of our Lord Jesus Christ, and the love of God, and the fellowship of the Holy Ghost, be with us all evermore. *Amen.*

*At the Burial of their Dead at Sea.*

¶ *The Office in the Common Prayer-book may be used; only instead of these words [We therefore commit his body to the ground, earth to earth, etc.], say,*

**W**E therefore commit his body to the deep, to be turned into corruption, looking for the resurrection of the body, (when the Sea shall give up her dead,) and the life of the world to come, through our Lord Jesus Christ, who at his coming shall change our vile body, that it may be like his glorious body, according to the mighty working, whereby he is able to subdue all things to himself.

## VIII.—AMUSEMENTS

Where men are isolated, and for long periods either alone or living in groups far from human society, hysteria is apt to develop to the point of insanity. This gives importance to camp amusements.

The romantic temperament produces artists in civilisation; adventurers in the wilderness; and Frontiersmen tend to develop the artist's love of beauty rather than the instinct for commercial gain. Lone men can arrest any tendency to melancholia and hysteria by cultivating writing, water-colour painting, photography, carving in wood or leather with a jack-knife, or any other amusement.

To make a fiddle procure a hardwood stick about  $1\frac{1}{2}$  in. square, and say 1 ft. longer than the cigar box, meat-tin, or gourd which is to form the body. Trim one end of the stick into a round pencil  $\frac{3}{4}$  in. longer than the body, and pass it through holes in ends of the body, fairly close to the top side. A peg through the projecting end will hold it firmly, and the strings of sinew or wire are made fast to the remainder of the projection. Pegs are fitted into holes bored or burned in the other end of the neck, like the turning pins of a banjo, and on these the strings are screwed taut. The neck should then be shaped and rounded on the under side. A finger-plate is then attached to the upper side, slightly rounded on its upper face, and projecting over the body almost to the bridge. The bridge to carry the strings clear of the body should be at one-third the length of the body from the lower end. Holes cut in front of box will let out the sound waves. An archer's bow, with strings of horsehair, rubbed with resin or pine gum, completes instrument. A complete foo-foo band can be improvised.

Failing cards, games may be played on a square board, ruled off into sixty-four squares, the alternate squares being darkened. Shells, beans, or discs of wood make pawns, sixteen white, sixteen coloured, and larger pieces added for use as kings in draughts. The Editor suggests a game he invented in Baffin's Bay, called "Baffin." The pawns are placed on alternate squares, not on the sides, but in two opposite corners of board; a pawn moves to front, left, or right, a king moves also to the rear. Rules as in draughts. Pawns made with distinguishing signs form the set for chess.

The spelling bee has been developed by members of a London Club into a game called "Spelka," wherein each player contributes a letter, either in front or behind a word in formation. A player contributing a letter making the completion of an English word impossible pays forfeit if caught. A player completing any word in the dictionary drops out, and the last player in takes the pool. Cards, each bearing a letter, are used in playing.

Try cock-fighting, gymnastic tricks, sing-songs, even dramatic plays.

*Ranche Sports.* By J. P. Thompson, L.F.—A stout open box just large enough to hold a man curled up, with sides 2 ft. 6 in. high is placed in the corral (yard). A wild heifer or steer is introduced. A man walks in, and on the steer proceeding towards him he jumps into the box. The animal inspects the enemy, walks all round the box, and finally puts his head inside, but cannot hook out the man. Horizontal bar is sometimes used as a refuge from charging cattle. Throwing horse or steer by hand is a common test of skill.

Where bulls are collected and fattened for market,

horns are usually sawn. A fresh bull added to the bunch is always inspected by the rest, and if he asserts himself he always has a fight with one of the most prominent of the mob. The rest form a circle, and evince great interest. On the first sign of one of them giving way and trying to retire, his opponent is reinforced by the rest of the herd, who pursue him with enthusiasm.

Pony racing in Texas is bareback, rider generally shedding his boots. Distance is usually from 100 to 300 yards, judged at both ends. The judges at the starting-point report to judges at finish as to any advantage of a rider at the start.

The roping contest.—A bunch of agile steers is enclosed in a small corral, and liberated one at a time. The competitors are stationed alongside the corral, and not allowed to start until the animal has crossed a line 100 yards off. Time is then taken by the judge as to which man ropes, throws, and ties the legs of the animal. This has frequently been done under one minute.

Tilting at the ring, picking up a chicken buried to the neck in the ground, or picking up hat or handkerchief at full gallop, shooting competitions, and shooting a turkey in the head, the head projecting from a box, are among the common competitions.

In mining camps drilling a foot of rock, and swift loading of a pack-horse are popular contests.

## IX.—MANNERS

If in camp, should a white man arrive, ask him to dismount, offer a drink. *South African practice*: Tell

him to off-saddle, and ask if he has fed. *Australian, New Zealand practice*: A man not asked to stay may take the hint and go. *American practice*: A man is not asked to stay, but expected to give some reason if he does not. *All countries*: It is insulting to ask personal questions, but visitor may, at his leisure, volunteer information as to who he is, what doing, where from, whither going. Except in South Africa, it is rude to interfere with a man's horses, which he handles himself while able to stand. Show visitor to water and pasture. Visitor will not offer to cook first meal, but may offer to dry in washing up. When men are armed, visitor disarms at entry, except U.S.A. *Spanish America*: He offers his revolver to hostess, if any, and her taking it in charge pledges honour of the house to guard guest. Everywhere in mining camps visitor will not go near any shaft, tunnel, or works uninvited. Except South Africa, if there is nobody in camp, enter, help yourself to a meal, leave everything clean, and entry secure as you found it. In lawless country, leave note to explain nature of your tracks, which might cause misgivings. A white man is bound to share his last bite and sup with any white man in need, and to relieve strangers in trouble. In countries under comic-opera government, a white man must be rescued from prison, and British-American element are one nationality.

On the trail, offer greeting to all strangers, noting failures to respond as suspicious. It is a point of honour to give clear trail directions when asked; but if there is cause for suspicion, keep stranger in front while speaking. Should your guest be an outlaw, commit no breach of hospitality. Do not betray him while he is your guest, and, on his leaving, give him a



sporting chance. Professionals living by robbery under arms are usually sportsmen. Show confidence and take no precautions. Casual felons and lunatics are dangerous. In lawless countries travel as a poor man.

*Cache Law, North America.*—A deposit of food is absolutely sacred, not to be touched by strangers.

In Western North America an unarmed man is non-combatant, and immune from attack. In Spanish America the armed rider is *El Caballero* (gentle), the unarmed rider, *el hombre* (this man). *El Caballero* gets eggs and chickens.

Always shut gates behind you in fenced stock range.

## PART V

### *SIMPLE MEDICAL AND SURGICAL TREATMENT FOR GUIDANCE WHEN NO DOCTOR CAN BE OBTAINED, IN- CLUDING RULES FOR HEALTHY LIFE IN CAMP.*

HALF a loaf, or even a quarter, is better than no bread. Some medical knowledge *may be* better than none when there is no doctor at hand. It may be, but only if used intelligently and with due regard to the fact that it is only part knowledge, and that if it is used without great caution it may do more harm than good. This chapter is written not to make every man his own doctor, but to serve as a guide to Frontiersmen faced with sickness or accident in themselves or others *when no medical aid can be obtained*. If a doctor comes into camp, hand over the tiller to him, and be thankful, for good doctoring is one of the hardest jobs on earth. The instructions that follow are written in plain English, and the space available for so large a subject has forced their writers to cut them very short. It will be well therefore to consider every word of an instruction before acting on it and to try to think out the reason behind it. Go about things cautiously in any case, but doubly so if it isn't clear to

you why you are told to do them. A great number of methods of treatment have been left out, because it is not safe for any but a medical man to attempt them.

It was first intended to write this section without reference to any drugs, relying only for treatment on things usually to be found in camp. But after much thought it has been decided to give instructions for the use of a few simple medicines. Read over carefully the note under the section "Medicines" before using any of them. This will also be of use in choosing a camp outfit if you carry drugs.

All the sections in this chapter are arranged alphabetically. All who own this book should read them through carefully enough to know under which section to look for any particular matter that may be required. It is necessary to warn men against learning off the symptoms of diseases too freely. That is a doctor's business. When a man knows the symptoms of a disease it is very easy to find them where they are not really present, and this leads to worry and harmful drugging. But it is useful to study sick men when the chance occurs, and to try to learn when a man is really sick. It's not always easy to tell. Every man on the frontier should carefully read the articles on Diarrhœa, Dysentery, Malaria, Enteric Fever, and Filters. He should learn also how to stop bleeding.

If he has to treat a man with an injured bone or joint he should read carefully the sections on Fracture or Dislocation dealing with the limb in question before doing anything.

The editor of this chapter, Dr. W. D. French, is, at the time of publication, absent in Natal, and the task of writing this preface falls to another pen. The writer

feels that a full acknowledgment is due to Dr. French for the great thought and pains which he has brought to bear on his work. The task before him was one of enormous difficulty and full of pitfalls. In spite of this Dr. French has produced a chapter which should be of real service to the Legion.

The Legion is indebted to Dr. J. W. Ettles and to the Union of Fire Brigades for permission to use the diagrams on Hæmorrhage, and to the Army Council for permission to use certain notes, which are acknowledged below, from the "Field Service Pocket Book."

J. B. R.

AGUE.—See Malaria.

ALCOHOL is to the human what spurs are to a horse : Used when great weakness sets in with enteric, pneumonia, influenza ; aid to digestion when exhausted by fatigue ; for sudden fainting ; given to patients when weak and during recovery from severe illness ; rubbed on skin to prevent bedsores ; diluted for erysipelas, burns, and scalds as antiseptic ; in cold compress for sprains and fresh bruises. Sponging patient with spirits and water (which evaporates), 1 in 6, relieves high fever. Failing carbolic, a disinfectant for wounds, and for surgical instruments. It is dangerous to use alcohol regularly in arctic climates. When these notes say "Avoid Alcohol" it is for some very good reason and not for a fad. In some conditions alcohol is rank poison, and its use may cost a man's life.

ANTISEPTICS.—Drugs that tend to prevent germs doing harm in wounds : Eucalyptus (gum or boiled leaves), alcohol (wine or spirits diluted), fresh roasted

coffee dusted on dry ; carbolic (which see) ; permanganate of potash, boric acid.

Soap and boiled water, although not in themselves antiseptic, clean a wound.

**APOPLEXY.**—Rupture of a blood-vessel in the brain.

*Symptoms.*—Sudden fall. If severe attack, insensibility, or loss of power in limbs ; face red, breathing long and snorting, puffing out cheeks.

*Treatment.*—Raise, and support head and upper part of chest. Loosen clothes about neck and chest. Cold water to head. Give nothing by the mouth, except purge. *No alcohol.*

**BANDAGES.** *Head* (see Fig. 1). Pocket handkerchief and band.

*Shoulder.*—Three handkerchiefs ; fold in half from corner to corner, place point over injured shoulder, carry long ends round, one below wound, tie. Next tie two handkerchiefs together, place knot over point of first, bring point over knot, and pin. One handkerchief brought across back under opposite armpit and up nearly to shoulder ; tie to fellow. Long end below wrist, spread out, and tie to short end (see Fig. 2).



FIG. 1.

BANDAGES AND SLING  
MADE WITH FOLDED  
HANDKERCHIEFS OR  
SCARVES.

*Sling. Arm.*—Fold handkerchief diagonally. Place one end over uninjured shoulder, allowing the other end to hang down. Draw point behind elbow of injured arm. Gently bend arm across front of bandage; bring lower end over arm and shoulder of injured side, tying

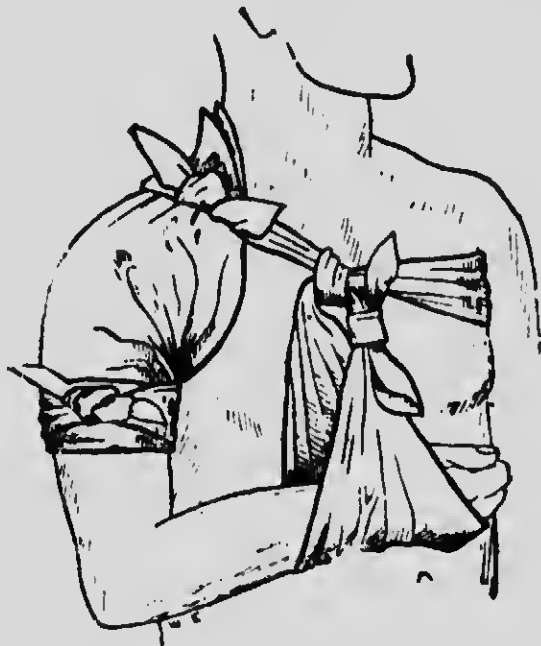


FIG. 2.—SHOULDER BANDAGE ; ALSO SHOWS SLING FOR  
BROKEN ARM ABOVE ELBOW.

at side of head. Lastly, bring point round to front of elbow, and pin (see Fig. 3).

*Hand.*—Fold handkerchief diagonally. Place fold below the wrist; bring point over tips of fingers on back of wrist. Ends are brought round and tied over point, which is brought over knot and pinned.

*Chest.*—Whole cloth. Place bandage over injury so

that the point lies over the shoulder of that side ; bring ends round chest ; tie behind, leaving one end longer than the other. Tie the longer end to point.

*Back.*—Apply same way, knotting in front.



FIG. 3.—ARM BANDAGE.

*Groin.* Hip or buttock.—Fold handkerchief diagonally. Place over wound, point upwards. Fasten bandage or belt round waist ; bring point over, and pin. Carry ends round thigh, cross, and tie on the outer side (see Fig. 1).

*Foot.*—Fold handkerchief diagonally. Spread on flat surface. Place foot in centre, heel 2 in. in front of

centre. Draw point over toes, and bring up in front of ankle. Gather up ends, cross in front of ankle over point round ankle, cross under sole, and tie on instep. (Dr. J. W. Ettles.)

BLEEDING, *Severe*.—First apply firm pressure to



FIG. 4.—PRESSING ON MAIN ARTERIES OF HEAD AND ARM.

bleeding spot, either with finger or any small hard substance wrapped in linen.

Always elevate the injured part, and endeavour to stop bleeding.

*Bleeding* from veins, dark red blood welling up. From arteries, bright red blood in spurts. Control former bleeding with pressure above and below wound, and arterial with pressure above.





FIG. 5.—PRESSURE ON MAIN ARTERIES AT WRIST.

with other thumb upon it (Fig. 6).

*Foot.*—For sole. Pressure behind ankle, inner side (see Fig. 7). For top of foot, press above wounded vessel.

Bleeding from *Upper Arm.* Drive thumb very hard down into the root of neck, just above collar-bone, and behind muscle running from breast-bone to ear (A, Fig. 4), or push fingers high into armpit and press upward and outward.

*Forearm.*—Press tips of fingers behind biceps, muscle bring pressure forward against bone (E, Fig. 4).

*Hand.*—Pressure on either side of wrist (see Fig. 5).

*Cut Throat.*—Press below the wound against spine (B, Fig. 4).

*Scalp.*—Pressure just in front of ear (D, Fig. 4).

*Thigh and Leg.*—Grasp the thigh with both hands and place one thumb upon artery; reinforce the pressure

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*Tourniquet.*—Wrap stone or hard substance in a handkerchief, place over blood-vessel; over this pad place another handkerchief round the limb, tie ends together.

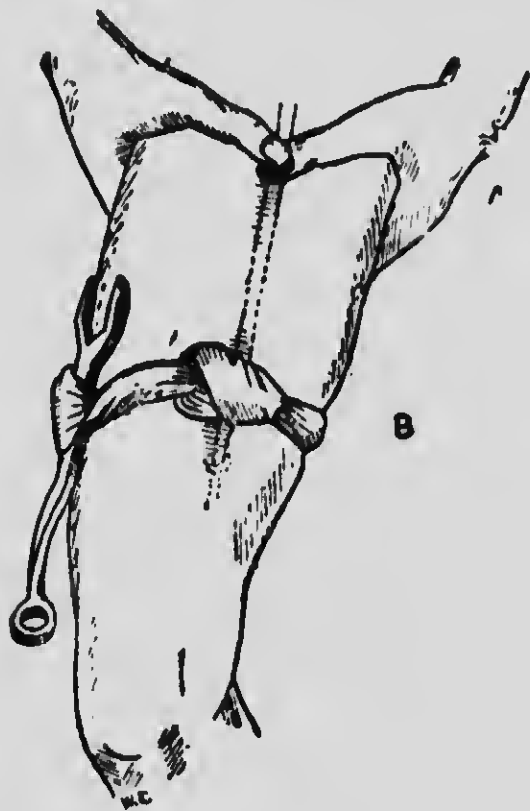


FIG. 6.—PRESSURE ON MAIN ARTERY OF THIGH.

Run a stout stick underneath, and twist up the bandage till bleeding stops (Fig. 6).

At the end of an hour gently relax the bandage by reversing stick. If bleeding recurs at once tighten sufficiently to stop it, and trek for nearest doctor; if

there be no bleeding allow it to remain slack, but watch carefully. Apply dressing to wound. (Dr. W. Ettles.)

BLEEDING, *slight*.—(See Hæmorrhage, and Wounds.) To stop apply pad, folded handkerchief tightly over



FIG. 7.—PRESSURE ON MAIN VESSEL OF SOLE OF FOOT.

part to exert prolonged pressure. Use solutions of alum, eucalyptus gum, or oak bark. Avoid alcohol.

*Bleeding from Nose*, cold to back of neck, lie down.

**BLACKWATER FEVER.**—Is a special form of malaria, the most marked sign of which is that the urine is reddish or even a deep blackish red. The commonest cause is neglect of small attacks of fever (malarial).

*Prevention.*—As for malaria. Take quinine (5 grains) daily with great regularity.

*Treatment.*—Go to bed and take hot drinks, but do not take any quinine. After recovery begin with small amount of quinine,  $\frac{1}{2}$  a grain three times daily. After a few days increase this to one grain, and so on. When 5 grains are reached, go on taking this daily for six months or a year. This is essential, even if you are quite free from the slightest fever. (Dr. J. W. W. Stephens.)

**BOILS.**—Usually out of condition. Feed up. Antiseptic fomentations.

*Bush Treatment.*—Brown paper size crown piece, hole  $\frac{1}{4}$  in. diameter in centre. Make paste common soap and sugar, cover brown paper with paste, and bandage tightly on boil. Good also for piles.

**BREKKBONE FEVER.**—See Dengue.

**BREATHING.**—Normal, 15 to 18 breaths per minute. If over 22 when quiet, something is wrong. See Bronchitis.

**BLISTERED FEET.**—See Feet, sore.

**BRONCHITIS.**—Generally caused by a chill.

*Symptoms.*—Tightness and soreness of chest, breathing difficult, wheezing sound, fever later on, much thick or frothy phlegm. If neglected, danger of inflammation of lungs.

*Treatment.*—Bed; poultices or fomentations back and front; warm drinks, such as lemon-juice and water, or weak tea. Never let hot applications cool on chest; after removing them, wrap up warmly.

**BROKEN BONES.**—See Fractures.

**BRUISING, Severe.**—Examine for broken bone (see Fracture), cover with an evaporating lotion to cool; lincn

soaked in spirit 1, water 5 ; later rub limb upwards, daily. (J. B. R.)

**BUBO.**—Inflamed gland in groin caused by irritating discharge from privates or buttocks, or from sore heel or ankle. If cause cannot be removed the swelling becomes an abscess. When this "points," but not before, let out matter by two *shallow* cross cuts with clean sharp knife. Don't cut deep or you'll cut a big artery. Apply antiseptic poultice to sore place and groin. Take quinine.

**BURNS.**—Apply oil or flour. Cover from air quickly. Cut clothes off, never pull them off. (Army Council.)

**CALOMEL.**—See Medicines.

**CARBOLIC ACID.**—See Medicines.

**CHAPPED SKIN.** *Prevention.*—After washing, dry at fire before exposure to cold.

**CHILBLAIN.** *Prevention.*—Keep benumbed hands and feet away from fire until rubbed warm.

**CHILL.** *Prevention.*—Keep moving when wet, and when possible change to dry clothing.

*Treatment.*—Stimulant and bed.

**CHLORODYNE.**—See Medicines.

**CHOLERA.** *Cause.*—Is a disease like typhoid or enteric fever. It is caused by drinking water that has been fouled by the discharges from the bowel of a cholera patient, at some time or another (possibly remote). If a glass or dish is washed in such water and then used, the danger of getting cholera is also great.

*Prevention.*—(1) *When cholera "is about," or, indeed, at all other times, never drink water that has not been boiled, if there is the least chance of its having been contaminated. (See Dysentery.)*

(2) Excreta and soiled clothing of cholera patients

must be disinfected with carbolic, boiled, burned, or buried.

(3) If nursing a cholera patient, great care must be taken to clean the hands very thoroughly before food.

*Treatment.*—Give 20 drops of chlorodyne (Collis Browne) and 10 drops every hour for four hours, till the purging stops. Give a teaspoonful of brandy with each dose of opium, and rub the legs with brandy or turpentine. Put a mustard plaster over the pit of the stomach.

Vinegar (a teaspoonful to a wineglassful of water) may be drunk as a harmless and sometimes useful preventive. (Dr. Stephens.)

**COCA LEAVES.** (Peru, Java, Bolivia, and East Indies.)—Nerve and muscle tonic; stimulant and restorative. Natives chew it to sustain them without eating until nightfall.

**COFFEE.** *Heart Tonic. Medical.*—Tea and coffee are most valuable as preventives of diseases carried by water, as the boiling of impure water makes its safer to drink. Black coffee, stimulant for heart failure.

*Surgical.*—Carry small bag pure ground coffee, or, better, roast and powder fresh berries. Failing usual dressings, sprinkle dry coffee on wound. Absorbent, coagulating, air-tight and antiseptic dressing.

**COLLAPSE.**—See Shock.

**COLIC.** *Symptoms.*—Griping pains in bowels, sometimes with diarrhoea often due to an irritating substance, or a chill.

*Treatment.*—Open bowels. Then if pain great, chlorodyne or Worcester sauce (a dessertspoonful in water). Hot applications to belly. Liquid diet until pain relieved.

**COMPRESSION OF BRAIN.**—Broken head, bleeding inside skull.

*Symptoms.*—Complete insensibility, eyeballs don't flinch when touched; pupils don't contract from light, are of unequal size, or both remain dilated; snorting breathing, and cheeks puffed out with each breath.

*Treatment.*—If wounds, cut off all hair closely; wash with soap and water, antiseptic lotion; cover with clean rag, soaked in lotion. *Avoid alcohol.* (See Surgical Notes, Loss of Consciousness.) Keep patient lying down flat. Give calomel to keep bowels open. Complete quiet, and feed with fluid diet.

**CONCUSSION OF BRAIN.**—See Loss of Consciousness in Surgical Section, also Compression of Brain.

**CONSUMPTION.**—Caused by a germ that is spread by spitting of infected phlegm. No consumptive should spit about where other men are, but spit into rags or leaves, and burn them. No consumptive should sleep in a fo'cs'le, for his own sake as well as his shipmates'.

*Symptoms.*—Cough, gradually getting worse, with spitting of green-yellow phlegm, sometimes bloodstained; loss of flesh; evening fever, with bright eyes and flushed face—patient often feels fittest at this time—sweating in sleep. These signs are most grave in a man whose near relations have or had consumption. Worst symptom is blood-spitting, which may amount to coughing up a pint or more of blood.

*Treatment. Fresh Air and Feeding.*—No man with active consumption is fit for hard work or short rations. Live and sleep in open air entirely—uplands better than plains, and sunshine than rains. Eat three square meals a day, with plenty fat. Drink milk freely. If indiges-

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tion, take raw scraped meat juice. For fever,  $\frac{1}{2}$  of a 5-grain quinine tablet at sundown. For night-sweats repeat same at bedtime, unless headache. If fever bad, lie up till better. For bad cough at night, take five drops chlorodyne. This may be repeated in two hours if necessary, *but never more than once*. If spitting blood, lie up till better, then trek for doctor. If a man coughs up much blood suddenly, getting pale and faint, *put him on back and keep him still for ten days at least*. Give *no spirits*, and only liquid food. Attend to bowels with basin. Give one grain calomel three mornings running. He must not strain, and tell him to check cough. Give ten drops chlorodyne three times a day for three days, then five drops three times a day for a week. He must start work again very slowly. He had better see doctor first. (J. B. R.)

**CONSTIPATION.**—Ordinary, due to errors of diet, change of climate, or cold.

*Prevention.*—Cultivate regular habits. Take vegetable food. Avoid regular purgatives, which often cause or make constipation worse.

*Treatment.*—If due to wrong diet see to food. If due to cold, keep body warm. With the hand oiled, rub belly from low down on right side up to the ribs, then across and down the other side. Repeat several times.

If not due to cold, splash cold water on belly in the morning.

**CRAMP**, or spasm of muscles.—Generally due to over-fatigue when out of training. Rest limb in sling or splint; hot fomentations for three or four days. Begin gently with rubbing towards heart only, and gradually increase use of limb.



**DELIRIUM TREMENS.**—*Bad signs* are marked feverishness, constant trembling all over, and great prostration. Death may occur from exhaustion or sudden heart failure. Wounds and pneumonia are very apt to cause delirium tremens in a “soaker.”

*Treatment.*—Don't stop alcohol suddenly. Liquid nourishing food, one teacup given every three hours. Purge. If restlessness very great, full dose of chlorodyne (about 15 drops), repeated, if necessary, in smaller doses (see Chlorodyne). Sponging with tepid water often calms the delirium. Do not tie patient down, but watch him. Afterwards give quinine.

**DENGUE.** “Break-bone Fever.”—Tropics and Sub-Tropics. Never fatal.

*Symptoms.*—Headache, and great pains in joints and muscles; often sudden vomiting. Sometimes a rash. After a few days, may recur. Must distinguish from Yellow Fever.

*Treatment.*—See Fever. If pains great, give chlorodyne. Convalescence slow. After the attack, give quinine.

**DIARRHŒA.**—It cannot be too strongly insisted that diarrhœa if unchecked may run on into dysentery. It is therefore *most important* to check diarrhœa at its first appearance, when it is comparatively easily treated.

*Prevention.*—As for enteric fever.

*Treatment.*—All water should be boiled or efficiently filtered (see Filters).

Milk diet and arrowroot where possible. Indigestible food to be avoided.

At first onset, two teaspoonfuls of castor oil with ten drops of chlorodyne or laudanum added.

If it still continues, read the instructions in the case of

dysentery, and carry them out, keeping as quiet as possible for a day or two.

Do not neglect diarrhoea in hot countries, nor regard it as a trivial or "a matter of course"; it not only may lead to dysentery, but it also predisposes to enteric fever. (Dr. H. H. Tooth.)

**DIPHTHERIA.**—See Infectious Diseases and Sore Throat.

**DISLOCATION.**—Bones out of joint.

*Symptoms.*—Loss of power, pain and swelling at joint, limb fixed, and joint different shape from that of other side.

*Treatment.*—General. Support limb in position easiest to patient, until the bone can be put back.

**DISLOCATION OF SHOULDER.** *Symptoms.*—Shoulder flattened. Round head of arm-bone (humerus) may be felt out of joint under collar-bone.

*Treatment.*—Sometimes raising the arm to level of shoulder or higher will get the bone back. If it does not, place patient on his back, take off your boot, and place your heel in his armpit. Before this, a cord must be fastened round the arm above elbow, with a clove hitch, and the flesh beneath protected by a bandage. Pull on the cord. Arm goes in with click. Bandage arm to side, and put the forearm in a sling. Before bandaging see that the shoulder joint is working.

After three days, move this arm about for the patient every day. Sling must be used for three or four weeks.

**DISLOCATION OF HIP.** *Symptoms.*—(1) The foot turned in over the other foot (2) or toes turned outwards (rare). Several men wanted for this job, which is difficult. Put the patient on his back. If the foot is turned

inwards, proceed as follows: Lift the leg up, bending the knee. Slightly turn the leg towards the sound side, and then turn it as far as it will go to the other side. With a circular or rolling movement bring the limb alongside its fellow. To carry out this movement, grasp the limb by the ankle. If the toes are pointed outwards, carry out the same movement, but with the circular movement in the opposite direction. Tie the patient's legs together, and put a broad bandage round his hips.

**DISLOCATION OF ELBOW.** *Cause.*—Blow on elbow, fall on, or wrench of, forearm or hand. *Most common form.* (1) Both bones of forearm driven backwards. (2) Outer bone of forearm driven *backwards* or *forwards*.

*Symptoms.*—*Both bones driven backwards.* Limb bent and shortened. Unusual lump at end of elbow.

It is very difficult to tell if arm is broken at elbow when joint is badly damaged. Therefore handle very carefully and bind bent arm on a right-angled splint (shaped out of wood or leather). Support arm in sling, keep splint on for a week, then remove and rub gently, a little longer each day, moving joint also by slow degrees. See a surgeon as soon as possible.

**DISLOCATION OF KNEE-CAP** (very rare).—Displacement outwards most common.

*Cause.*—Blow, or sudden action of muscles.

*Symptoms.*—Knee-cap seen to be out of place especially in comparing with other knee.

*Treatment.*—Bend the thigh on the belly, keeping the leg in a straight line with the thigh. Press on the edge of the knee-cap farthest from the centre of the joint, and thus raise the opposite edge so that it can slide over the ridge of bone. The muscles will then draw it into place. Wear bandage afterwards.

**DISLOCATION OF THUMB.**—Pull the thumb away from palm, push the base of the thumb up, and bend the thumb towards palm. Failing this, force thumb into centre of palm, and, protecting it with wet rag, apply a clove hitch to thumb, pulling in direction of displacement, and then, suddenly, forcibly bend in opposite direction.

**DROWNING. 1.**—Remove all obstructions to the passage of air into the lungs by:

(a) Opening out clothing so as to expose the chest and waist.

(b) Clearing away any mucus, weeds, mud, etc., from the mouth, nose, and throat.

(c) Drawing forward the tongue, and keeping it projecting beyond the lips, by tying a piece of tape round it, or by holding it with a dry cloth.

(d) Emptying the water out of the lungs as much as possible; to do this, turn the patient face downwards, having first placed a large firm roll of clothing under his chest and stomach, press two or three times for four or five seconds each time upon the patient's back.

2. Restore the breathing:

(a) Give two or three quick, smart slaps on the stomach or chest with the open hand.

(b) Turn the patient on his back, placing a roll of clothing or a cushion under the shoulder blades, the head being allowed to fall back.

(c) Standing at the patient's head, grasp the arms just above the elbows, draw them gently and steadily upwards above the head, and keep them stretched for *two seconds*.

(d) Turn down the patient's arms and press them gently and firmly for *two seconds* against the sides of

the chest, crossing the forearms over the pit of the stomach.

(e) Repeat these movements alternately, deliberately, and perseveringly *about fifteen times a minute (not more)*, until a spontaneous effort to breathe is perceived. The movements may have to be continued for two hours.

N. B.—*Do these movements slowly, as stated. Quicker movements will tire the rescuer rapidly and do the patient no good.*

3. Promote warmth and circulation. (Efforts to promote warmth and circulation, beyond removing the wet clothes and drying the skin, must not be made until the first appearance of natural breathing, for if the circulation of the blood be induced before breathing has recommenced, the restoration of life will be endangered.)

Apply friction by rubbing limb upwards, and apply hot flannels or hot bottles to the pit of the stomach, armpits and soles of the feet. Administer small quantities of wine, warm brandy, and water or coffee. (Army Council.)

DYNAMITE.—In handling wear gloves, and avoid touching your head with anything soiled by dynamite. (Ware headache.)

DYSENTERY.—There are two principal forms possessing many features in common, but probably due to different microbes.

(1) *Tropical*, occurring in the tropical climates. In this form the large intestine is inflamed and ulcerated, and abscess of the liver is common.

(2) *European*, which may occur in any part of the world. In this the large intestine is also inflamed, and may be ulcerated, but the liver is not affected.

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Both forms are due to some microbe, which is taken in by eating or drinking contaminated food or water, as in the case of typhoid fever.

*Prevention.*—All water that cannot be guaranteed as above suspicion must be boiled or efficiently filtered. (See Filters, and read also instructions for Prevention of Enteric Fever.)

Diarrhœa is the earlier symptom, therefore the slightest looseness of the bowels should be treated (see Diarrhœa). Timely treatment of diarrhœa may avert a serious attack of dysentery.

*Symptoms.* Diarrhœa.—Slime and blood in the motions; pain in the belly; distressing sense of straining at stool.

*Treatment.*—Castor oil, two teaspoonfuls with ten drops of chlorodyne or laudanum, at once. Failing this, any purge may be used.

Follow this up in two hours' time by a teaspoonful of sulphate of magnesia (Epsom salts), or sulphate of soda (Glauber's salt), in a wineglassful of water *every hour* for twelve to twenty-four hours. Under this treatment the motions should cease to contain blood and slime, and the pains and straining should also cease.

If the motions are still loose, take ten drops of chlorodyne or laudanum in water, three times a day for four or five days.

The diet should be mostly of milk and arrowroot or other starchy food; no meat.

The motions of a patient with dysentery should be disinfected and treated as in the case of enteric fever. (Dr. Tooth.)

*Dysentery, Tropical.*—Like typhoid fever (enteric) and cholera, is caused by the drinking of water which has

been contaminated by the discharges of people suffering from dysentery.

*Prevention.*—All water that cannot be guaranteed as above suspicion must be boiled. *It is never safe to drink any "doubtful" water, e.g. in forest pools, ditches, etc., without boiling.* A filter is less trustworthy, but the golden rule is: *Boil your drinking water unless quite sure of it.* It pays in the long run.

*Treatment.*—Give a purge to get rid of the causative microbes from the gut, e.g. half an ounce of castor oil, with ten drops of chlorodyne. A teaspoonful of Epsom salts in a little water every hour till the blood ceases in the motion. (Dr. Stephens.)

*Bush Treatment.*—Supposing bowel to have open sores, Major P. W. Forhes put one-third wood ashes in bucket with two-thirds boiling water, and served tepid one tumbler three times daily. This reported to be very effective.

*Bush treatment* said to make scab on sores in bowel.—Diet solely on strong solution of corn or other starch in warm coffee. If blood, take bismuth subnitrate to cover a threepenny piece three times a day.

**EMETIC.**—Best is Mustard (which see). A charge of gunpowder in warm soapy water, and tickle throat.

**ENTERIC FEVER (Typhoid).**—Is due to a microbe or bacillus taken in by the mouth and swallowed, causing inflammation and ulceration of the small intestine.

The bacillus is conveyed principally by water, but it also may adhere to grains of dust, which are blown about and swallowed, and also to the legs of flies which settle on the food.

*Prevention.*—The water drunk must always be above suspicion, or else it must be treated by boiling or filtering. It is safest always to boil the water. This kills the

bacilli, but the water is less palatable. Weak tea (made with boiling water and drunk cold) is wholesome, safe, and palatable.

All filters are to be regarded with suspicion; but with care and observance of proper precautions, the Berkefeld and Pasteur filters are believed to be efficient. (See Filters.)

In camp the stools of a patient with enteric fever must be regarded as virulent poisons which may infect the whole camp in dry climates. They should be, if possible, treated with lime, carbolic acid, Jeyes' fluid, or other disinfectants, and buried deep, or they will dry and blow about in the sand storms, or be scattered all over the camp by flies. If no disinfectant is to be had, burn the stools. The same precautions apply to the urine, which may contain millions of bacilli. The multiplication of flies, which is enormous, should be kept within bounds by the prompt burial of all refuse, meat cans, dead horses.

If possible, the patient should be removed *at once* to the nearest hospital, for the good of the rest as well as his own. He should not share a tent with other men.

*Symptoms.*—Generally indefinite at first, onset sometimes sudden in tropics, resembling sunstroke. General feeling of illness and weakness. Headache. Sometimes diarrhoea, light-coloured, watery, "pea-soup" stools, more often rather constipated. Fever, dirty brown tongue. The disease is a long one, at the least three weeks, and generally longer, and relapses are common.

*Treatment.*—To be kept lying down and still. All food to be soft and digestible. Milk boiled, and fresh if possible, or canned, if no other is available; soft bread and milk; eggs beaten up with milk. Solid food



of all kinds to be avoided. Soup and beef-tea to be used very sparingly, and not at all if there is diarrhoea.

Brandy is best not used except as a medicine. When fever is high, the patient becoming exhausted, then 2 oz. to 6 oz. a day.

In constipated case, purges should never be given. Warm water injections are the only safe means of unloading the bowels. If blood appears in stools keep patient quite still on his back; clean buttocks as best you can, but don't lift him. Stop all food but milk. Give no brandy.

When the temperature has fallen, the soft diet should still be continued for fear of relapse, or perforation, for at least fourteen days. All precautions as regards disinfection of stools should be continued, and the patient should be rigidly kept in bed. Afterwards give a tonic tablet *three times a day*. (Dr. Tooth.)

EPILEPSY.—See Fits.

EUCALYPTUS GUM.—Gum from the bark. (India, Australia, and Africa.)

Useful in diarrhoea, dysentery, and relaxed throat. Dose 2 to 5 grains.

Or solution of, gum 7 parts to water 20 parts. Dissolve and strain.

Half a teaspoonful to a teaspoonful of above solution helps to stop bleeding. Give with about three tablespoonfuls of water. To keep, add a little brandy.

Applied to the inside of the nose, stops bleeding.

Boiled eucalyptus leaves make an antiseptic lotion for wounds. Eucalyptus and vascline keep off insects.

EYE. *Inflamed Eyelids*.—Bathe frequently with a lotion of 1 teaspoonful of boric acid to half a pint of water, or with warm water, or with Condy's and water of light pink colour.

*Dust in Eye.*—Open eye under warm water.

If inflammation severe, purge with calomel, and blister, or leeches on side of temple behind eye, to draw off blood. Bathe eyes with boric acid lotion.

*Foreign Substances in Eye.*—Take wooden match, lay on junction of upper eyelid and forehead, turn up eyelid over match, and remove with corner of clean handkerchief.

*Snow-blindness, Ophthalmia, etc.*—Swellings of eyelids due to light and heat.

*Prevention.*—Keep away light and heat with goggles, smoked glass, or wood with a horizontal slit for seeing, closed round face with wire netting. Or with a soot and oil blacking, blacken skin round eyes and nose, letting sight rest only on dark surfaces.

*Treatment.*—Dark room, and bathe eyes with milk or lotion of boric acid.

**FAINTING.**—If from loss of blood, do not try to revive, or the bleeding may start again. No alcohol.

*To prevent ordinary fainting.*—Sit patient down, and pull his head forward between his knees, holding him so that he does not fall. Flick cold water in his face.

*If he has fainted,* lay him flat on his back, with his head as low as possible. Loosen tight clothing. Afterwards give a little stimulant, and let him lie quiet. (See Loss of Consciousness.)

**FEVER.** *Symptoms. General.*—First signs, flushed face, very bright eyes, headache, pain in back and limbs, with thirst; skin hot, pulse quick, tongue furred, weakness, and small amount of high-coloured urine. May start with chill, and fever then usually high.

*Treatment. General.*—Bed in a place that is not stuffy or draughty. Prevent patient getting chilled. Light

diet, bland fluids, such as warm water or barley-water, and cooling drinks for hot state, such as lemon-juice in water. If fever getting very high, sponge with cold water, uncovering one limb at a time. Repeat hourly.

No stimulants unless great weakness. (See Enteric Fever.)

**FEET, SORE.** *Prevention.*—Oil boot leather (castor oil best). Soap stockings well, or, if possible, break raw egg into each boot before marching.

*Treatment.*—Wash gently in hot water with soap, and powder with boric acid. To harden, soak in alum water (half a teaspoonful of alum in a pint of water) or in warm water, strongly salted, or rub with alcohol. If socks much worn, make a linen bandage instead. If feet wet or cold, change socks, and save a lot of trouble later.

*Feet, Cold.* Pour alcohol into boots.

*Blisters. Prevention.* Boots should have broad, low heel, broad tread, raised toecap.

*Feet, Blistered.*—Ointment each night. Candle drippings or lard mixed with spirits. Change right and left socks, turn inside out at intervals.

*Feet, Sore.*—Bathe the feet at night in tepid water with salt and alum in it. Rub the feet with soap, tallow or oil before marching.

*Blisters.*—Prick with a needle, keep clean, and prevent surface being rubbed. (Army Council.)

**FOMENTATION.** (Antiseptic). *Wounds.*—Linen, fresh every time, wrung out of boiling antiseptic lotion, applied *hot and dry*. Cover with leaf, or oil silk and flannel; to *relieve pain*, flannel wrung out of boiling water. Cover with leaf. Renew often.

**FITS.**—If man suddenly falls in convulsions, and becomes insensible, loosen clothes and collar. Put

wood between teeth to save him from biting tongue, and lay him in shady place to recover. A man given to fits is unfit for frontier life.

**FRACTURE.** *Symptoms.*—Pain, limb useless, and altered in shape. Possibly bent or shortened. Swelling and unusual movement at injured spot often noticed. In simple fracture the skin is unbroken, in compound fracture there is a wound.

*Treatment.*—Proceed very carefully or bone may pierce skin. Prevent movement of the limb, fix the joints above and below the break with splints, and keep the sharp ends of the bone from doing further damage. Put on splints before moving patient.

To move the limb, place one hand above, and the other below the break. Cut the clothing up the seams. If no surgeon handy, gently pull and manœuvre the limb until it is the same as its fellow of the other side. Apply splints and bandages.

If compound, bathe with an antiseptic lotion, and dress with rag soaked in this lotion. If bone projects, saturate with an antiseptic lotion before replacing.

*Broken Collar-bone.*—May be caused by direct blow, or by falling on hand with arm outstretched.

*Symptoms.*—Cannot raise arm. Bone can be felt broken. Shoulder droops forward.

*Treatment.*—Put a soft pad in the armpit, raise the elbow, and bind the arm to the side with the forearm crossing chest, the hand reaching the opposite shoulder. Keep the elbow well back by a handkerchief round the arm above it, and passed round body behind the back.

*Broken Ribs.* *Symptoms.*—Sharp pain with each breath.

*Treatment.*—Roll a broad bandage round the chest.

If bleeding at the mouth keep patient sitting up to keep lungs from filling with blood.

*Broken Arm* above elbow.—Bend the elbow at right angles, apply splint, and a sling to hold the wrist only. (See Fig. 2, page 403.)

*Broken Forearm*.—Splints to be broader than the arm. Angled splint useful. Bandage lightly, and pad splints well.

*Broken Thigh*.—*Symptoms*.—Limb always shortened, and quite helpless.

*Treatment*.—A long splint from the armpit, with wide band round chest, to below the foot if possible, to keep the ends of the bone from overriding. (See Splints.)  
*Keep patient on back six weeks.*

*Broken Leg*.—After putting on splints, tie both legs together, so that the sound one may support the other. See that the circulation is not interfered with by too tight bandaging. Splints four weeks.

*Broken Ankle*. *Symptoms*.—Foot generally turned out and helpless.

*Treatment*.—Splint *inner* side of leg and brace foot inwards to proper position by bandage. Carry bandage up leg to fix knee.

In all fractures, after ten days remove splint carefully, and rub limb gently daily without moving it, gradually increasing strength. Replace splints. This means a useful limb afterwards, but needs caution.

In fractures of leg, wire or cord fixed to a leather collar or bandage round ankle, with weight at end, passing over cotton-reel block at end of bed, helps much in keeping limb straight. Raise slightly foot of bed. Sand-bags make pads to keep limb in place.

*Splints*.—Besides wood, splints may be made of (1)

WHEN NO DOCTOR CAN BE OBTAINED 427

Saddle leather soaked, wrapped round limb to take shape, taken off to dry, cut so it does not meet round limb, then laced to limb over cotton wool. (2) Flannel cut to shape, soaked in plaster and applied quickly. (3) Boiled rice starch wrapped with bandages soaked in the same. Pad wooden splints with soft material.

*Fractured Knee-cap.*—Seldom from direct violence, usually by muscular action to prevent fall.

*Symptoms.*—Pain and rapid swelling, dent across knee.

*Treatment.*—Keep limb on splint applied to back of leg, bandage firmly above and below knee; apply lotion to knee.

*Fractured Jaw.* *Symptoms.*—Patient supports jaw with one hand, speaks between teeth, mouth bleeding.

*Treatment.*—Cut up splint of cardboard or leather. This is cut along inner line, hollow under lower lip and sides across cheek, lower portion bent up over these. Kept in position by two handkerchiefs; first placed across chin and tied behind neck, second below chin tied over head.

*Spine.* *Symptoms.*—Paralysis below injury. Below shoulders legs are paralysed; above, arms as well.

*Treatment.*—Keep patient quite flat, and disturb as little as possible. For moving, a shutter is better than a stretcher, as it is rigid. Turn patient carefully on his side, and slide shutter under him. Do not raise head. Feed fluid diet. Get doctor if possible, as often water must be drawn off.

*Fractured Skull.* *Vault.*—Cause, a blow.

*Symptoms.*—Patient is struck senseless, face pale, eyes half-closed, pupils contracted, skin cold, pulse weak.

*Fractured Base.*—From fall on back of head.

*Symptoms* as above ; in addition, bleeding from mouth, nose, ears, or clear fluid from nose or ears.

*Treatment* as for Compression.

FROST BITE.—Rub affected part with snow or cold water. Avoid taking the patient into a warm room until the part has been thoroughly, but very gradually thawed. (Army Council.)

For trifling cases see above. Where a limb is frozen badly, rapid thawing is dangerous. Keep patient away from artificial warmth, well wrapped. Stimulant. Keep limb in bath of petroleum, or water and ice, renewing ice. When skin is red all over treat as for burn, with nursing and dieting for shock. Parts of flesh or bone turning black must be watched, and if spreading up limb, cut away, otherwise wait until after shock is over. Wounds heal slowly, generally after change of air. (By Editor.)

GALLS. *From oak-tree.*—Galls crushed into powder 1 to lard 4. Makes ointment for piles. Lotion: Bruised galls 2½, water 40. Boil until only half the amount, then strain. Lotion for bleeding from nose or gums.

GONORRHŒA.—See Venereal.

GUNPOWDER.—Make a paste to dress sores for mange, veldt sores, ulcers. A strong solution for horses in fever, for worms, or wind colic. Promptly explode powder in wound for rabies, poisoned arrow, snake-bite, etc. (Major E. E. Craster.)

HEART DISEASE.—*Symptoms.*—Man may work for years without symptoms, then knock up suddenly. Has probably had rheumatic fever, or done prolonged hard work and hard drinking. Shortness of breath, blue lips, swelling of feet and legs, and throbbing of heart. Sometimes pain in heart. Too little urine. Faintness.

*Treatment.*—Rest on back for a month at least. Fresh air. If faintness, small doses spirits or strychnine and iron tabloid three times a day. Keep bowels well open, especially if feet swollen. Light, nourishing diet. If breathing very hard, prop up in bed. Get medical advice. (J. B. R.)

**HORSES.**—See Travel Notes, Gunpowder.

**HYDATIDS.**—(Australia, New Zealand, Iceland, Europe.) Due to minute tapeworm of dog. The eggs abound in drinking water. These eggs in man develop into large water tumours containing “bladder worms.” The dogs most liable to the disease are sheep dogs and the dogs of New Zealand, for nearly all the latter feed on the rabbit which has the disease.

*Prevention.*—From ordinary motives of cleanliness, it is as well not to let a dog lick the hand or feed off a plate used for man, but in the above-mentioned countries it is an extremely dangerous proceeding.

**HYDROPHOBIA.**—See Rabies.

**INDIGESTION.**—Baking powder to cover a shilling piece, in half a pint of hot water half an hour before meals. If “heart burn,” the same dose in less warm water may be taken when required. Beware of spirit “nips.”

**INFECTIOUS DISEASES.**—Where a “catching” illness is prevalent, any man sickening with the symptoms must, with his gear and attendant, be quarantined well to leeward of camp. Any man in contact with case must be quarantined: small-pox for 14 days, typhus 12, scarlet fever 6, measles 14, diphtheria 7 days. No drug cure. Patients saved by nursing. Slop diet. Rations: three pints boiled milk with two to three raw eggs, or beef-tea; cold boiled water always within patient’s reach, with lemon or other acid juice, and fruit pulp, except when



diarrhoea. If weak, pulse over 120, with delirium, one tablespoon spirits in water every two hours. If getting worse  $1\frac{1}{2}$  tablespoons. Swab out mouth and tongue with dilute lemon-juice or weak carbolic (1 in 400) solution and glycerine, using linen rag on stick. Attend bowels with a basin, and keep buttocks clean. Protect from flies and mosquitoes. Allow fresh air, avoiding draughts. If high delirium, watch carefully. Convalescents get about by slow degrees.

*Diphtheria.*—Sec Sore Throat.

*Small-pox.*—(9 to 14, often 12 days from infection to first symptoms.)

*Symptoms.*—Sudden, sharp illness. Headache, backache, often vomiting. Patient may faint off. Fever quickly rising. On third or fourth day red spotty rash over face and body. (Watch this.) Fever drops and he feels better; two days later spots swell into watery "blebs," and in two days more these turn to "pustules," round swellings, like small peas, red at root, and with yellow tops full of matter. Itching terrible; skin between red and swollen; eyes bunged up. Fever returns; in bad cases pustules run together, and patient may get delirious, unconscious, and die. Generally pustules dry up in about two days, scabs fall off about fourteenth day.

*Prevention.*—*Vaccination, and if going to small-pox district, be vaccinated again.*

*Treatment.*—Danger is from exhaustion and heart-failure in second week. Give spirits (and strychnine and iron tablet every 6 hours) till stronger. Wash out eyes with weak tea. Matter and scabs from pustules very dangerous. Bake or burn all bedding. If patient dies bury quick or cremate far from camp.

*Typhus Fever.* (Camp or Jail Fever).—(12 days.) Sudden onset. Chills and vomiting, high fever, for 12 to 14 days, often delirium. On third to fifth day, a dusky red mottled rash over body. Tongue dry and cracked. Patient may die in second week, or get better suddenly.

*Treatment.*—As for small-pox. Plenty of fresh air. It is terribly "catching," and often fatal. It is a disease of damp, dark, and dirty places.

*Scarlet Fever.*—(2 to 4, longest 7 days.) Sudden onset. Vomiting, high fever and pulse. Throat sore and dusky red. Next day red rash all over body. Throat more sore. Tongue furred. Rash fades inside of a week. (If scarlet is about, beware of sore throat and fever, even if no rash, which may not appear.) Tongue left red and raw. Dead skin peels off body and limbs when rash fades.

*Treatment.*—Give plenty of water, especially if too little water passed. Not spirits. Swab out mouth with carbolic solution, 1 in 400, and give as gargle. Keep in bed 4 weeks. Danger of inflammation of kidneys if neglected. Case is infectious while skin is peeling, 6 weeks.

*Measles.* (7 to 14) *Symptoms.*—Begins with feverish cold; nose and eyes running. On fourth day higher fever, with red blotchy rash on face and body. Measles is very "catching" for men who have not had it, and may lead to inflammation of lungs if not looked after properly.

*Treatment.*—See Fever. Keep away from draughts, and cover body when perspiring. (J. B. R.)

*Diphtheria.*—(2 to 7.) See Sore Throat.

**INFLAMMATION.** *Symptoms.*—Pain, heat, redness, swelling, and, if severe, fever.

*Treatment.*—Rest the part, and apply antiseptics.

If increasing, and with throbbing pain, apply antiseptic poultices or fomentations.

Where matter is formed it should be let out with *clean* sharp knife, and fomentations applied.

**INFLUENZA.**—*Very infectious, epidemic. Symptoms.*—Sudden onset of illness, headache, fever, pains in back. Afterwards, often great weakness.

*Treatment.*—Stimulants given *at onset* may ward off the worst of the attack. Rest, light diet until after fever has gone, and then good food. (Xaxa, 1 tabloid, 5 grains, hourly for three doses, then every four hours, or quinine three times a day.) Great danger of “chill” afterwards, if care not taken. Try eucalyptus extract in boiling water, inhaled in steam.

**INSENSIBILITY.** *General Treatment.*—Lay patient on his back, with head slightly raised and turned to one side, to prevent tongue falling back and stopping the breathing. If face pale, place the head low. Loosen all tight clothing about neck and chest. Examine for wounds, broken limbs, etc. (Loss of Consciousness.)

**INSTRUMENTS.**—*Instruments to be used only in cases of extreme need.*

Boil all instruments before using, and soak in carbolic (1 in 20) or alcohol. Knives that have been used to cut raw meat should not be used in surgery, as even boiling and grinding fail to clean them. The chief danger in surgery is from dirt.

**JAUNDICE.**—See Liver.

**JIGGERS.**—See Ticks.

**LATRINES,** *slaughter places, and refuse places* should be to leeward of camps, and as far away as convenient. Fill in latrines, using disinfectants. Burn dead animals

and refuse, and then bury. To burn a dead animal, open the belly, and light a fire inside the carcass.

**LEAD POISONING.** *Prevention.* — Cleanliness, specially clean hands before eating; great care of finger nails.

*Symptoms.* — Blue line at base of teeth on gums. Lead colic, paralysis.

*Treatment.* — Quit lead mining. To relieve colic, 1 to 2 oz. castor oil with chlorodyne when colic appears. Take a heaped teaspoonful Epsom salts every morning.

**LEMON.** — Peel improves appetite and digestion. The juice with water makes cooling drink in fever, and also used to prevent scurvy. Loosens phlegm in tight cough.

**LINIMENT.** — Whites of 4 eggs to 1 pint turps, and add mustard (about a teaspoonful). Or equal parts of oil and brandy, or rub with vaseline or powder such as flour. (For sprains, rheumatism, etc.)

**LINT.** — Scrape linen with clean knife to roughen surface.

**LIVER, CONGESTION.** *Cause.* — Sedentary habits. Too much drink and food (especially spices).

*Symptoms.* — Discomfort along borders of lower ribs of right side, furred tongue, light-coloured motions. Possibly jaundice.

*Treatment.* — Rest. Spare diet, no alcohol. Purge (calomel).

*Prevention.* — Live an active life, keep bowels open with calomel; avoid high seasoning of food.

**LIVER, INFLAMMATION.** *Cause.* — Chill, or after dysentery. *Symptoms* are those of Congestion, but worse, and with fever.

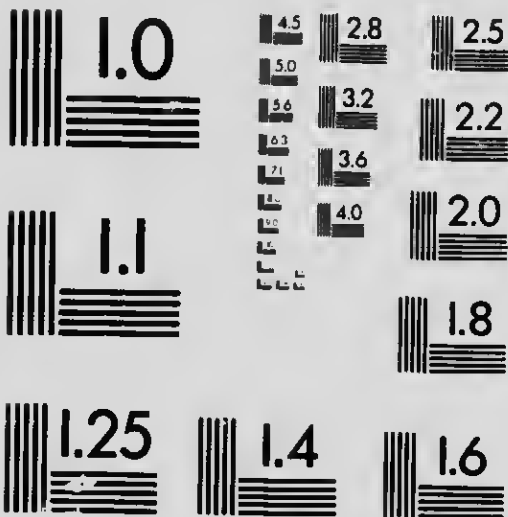
*Treatment.* — Mustard poultice over liver gives relief.

**LOCK-JAW.** — Caused by dirt entering a wound.



# MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No. 2)



**APPLIED IMAGE Inc**

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*Prevention.*—Remove dirt from wound, clean with soap and water, nail-brush if very dirty; use antiseptics. In tropics clean smallest wound carefully, especially if dirt be rubbed in.

*Symptoms.*—Painful swelling. Spasms and stiffness of jaw, going on to painful convulsions and spasm of limbs and body. Generally fatal in ten days.

*Treatment.*—Cauterise wound. If necessary extract teeth and feed with fluid through hole.

**LOSS OF CONSCIOUSNESS.** (*a*) *Fainting.*—Lay the patient on his back with his head low, and loosen clothes about the head and neck. Sprinkle cold water on the face and neck. Apply smelling salts and give small quantities of stimulant.

(*b*) *Concussion of the Brain.*—Rest with head low. Do not give stimulant without orders, but apply warmth to surface of body.

(*c*) *Sunstroke.*—Carry into shade or coolest available place. Provide plenty of fresh air. Raise head and uncover upper part of body. Douche head, neck, and chest with cold water; in severe cases the whole body should be doused. Do not give stimulants. (Army Council.)

**LUMBAGO.**—Rheumatism in muscles of back.

*Symptoms.*—Pain and stiffness, walking with bent back.

*Treatment.*—Keep warm, rub the part well. 1 “xaxa” tabloid three times a day. (See Rheumatism, Willow.)

**MADNESS.**—Remove boots and spurs.

*If violent,* avoid restraint by tying down, etc., unless absolutely necessary. Watch closely. Remove weapons and crockery, etc. Purge freely. If sleepless three nights, give full dose chlorodyne, but not before.

*If moping, and suspicious, watch very carefully. Great danger of suicide. Feed up and keep at rest.* (J. B. R.)

MALARIA.—Is not caused by miasmas, fog, or damp arising from the soil, but solely by the bite of a particular kind of mosquito. This particular mosquito (*Anopheles*) is not hunch-backed like the majority of mosquitoes, but while resting on a wall, stands out like the pointer of a little sun-dial. It also has little spots on the wings, and hence is called the "Spotted-Wing Mosquito."

It is important to realise how these mosquitoes are able to give "malaria," "ague," or "fever," for these terms all mean the same thing. The mosquito does not get its fever parasite from water, but from the blood of a person who is already suffering from fever. In the tropics, it is the native children who, although apparently quite well, have the fever parasites in their blood; and unless the "Anopheline" or spotted-wing mosquito has previously bitten a fever patient (generally a native child) it is quite harmless.

*Prevention.* (1) *Avoid, for the reasons just stated, sleeping in native huts.* Unless protected by a mosquito net, fever will almost certainly result, about a fortnight or less after the exposure.

(2) *Always use a mosquito net; it is the most important item in a tropical outfit.*

(3) *If there are holes in the net, tie them up with string.*

(4) *Tuck the net under you at night. Arrange it so that the arms and legs cannot be bitten through the net. It is a good plan to sew on a piece of calico at the level of the mattress all round for this purpose.*

(5) *Poles are unnecessary. Fasten the net up with string to the walls, tent pole, tree, etc., etc.*



(6) *Take a five-grain tabloid of quinine every day with absolute regularity on getting up, or the last thing at night.*

*Treatment of an Attack.*—Take 10 or 15 grains of quinine every three hours, until ringing in the ears is produced. Promote sweating by hot tea or coffee. Go on with quinine (5 grains) every day, when the attack subsides. (Dr. Stephens.)

After a bad attack get out to sea or up to the hills if possible.

**MANGE.**—See Gunpowder.

**MEASLES.**—See Infectious Diseases.

**MEAT, TINNED.**—If ends of tin bulge, destroy it. If food kept open, keep in cooking china or enamelled dish. Opening vegetables pour preserving fluid away, and cook in clean water.

#### MEDICINES.

*Carbolic Acid.*—Poison. Use 1 in 20 (20 grains in 2 *tablespoons* water) to wash out poisoned or dirty wounds, and subsequently apply 1 in 40 on lint or clean rag.

1 in 60 (20 grains in 3 *tablespoons* water) to wash all inflamed surfaces (except eye), wounds, cuts, scratches, etc.

*Carbolic Oil.*—1 in 10 of olive or other vegetable oil, for wounds, boils, abscesses, and to spread on skin before poulticing. Stops itching round the back passage.

*Chlorodyne.*—Be cautious. Given in water. *Dose:* 5 to 15 drops at a time. Shake bottle. For diarrhœa, dysentery, severe blood-spitting, etc.

Preparation now likely to be sold in most places as chlorodyne is four times the strength of the British Pharmacopœia mixture of 1885, known as the compound tincture of chloroform and morphia.

If bought as a proprietary compound, the dose should be on the bottle.

*Disinfectants.*—Permanganate of potash. Carbolic acid. Corrosive sublimate (perchloride of mercury). Boric acid. Carbolic or sublimate can be carried in tablets with instructions how to make up solutions of given strength. Use 1 in 4,000 sublimate where you would use 1 in 60 carbolic, and so on in proportion. Sublimate is of no use in soapy water. Use boric or Condy's weak for nose, mouth, or eye wash.

*Quinine.*—Is a very valuable drug in malarial fever, both as a preventive and as a curative agent.

*As a Preventive.*—When in a region known to be malarious it is advisable to take 5 grains every day.

*As a Treatment.*—For an attack of fever, take 10 grains quinine when the sweating stage has begun, and 5 grains twice a day after for three days, and after that 5 grains once a day.

Quinine should not be used indiscriminately; its real value is in the treatment of malaria. (Dr. Tooth.)

Quinine acts more quickly on an empty stomach, and less dose required than when stomach is full. Tablets should be pulverised. (See Malaria.)

*Purge. Calomel.* (Sub-chloride of mercury.) Best given with a few grains of compound jalap powder to 1 grain calomel.

Epsom salts or Cascara. Tabloids for more frequent use.

*Tonic.*—Strychnine  $\frac{1}{32}$  gr. with phosphate of iron, 1 gr. in tablets. Give three times a day after meals. Valuable tonic after illness. Useful in heart-disease or debility.

Easton's syrup tablets are also good tonic.

*Salicylic acid and salicylates*—for rheumatism (which

see); found naturally in sweet birch, wintergreen, and willow leaves. Prepared as salicylic acid, salicylate of soda, etc.

5 grain acetyl-salicylic acid (or "Xaxa") in 'tabloids.'—For rheumatic fever, rheumatic pains, sciatica, lumbago, pains and headache of influenza and some other fevers. This is a good drug to carry.

N.B.—Messrs. Burroughs Wellcome & Co. have prepared a leather travelling medicine-case containing a supply of eight drugs, the uses of which have been described: viz. (a) "Tabloid" Quinine Bisulphate (3 grains), one bottle; (b) "Tabloid" Quinine Bisulphate (2 grains), one bottle; (c) Chlorodyne, one bottle fluid (*largest dose* 15 drops); (d) one bottle "Tabloid" Calomel (1 grain) with Jalap powder (2 grains) (*largest dose* three); (e) one bottle "Tabloid" "Xaxa" (5 grains) (*largest dose* two)—"Xaxa" is the name given by B. W. & Co. to acetyl-salicylic acid; (f) one bottle "Tabloid" Iron Phosphate (1 grain) with Strychnine Phosphate ( $\frac{1}{32}$  grain) (*largest dose* one every eight hours, or, as a milder tonic, half a tabloid three times a day); (g) one bottle "Soloid" Permanganate of Potash (5 grains) (these may be powdered and dissolved in water to form an antiseptic wash, or used dry for snake-bite—which see); (h) one bottle "Soloid" Carbolic Acid (5 grains), four in 2 ounces of water (4 tablespoonfuls or a wineglassful) make approximately a 1 in 40 solution. See that all is dissolved before use. If medicine supply is meant for more than one man, and wounds are expected, a spare bottle of 20 grain "Soloid" Carbolic Acid may well be carried. One of these in 2 ounces of water makes approximately a 1 in 40 solution, a good strength for washing wounds. These are too big to carry in

B. W. & Co.'s case. This can be had fitted with above drugs, lancet, forceps, and three surgical needles for titching wounds, from Messrs. Munro & Co., 273, Regent Street, London, W., or other of Messrs. B. W. & Co.'s agents, to whom the medicine-case number 134 must be quoted, and this list shown. The outfit is recommended. In white-ant countries the case should be carried in a tin box to preserve leather.

A medical man will be pleased to advise Frontiersmen applying at Headquarters upon any point connected with their medical equipment.

**MOSQUITOES.**—Certain strong oils, as oil of pennyroyal, and pyrethrum, rubbed on skin, keep these pests away. Avoid camping on marshy ground, and **FILL UP SHALLOW PUDDLES, ETC., NEAR CAMP, OR POUR PARAFFIN ON THEM TO DESTROY YOUNG MOSQUITOES.**

Very few drops of mineral oil will cover a good-sized pool. If camping for some time in one spot, clear belt of scrub round camp. Such measures have done much to reduce malaria in mosquito countries. (See also Malaria above.)

**MUSTARD.** *Stimulant.*—A tablespoonful in a tumblerful of warm water causes sickness (emetic). When applied outside for about ten minutes causes warmth, with relief of pain. Applied as poultice in pneumonia, pleurisy, rheumatism in the muscles, lumbago, and neuralgia.

**NEURALGIA.**—Feed up. Quinine (5 grains), or "Xaxa" (10 grains). Hot applications.

**OINTMENT.**—Equal parts oil and wax, or oil and lard, with disinfectant.

**OAK BARK.**—Dried bark of twigs.

Dose of powder, 30 to 120 grains for diarrhœa,

bleeding from bowels. Dissolve powder, for sore gums and as gargle for sore throat.

**PEPPER.** *Stimulant.*—Outside (dissolved in brandy or whisky) may be rubbed in for rheumatism and lumbago. A small piece of lint or cotton-wool dipped in this may be applied for toothache (which see).

**POISON.**—Treatment varies, but main principles are :

1. To give emetics, such as a tablespoonful of salt or mustard, in a tumblerful of warm water, or tickle the throat with a feather to bring on vomiting, *except in cases of corrosive poisoning, when emetics should not be given.* (Examples of corrosives are vitriol, caustic alkalis, oxalic acid, carbolic acid.)

2. To lessen the poisonous effect by giving antidotes.

Antidotes are as follows :

For any of the Strong Acids.—Common chalk and water, linseed or olive oil, or soap suds.

For Alkalis.—Weak vinegar and water, or limejuice.

For Arsenic.—Magnesia, powdered charcoal, oil, and limewater.

For Prussic Acid.—Ammonia to nostrils, brandy internally.

For Opium.—Keep patient walking, give strong coffee, slap with flat surface, give mustard emetics. (Army Council.)

**PILES.**—If inflamed, open the bowels, apply carbolic oil, and use hot fomentations or antiseptic poultices. If they come down after a stool, oil the fingers, and replace. Avoid food containing seeds or pips. If not inflamed, use gall ointment. (See Boils.)

**PLAGUE.**—Is transmitted to man solely by the bite of the rat-flea. It is all-important in plague districts to adopt every possible means of destroying rats and

keeping them out of houses. The mosquito net, well tucked in under the mattress, proves to be the one great essential of a tropical outfit for the purpose of keeping out fleas. (Dr. Stephens.)

**PLEURISY.**—Inflammation of the covering of the lungs.

*Symptoms.*—Sharp stabbing pain in side on breathing or coughing. Fever.

*Treatment.*—Bed, fluid diet, hot fomentations. Bandage chest, to ease the pain of breathing. Chlorodyne if pain very bad; afterwards quinine.

**PNEUMONIA.**—Inflammation of lungs.

*Symptoms.*—Often first a severe "chill." Fever; pain in one or both sides; cough short and painful, with no phlegm; breathing rapid and difficult. Patient decidedly ill. Later, rusty coloured phlegm.

*Treatment.*—After third day, if case is bad, give stimulants up to 6 ounces of brandy or whisky during the 24 hours if needed. If great pain, 10 drops chlorodyne. Milk, beef juice, yolk of eggs beaten up in the brandy, with milk and sugar. Afterwards tonic tablets.

**POULTICES.**—Plain for chest or belly, may be made of linseed meal, oatmeal, bran, etc. Put boiling water in a hot basin and gradually pour in the meal, stirring all the time. Make into a thick paste. Spread on linen, to about half an inch thick, leaving half an inch of the linen to turn over at edge. Poultice should be hot and dry, and not messy. If to be carried, place between two hot plates. A spoonful of mustard makes poultice stronger; if used, oil the skin before applying.

*Poultice. Antiseptic.*—For wounds, inflamed surfaces or abscesses. Made as above, but two teaspoonfuls of

carbolic acid (or any antiseptic) to be added to half a pint of the water used in making.

**PRICKLY HEAT.**—Sponge with dilute vinegar, or dilute carbolic (1 in 60), or dust with powdered starch (with 15 gr. oxide zinc to 1 oz.). Wear linen or cotton; flannel only round loins.

**PULSE.**—Normal, 70 to 80 beats per minute. If steadily over 100, something wrong. Always high in fever.

**PURGES.**—To clear bowels calomel, castor oil, cascara, green food, ripe fruit, strong hot coffee on waking. *Beware of the drug habit, which ruins bowels.*

**QUININE.**—See Medicines.

**RABIES.**—If bitten by any animal with hydrophobia, instantly explode gunpowder on wound, or burn out with hot iron, and go quick to nearest Pasteur Institute.

**RHEUMATIC FEVER.**—Exposure to cold and damp.

*Symptoms.*—Fever, white-coated tongue; scanty urine. One or more joints exceedingly painful. Sour-smelling sweat.

*Prevention.*—To prevent, camp on high ground and gravel soil, avoid clayey and low and marshy places.

*Treatment.*—Bed. Open bowels. "Xaxa" or salicylate (5 gr.) 1 tablet 3-hourly for 2 days, then 3 times a day for a week, or willow tea. Keep affected joints warm by wrapping them up. Milk and broth; no meat; lemon-juice and lime-juice diluted; afterwards quinine. Keep in bed ten days at least.

**RHEUMATISM.**—Of joints and muscles. Caused by cold and damp.

*Prevention.*—Wear flannel, and change as soon as possible when wet.

*Treatment.*—Rub the affected part with mustard, and then cover with flannel. "Xaxa" 1 tabloid three times a day for pains. (See Willow.)

**RINGWORM.** *Prevention.*—Avoid bathing in waters where disease prevalent. Wash with soap and water.

*Treatment.*—Shave hair. Tincture cordial, or ordinary black ink.

**RUPTURE.**—As the result of a strain, the bowel protrudes through the walls of the belly, usually in the groin.

*Symptoms.*—Pain after the strain, followed by a soft swelling appearing in the groin.

*Treatment.*—Take hold of the neck of the swelling with the tips of the fingers, and try to very gently get that part of the bowel back first which came down last. A gurgle is often felt when the bowel goes back. Put on a soft pad and a bandage. It is very liable to come back. If it does not go back after trying for ten minutes, keep the patient at rest on his back, with the foot of the bed raised. Keep him on starvation diet, apply cold, and try daily to get the bowel back gently with the fingers.

If the blood supply to the bowel is stopped, shown by pain, constipation, vomiting, thirst, hiccough, stoppage of the urine, and general collapse, try and reduce for ten minutes in a very hot bath. If shock and pain great, give chlorodyne.

This is only emergency work, and if these serious symptoms appear and a surgeon can be got, do nothing, but send for him.

**SALICYLIC ACID.**—See Medicines.

**SCALDS.**—See Burns.

**SCARLET FEVER.**—See Infectious Diseases.



**SCURVY.**—From lack of fresh food.

*Prevention.*—Carry hops, and add a pinch to brew of tea.

*Symptoms.*—Great weariness ; soreness of gums, which bleed easily ; teeth loosen ; blue spots on skin ; pains in limbs ; diarrhœa.

*Treatment.*—Fresh meat, raw vegetables and fruit ; milk, lime-juice and lemon-juice ; later, quinine.

**SEA-SICKNESS.** *Cause.*—Disturbed balance of body.

*Treatment.*—Fight it out to a finish as sailors must, poising against ship's motion, walking or working, staying on deck away from smells. Diet : dry toast, or, if thirst extreme, soda-water or coffee. Give stomach a rest, and go below only when tired out for sleep. If not cured in 16 hours' work try mixture 10 grs. bromide of sodium,  $\frac{1}{10}$  gr. ipecacuanha, one teaspoonful in half tumbler water, and bandage round belly. Chlorctone 10 gr., repeated in three hours, acts well in some.

**SHOCK.** (Collapse.)—From injury, especially to belly, or sudden alarm.

*Symptoms.*—Face pale, skin cold and clammy, puls too small to feel, breathing hardly noticeable.

*Treatment.*—Lay out flat, apply warmth, rub limbs towards trunk, give nothing by the mouth. When conscious, hot tea, coffee, spirits-and-water (if no bleeding). Rest and sleep. Afterwards, good food.

**SLEEPING SICKNESS.**—A disease of tropical Africa, is contracted by the bite of a particular kind of tsetse fly. Here again it is only flies that have bitten natives suffering from the disease that are dangerous. These flies frequent places near water, with plenty of grass and brushwood, so that in camping out avoid such situations, especially, too, if a native village is near.

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*Treatment.*—Take patient at once away from locality and put him under a doctor. Meanwhile keep him moving, and rub his limbs frequently. Calomel 1 to 2 grs. for a few nights. Arsenic in form of Fowler's solution three times a day, 5 drops in water after meals. (Dr. Stephens.)

*Bush Treatment.*—Treat with or some other sweet, sticky substance, to attract and hold the flies. (Gloves to be worn in collecting flies. Make "tea" of flies for patient. (Dr. E. Wynstone Waters.)

**SLEEPLESSNESS IN HEAT.**—A piece of cotton dipped in cold water and placed behind the ears will cool one off wonderfully. A drop or two of ammonia may be added to the water.—*Health.*

**SMALL-POX.**—See Infectious Diseases.

### SNAKE AND DANGEROUS INSECT BITES.

*Prevention.*—See Travel Notes.

*Treatment.*—(1) Place a ligature (e.g. piece of shirt) on the limb above the part bitten. The ligature must be placed on the arm or thigh (and not on the forearm or leg); tighten the ligature with a stick. The ligature must not remain on for more than about 20 minutes.

(2) With a sharp knife cut down *freely* in various directions, especially on the heart side of the bite. Wash out the wound so made with Condy's fluid, or rub in crystals of permanganate of potash into the wound opened as above. It is all-important that the solutions should get in contact with the poison, in order to destroy it before it is absorbed. *This is the best treatment.*

3. Give a good dose of brandy or some other spirit.

4. If breathing is bad, use artificial respiration. (Army Council.)

A full bite from a deadly snake must not be trifled

with. Strong measures must be taken, immediately ligature, caustic, or even a red-hot iron. (Dr. Stephens.)

*Bush Practice.* (African, American, Australian.)—Put gunpowder on wound and blow it up. Cordite only burns like a match. Or light a fusee match in the wound.

*South American.*—Carry always a string for ligature, case with hypodermic syringe, 2 needles (boil after use), bottle glass, stoppered air-tight, of *eau de luce* or *sal volatile*. *Shake.* Supply of stimulant. *Treatment.*—Instantly ligature above and below bite, inject 10 minims *eau de luce* around wound, ligature on upper limb, and inject 10 minims above that ligature; burn wound with hot iron or cut bite out and suck wound (unless your lips or gums have been cut or inflamed). Keep patient walking. Half tumbler spirits. In half an hour remove ligatures, inject again.

SNOW-BLINDNESS.—See Eyes.

SORE THROAT.—A man may feel ill with simple sore throat. When a catching disease is about, it may mean the beginning of it (see Infectious Diseases), especially if with fever. Frequent sore throats mean man is run down.

*Treatment.*—Clear bowels. Calomel best. Gargle with carbolic solution, 1 in 400, every few hours, or with alum, 1 teaspoonful to pint of water, or permanganate solution, weak claret colour. If feverish, lie up a day.

*Diphtheria.*—Most serious sore throat is diphtheria.

*Symptoms.*—Fever, maybe high; throat red and tonsils swollen, with greyish yellow patches on them (on each side at back of mouth). Patient cannot swallow solids. He gets very ill and restless, perhaps delirious or unconscious. Breathing difficult. He may suffocate

or die suddenly from heart failure. Disease is difficult to tell, but if such symptoms come on in several folk together, keep them isolated. Treat case as Infectious Diseases and throat as above. *Make him* swallow milk and beef-tea. He won't want to. If pulse very feeble and fast, give spirits (and strychnine and iron tabloids every 6 hours). After recovery heart is always weak, and there is danger of palsy of muscles. Do no work for a month, and take strychnine and iron tablet 3 times a day for 3 weeks. Then start work gently. Get medical help if possible during illness. If patient is dying of suffocation, only chance is to open windpipe with sharp knife, in middle line of neck in front, below "Adam's apple"; put in large quill or other tube, and wipe out windpipe with a feather.

After patient apparently well, should he develop symptoms such as talking or vomiting through nose, 'ware danger of palsy and heart failure; put him to bed, keep him quiet, give strychnine and iron tablet. (J. B. R.)

**SPLINTS.**—Are applied round a broken limb. Make of any unyielding substance, such as wood, bark, bundles of twigs, wire, rifles, bayonets, swords, etc. They should be padded with some soft material. They are bound to the limb with bandages, tapes, etc. Cases of suspected fracture should not be moved without first applying a splint. (Army Council.)

Try long withes or twigs lashed abreast with string into a narrow mat. Should be well padded, especially at ends, and should fix joints above and below injury, as well as keep broken bones in place. Anything soft can be used for padding—leaves, hay, etc.—that is dry and clean. If much swelling occurs, loosen the bandages. (See also last note of Fractures.)

**SPRAINS.**—If seen at once, cold applications are usually best, but if there is much swelling hot fomentations may give most relief. The part should be kept at rest, and a sling or splint may be very useful. (Army Council.)

Apply cold water rags frequently renewed for first day, or spirit lotion, then warm applications for three or four days. Begin gently with rubbing, towards the heart only, gradually increasing use of limb. In using spirit lotion do not cover with waterproof, but with one thickness linen bandage, which keep wet constantly with spirit 1, water 5.

**STIMULANTS.**—Strychnine and iron tablets, or Easton's syrup, spirits, coffee, tea, pepper, mustard, coca leaves.

**STINGS.**—If severe, see Snake Bite.

**STRETCHER.**—Turn sleeves of two coats or shirts inside out, pass two poles through sleeves, and button coats over poles. Or two sacks, with holes made for poles at bottom corners, keeping bottoms of sacks at ends of stretcher. For distances, two poles, with cross bars, lowered over patient. Take up edges of his blanket, and hook them to the poles. Bearers walk out of step.

**STRICTURE.**—See Venereal.

**STUNNING.**—Heavy blow, shaking the brain. Severe—see Shock, but vomiting usually before recovery. Very severe—complete insensibility.

*Treatment.*—Bed. Fluid diet. No alcohol. Cold to head. Absolute quiet and rest. (See Fractured Skull.)

**SUFFOCATION.**—Fresh air. Loosen clothes round chest and neck. If suspicious of anything swallowed, examine mouth and throat, and if anything found that cannot be got out with the fingers, turn patient upside

down, and shake it out. Dash cold water on face and chest, and proceed as for drowning. (Surgical Notes below.)

**SUNSTROKE** (see "Loss of Consciousness").

*Prevention.*—Legion scarf of lightest China silk worn loose round neck, point low on back. Best colours: yellow, orange, brown. Or yellow or orange stripe three inches wide down inside shirt or coat, over spine. Or extra thickness of clothing down spine. Solar topee or stetson hat. Latter best if properly worn. It needs a bootlace passing round front outside under head, through eyelets above ears, and tied hard round base of skull, to loosen fit behind head, and let air flow freely over head. Don't remove hat in shade of trees. Wear cold leaves in hat if troubled by heat.

**SYPHILIS.** See Venereal.

**TEA.**—Good thirst-quencher and reviver after fatigue. Tea and coffee most valuable preventive of disease, because the boiling of impure water makes it safer to drink.

**TICKS AND JIGGERS.** *Prevention.*—Use strong coal-tar or carbolic soap when bathing, and protect feet with one part carbolic to 20 oil. Examine daily, especially under nails.

**LEECHES.**—Search body and clothing daily, dislodge with salt water.

**TICK FEVER, African.**—A disease of tropical Africa, is transmitted by a tick which is flat and brown in appearance, with a corrugated surface. These ticks frequent especially rest-houses, native huts, "camping trees," etc., along caravan routes, hence these situations must be avoided. *As a general rule, avoid native villages for camping, for there, unless well protected,*

you very likely will contract malaria, tick fever, or even sleeping sickness (in Africa). (Dr. Stephens.)

**TESTICLE**, Injury or Inflammation.—Rest in bed, open bowels freely, raise the part on a pillow between thighs. Hot fomentations. If much pain, chlorodyne. If unable to rest, sling up the part with handkerchief and keep raised for several weeks. If inflamed, from clap, see Venereal.

**TOBACCO**.—Make "tea" for emetic. Don't apply it to wounds. Nicotine from pipe will remove tick and jigger heads lodged in skin.

**TOOTHACHE**.—Drop whisky in hollow tooth. If sleepless, tie pepper in small linen bag, dip bag in spirits, and put in ear of same side. Heat will often "draw" pain from tooth. (J. B. R.)

**TYPHUS FEVER** (Camp or Jail Fever).—See Infectious Diseases.

**ULCERS**.—See Gunpowder.

**UNCONSCIOUSNESS**.—To carry unconscious man, lay him on his face, kneel down, facing across him; raise his head and chest on to your back, pass your left arm through his fork, and hoist him across your shoulder. Right hand remains free for your weapon.

On horse. Lay man flat on his face, make a rope fast round his body below armpits, stretch the arms in front of him as in diving, and with loose end of headrope tie hands together, leaving rope end free. Second rope fast round waist, then round ankles, with end free. Throw stirrups across saddle. Lift man across, face down, head on off-side. Rope from wrists passes under belly up to off-stirrup as it hangs on near side, and make fast. Rope from ankles passes under belly, and make fast to the near stirrup hanging on off-side.

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A sling, made of three belts buckled together to form a large loop. This is turned on itself to form a figure of eight. Each bearer places a loop over his head, and the sling crosses and hangs down between them. Kneeling down behind the patient, they place their hands on each other's shoulders, so forming a chair back. The patient being seated, they rise together. (Dr. Ettles.)

**VARICOSE VEINS.**—Veins of legs when enlarged and twisty; cause pain when walking. They may cause ulcers.

*Treatment.*—Bandage like a puttee, and dust on boracic acid powder. Should the veins burst, lie flat on your back with the leg in the air, and get some one to put a pad over the place, pressing above and below where the bleeding comes from. Bandage firmly. If there is eczema (red skin and irritation), do not rub the place, or you may burst the veins. If ulcers, bathe daily with carbolic (1 in 60) and keep covered.

**VELDT SORES.**—Rub with dry permanganate and keep from sun. (See Gunpowder.)

Long-recurring experiences of these show these best dealt with by cyanide lint dressings and daily Epsom salt doses until they disappear. (A. P., Rhodesia)

**VENEREAL.** *Clap.* (*Gonorrhœa.*) *Symptoms.*—Yellow discharge. Scalding on passing water.

*Treatment.*—AVOID ALCOHOL. Purge freely. After four days inject Candy's (weak claret colour) thrice daily, letting it run well in, and passing it out with urine. If testicles swollen and painful, hot fomentations; support with bandage and lie up.

Avoid intercourse. The statement that it cures clap is a lie.



*Pox. (Syphilis.) Symptoms.*—Sore on private parts a fortnight after unclean connection. Within two months "secondaries." Slight fever. General "seediness," and red rash over body, and sore throat are chief symptoms. Later (perhaps years after) ulcers and other "tertiaries" develop, which may be very serious. Therefore thorough and long treatment with mercury is important. See a doctor. A man with syphilis untreated is a misery to himself and a danger to his fellows.

It is criminal for a man with pox to have intercourse. He must not let any one use his pipe or his food and drink vessels without first boiling while throat or mouth is sore.

*Stricture.*—Cause—old clap.

*Symptoms.*—Cannot pass water. Pain.

*Treatment.*—AVOID ALCOHOL. It is the worst poison to a man with a stricture. Purge freely. Sit in hot water. Then hot fomentations (which see) to lower belly. If no better, trek for doctor. (J. B. R.)

**WATER.**—Cloths wrung out in hot water applied to the part, relieve inflammation and pain in the stomach. Cover the cloths well to keep the heat in.

*Clean* hot water cleanses wounds, and relieves old sprains and bruises.

Cold water relieves sprains and bruises when applied early, and changed often.

*Drinking Water.*—All water that cannot be guaranteed as above suspicion must be boiled or efficiently filtered. It is safest always to boil the water: this kills the bacilli, but water is less palatable. Weak tea (made with boiling water and drunk cold) is wholesome and safe.

All filters are to be regarded with suspicion; but with

care and proper cleaning the Berkefeld and Pasteur filters are believed to be efficient. (Dr. Tooth.)

WILLOW. — Boil down leaves. Wineglassful or two for rheumatism or rheumatic fever three times daily, every four hours if bad. (See Salicylic and Medicines.)

WIND STROKE. — Paralysis of one side of face from sleeping in a draught.

*Treatment.* — Hot fomentations.

WORMS. *Prevention.* — Sterilized water, well cooked food. Where guinea worm or other skin worms prevalent, use carbolic soap; dry thoroughly, and apply carbolic oil.

*Treatment.* — Tapeworm: 5-drachm doses of kouso.

*Treatment.* — Guinea worm, 10 to 15 gr. assafoetida three times daily.

WOUNDS. — Clean thoroughly, soap and boiled water, with new soft brush; if necessary apply antiseptic pad of dressing; keep covered from air. If throbbing, apply fomentations. If no throbbing, pain, or discharge, leave dressing a week. If any of above symptoms, frequent fomentations. Squeeze out pus or matter at each dressing. Treat fever (which see) if any. If slight bleeding, apply pressure on dressing. If serious bleeding, see Surgical Notes, "Bleeding." Where flying insects are abundant scent the dressed wound in wood smoke. If on a march winged insects trouble wound, use pepper.

*Simple Wounds.* — 1. Stop the bleeding.

2. Clean the wound with antiseptics, if possible.

3. Apply a dressing. (Army Council.)

XAXA. — See Medicines.

YELLOW FEVER. — This disease is caused by the bite of the "tiger" mosquito. It can easily be recognised by its legs being inarked silver-white, and by the

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silver lyre-shaped marking on the back. It is a most persistent biter, and very worrying in its attacks. Disease takes three or four days to develop.

*Prevention.* - There is not much danger in frequenting a town where yellow fever is epidemic between the hours of 9 a.m. and 3 p.m. After this time the mosquito (*Stegomyia*) begins to bite, and the danger is great. This mosquito breeds mainly in standing water, e.g. in tubs, cisterns, rain-barrels, etc., etc. These should either be emptied periodically, if possible, to kill the larvæ ("wrigglers") or covered with wire netting. It must be remembered that the mosquito of itself is harmless; it only transmits disease if it has bitten a yellow-fever patient some time previously. It is very important therefore that every yellow-fever patient, and in fact every one in a yellow-fever district, suffering from fever, chill, and headache, should be kept under a mosquito net, so that no *stegomyia* mosquito can get at him, and so eventually disseminate the disease. *The use of a mosquito net is of course imperative in a yellow-fever district.* It must be tucked under the mattress, and the limbs must be protected by having a piece of stout material (calico) fastened to the net, all round at the level of the limbs.

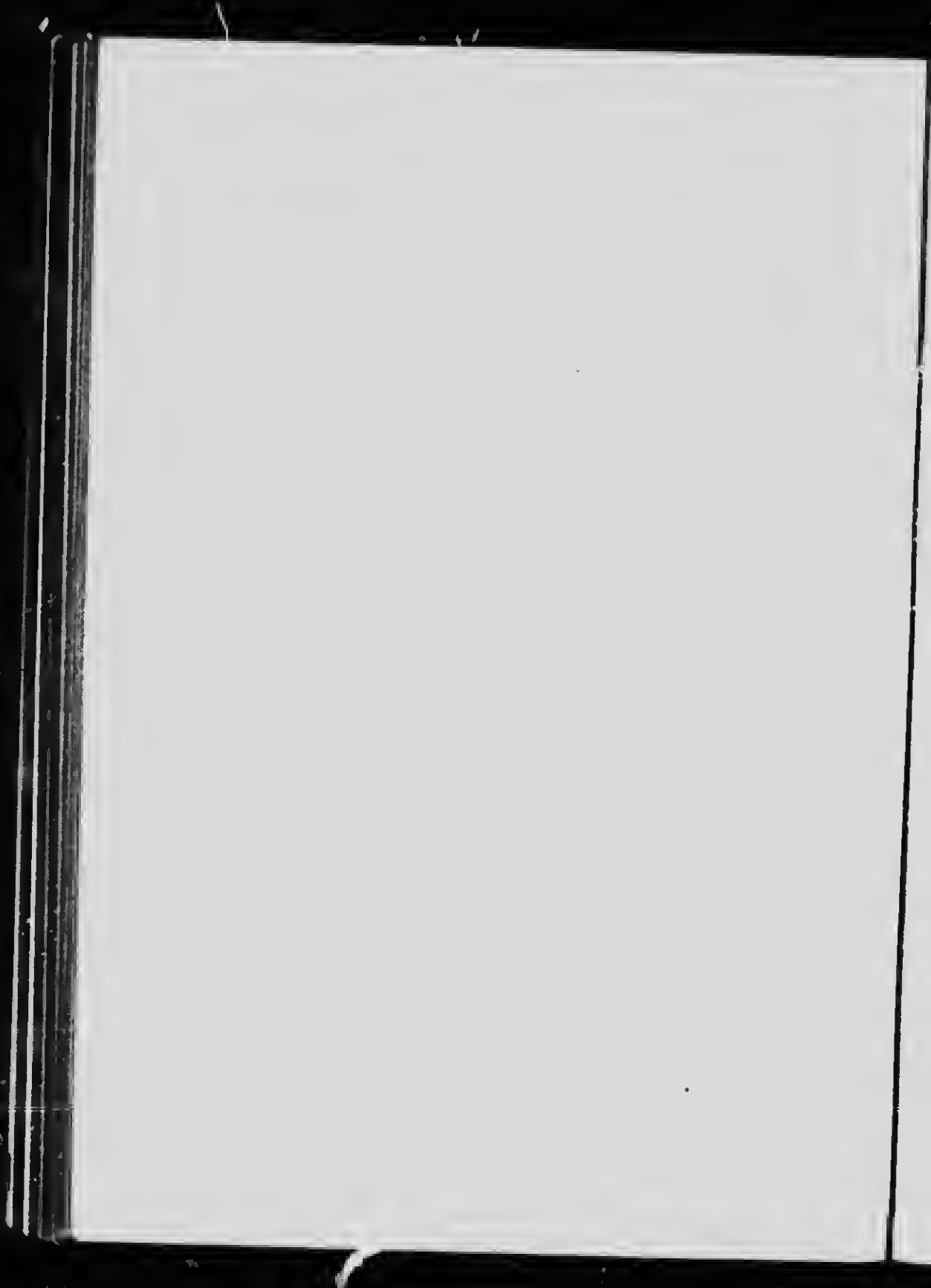
If a yellow-fever locality must be visited at night, then puttees, gloves, and veil are absolutely necessary. Otherwise, the practically certain result is Yellow Jack, and possibly death.

*Symptoms.*—Chills, high fever, slow pulse, jaundice. Vomiting sometimes black (*i.e.* blood) vomit.

*Treatment.*—A mild purge should be given, or a soap-and-water injection into the bowel by means of a syringe or small pump. The patient should be kept in bed, and

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blankets put on, and lemonade be given to promote sweating. All food is stopped for the first few days, and the patient given a mineral water with a teaspoonful of bicarbonate of soda to the pint to drink. This should not be omitted if possible. Baking powder is better than nothing. (Dr. Stephens.)



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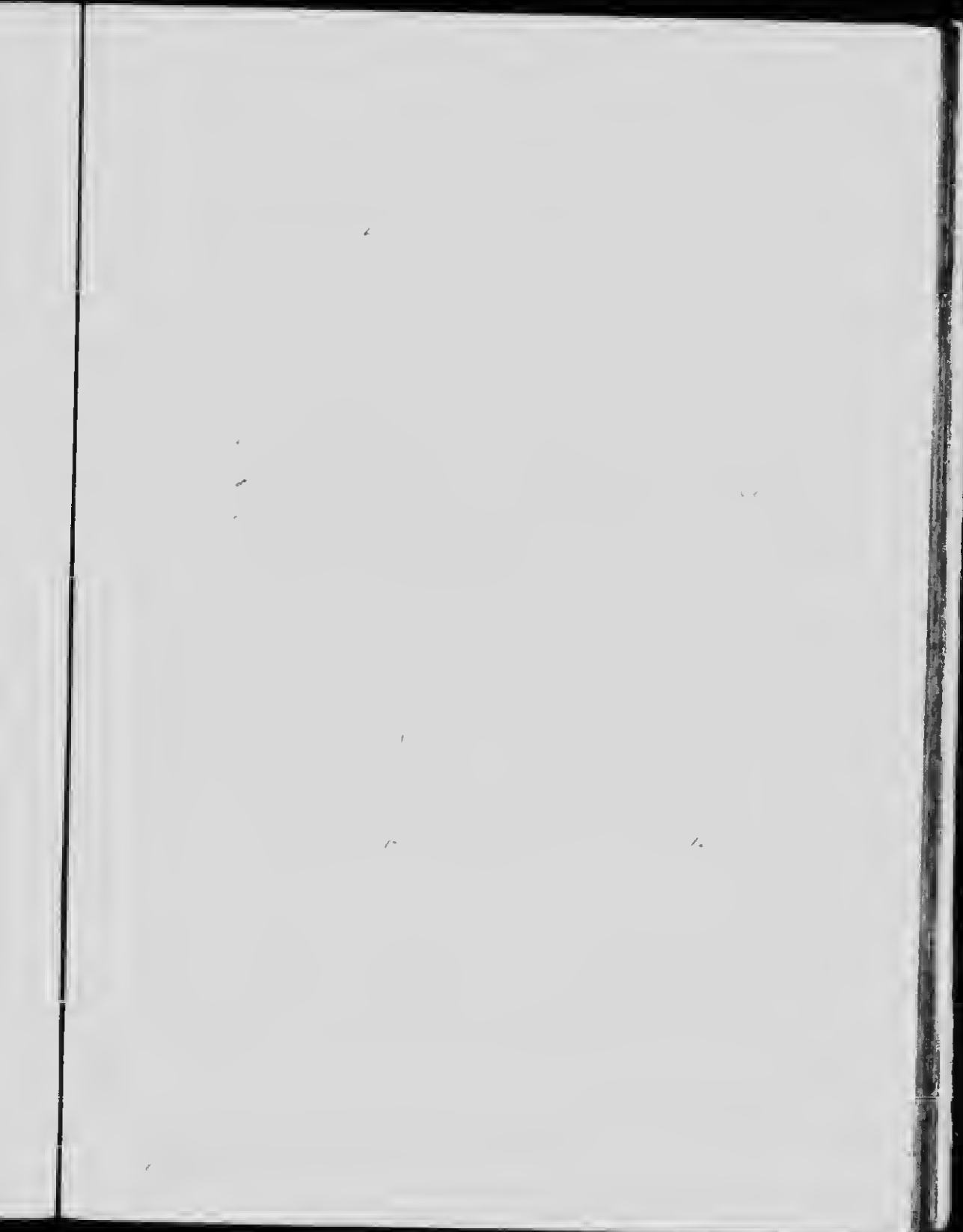
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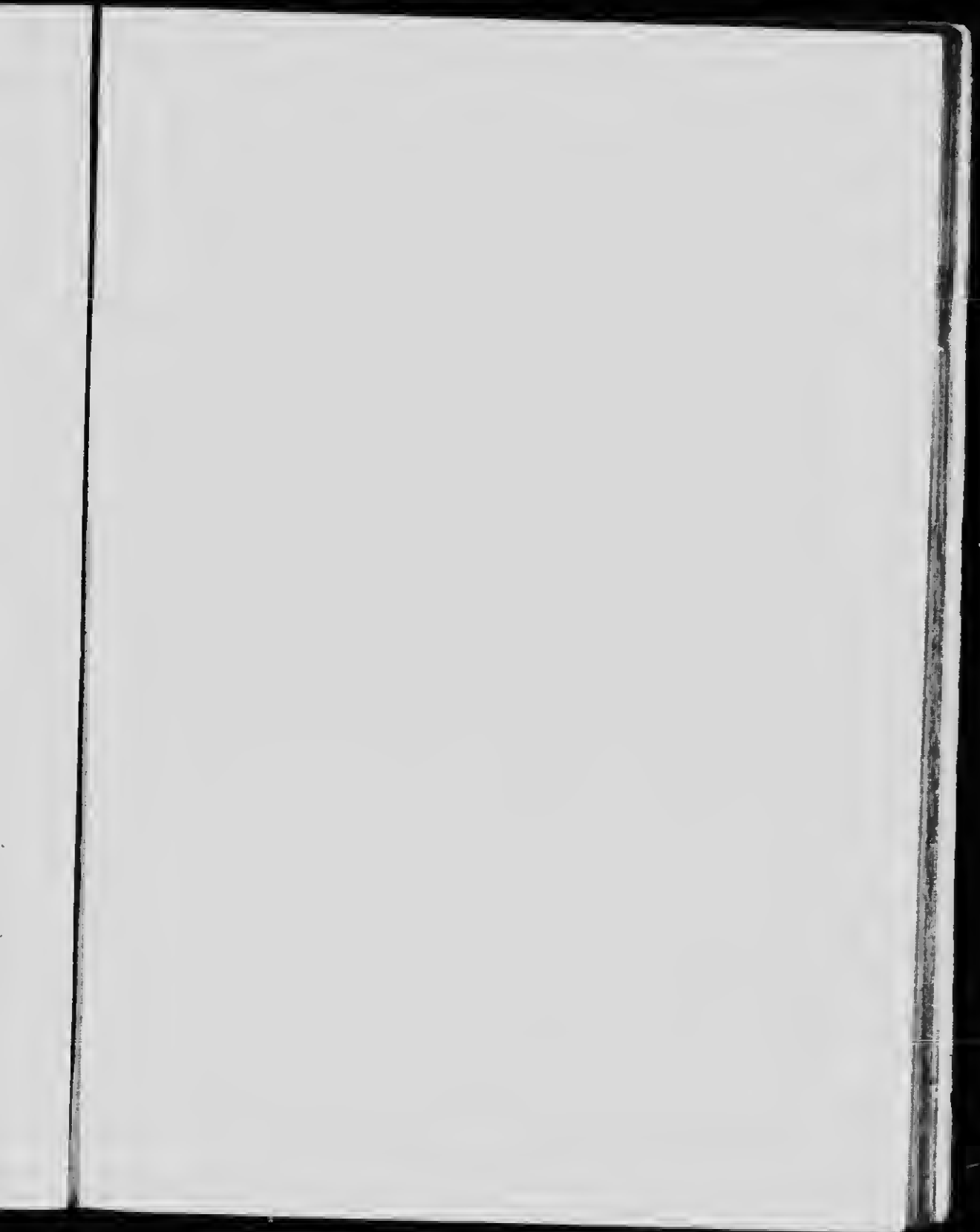
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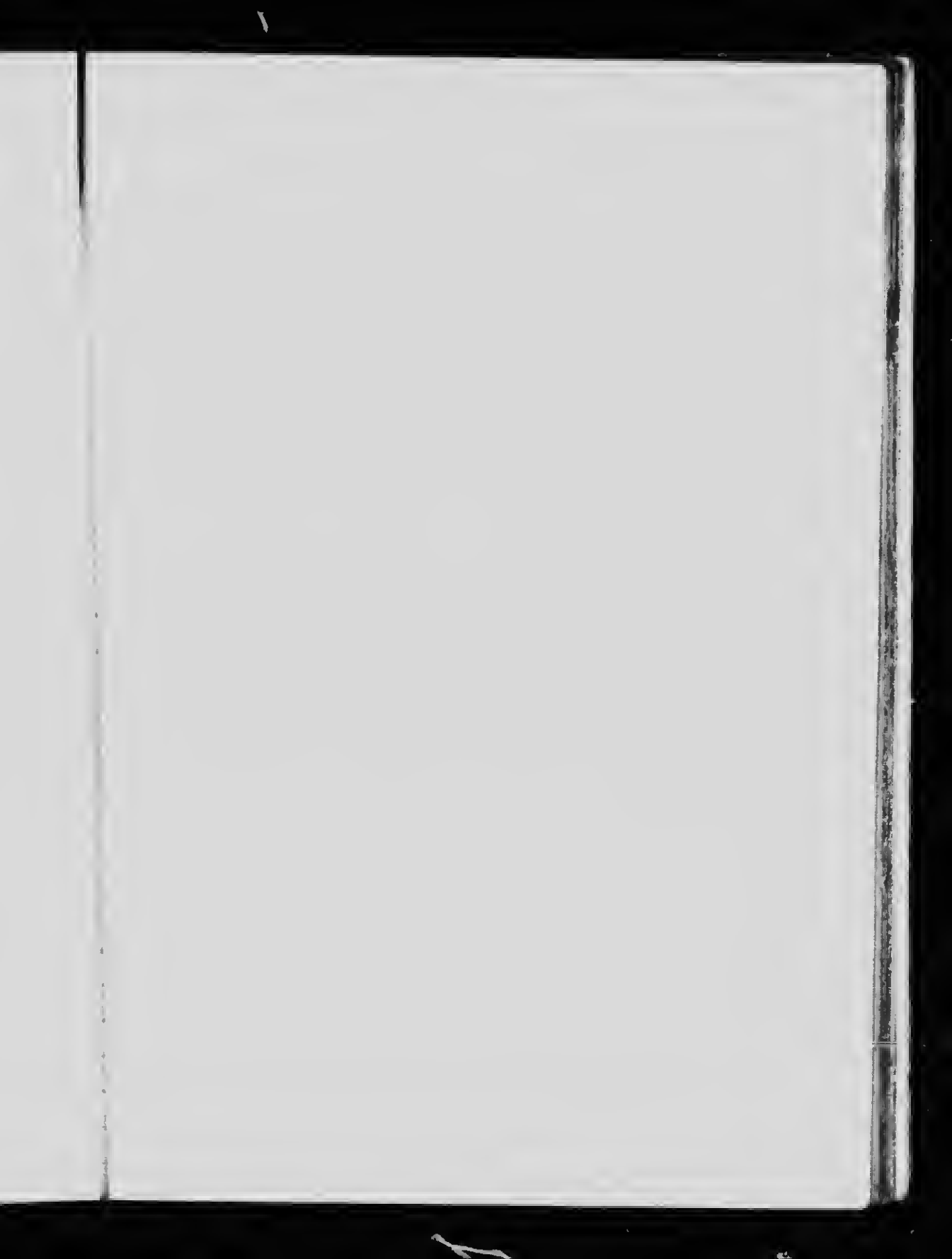
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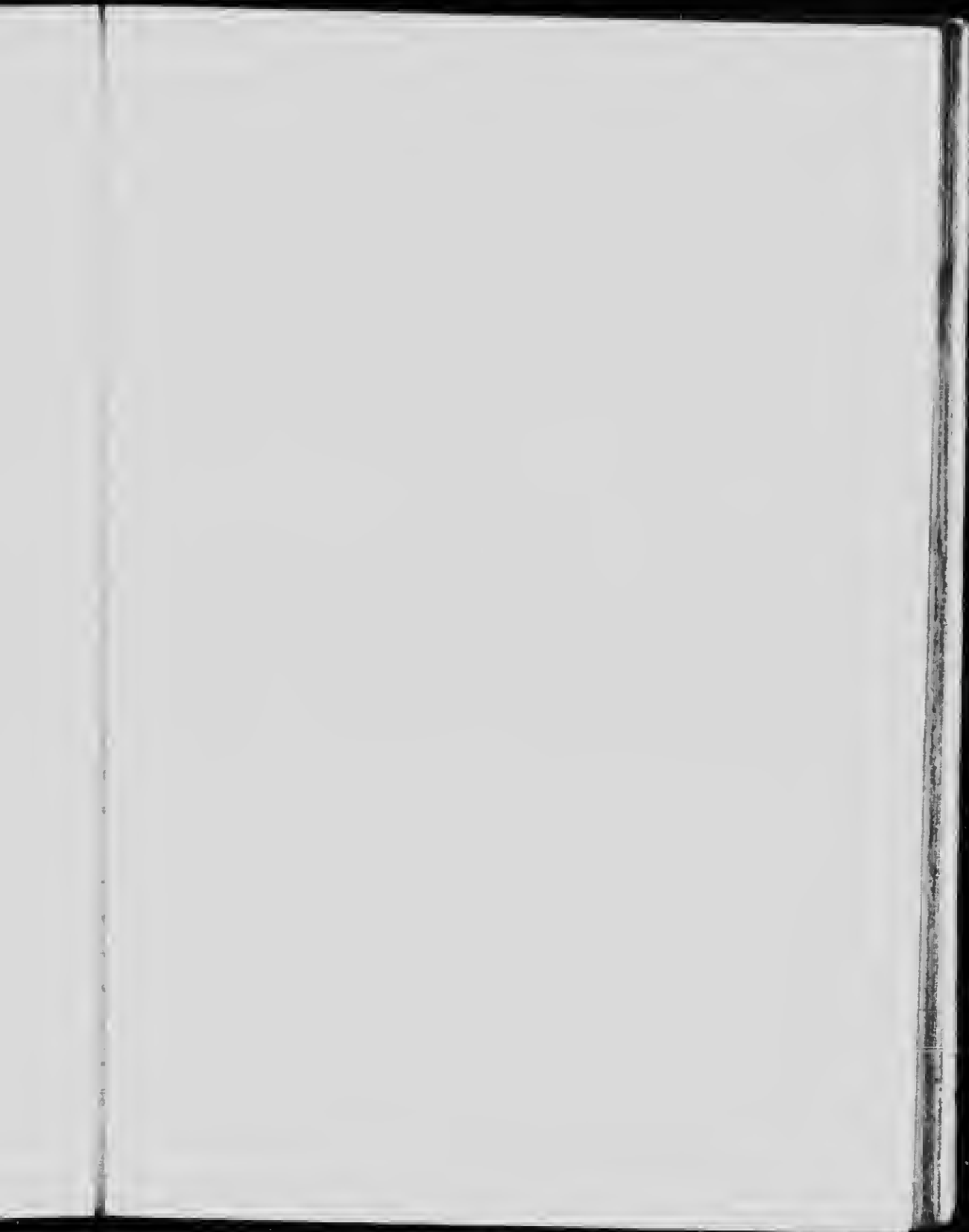






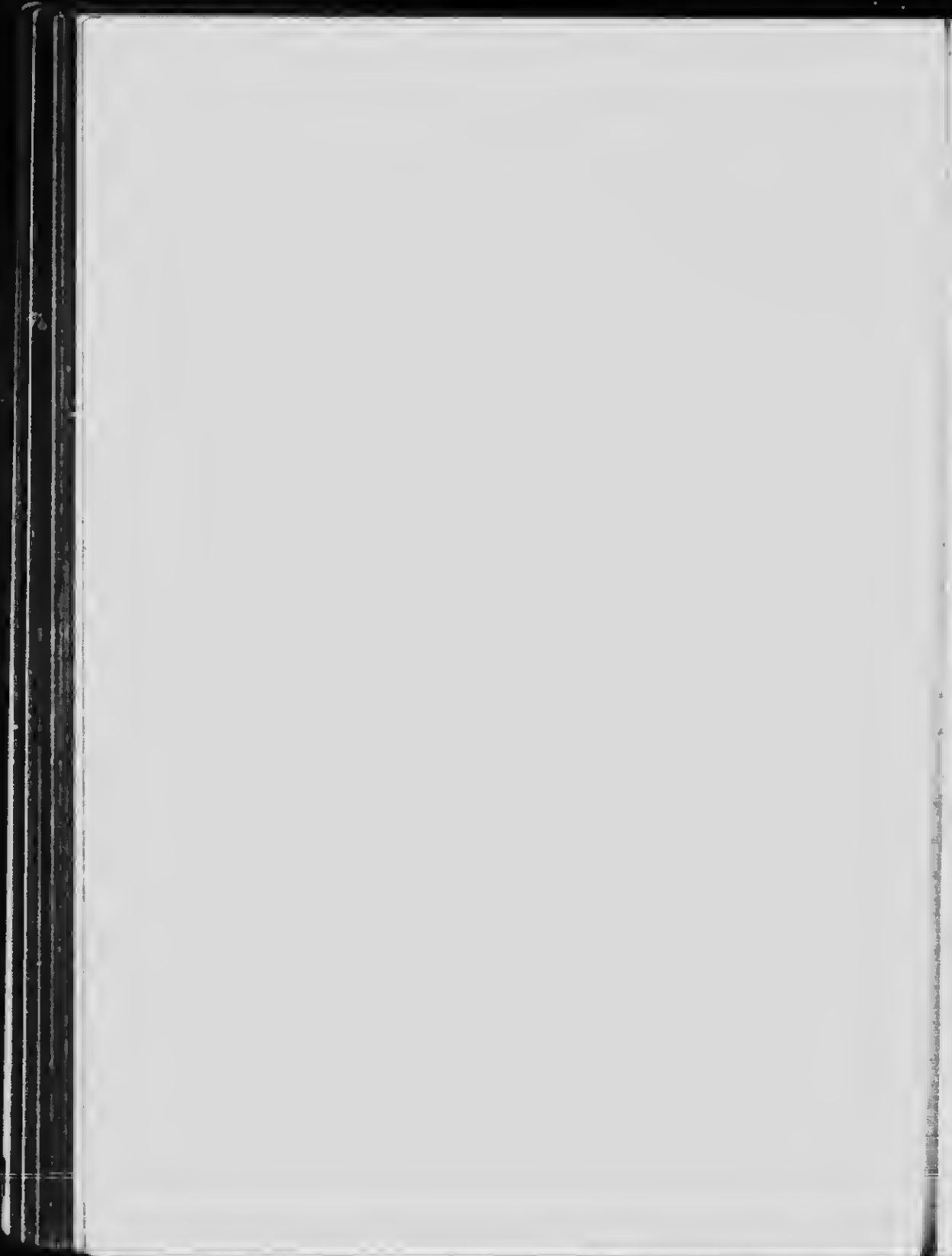


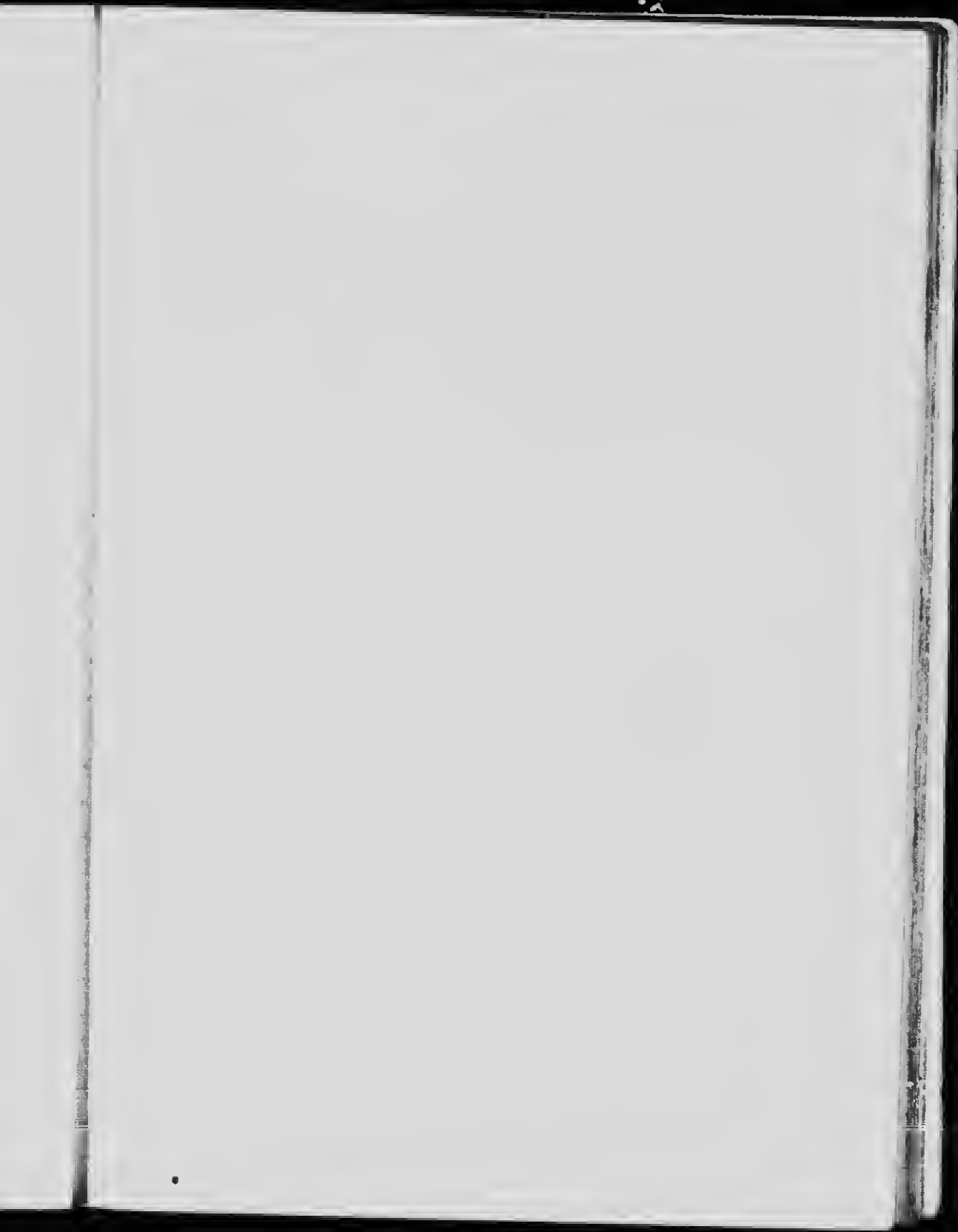




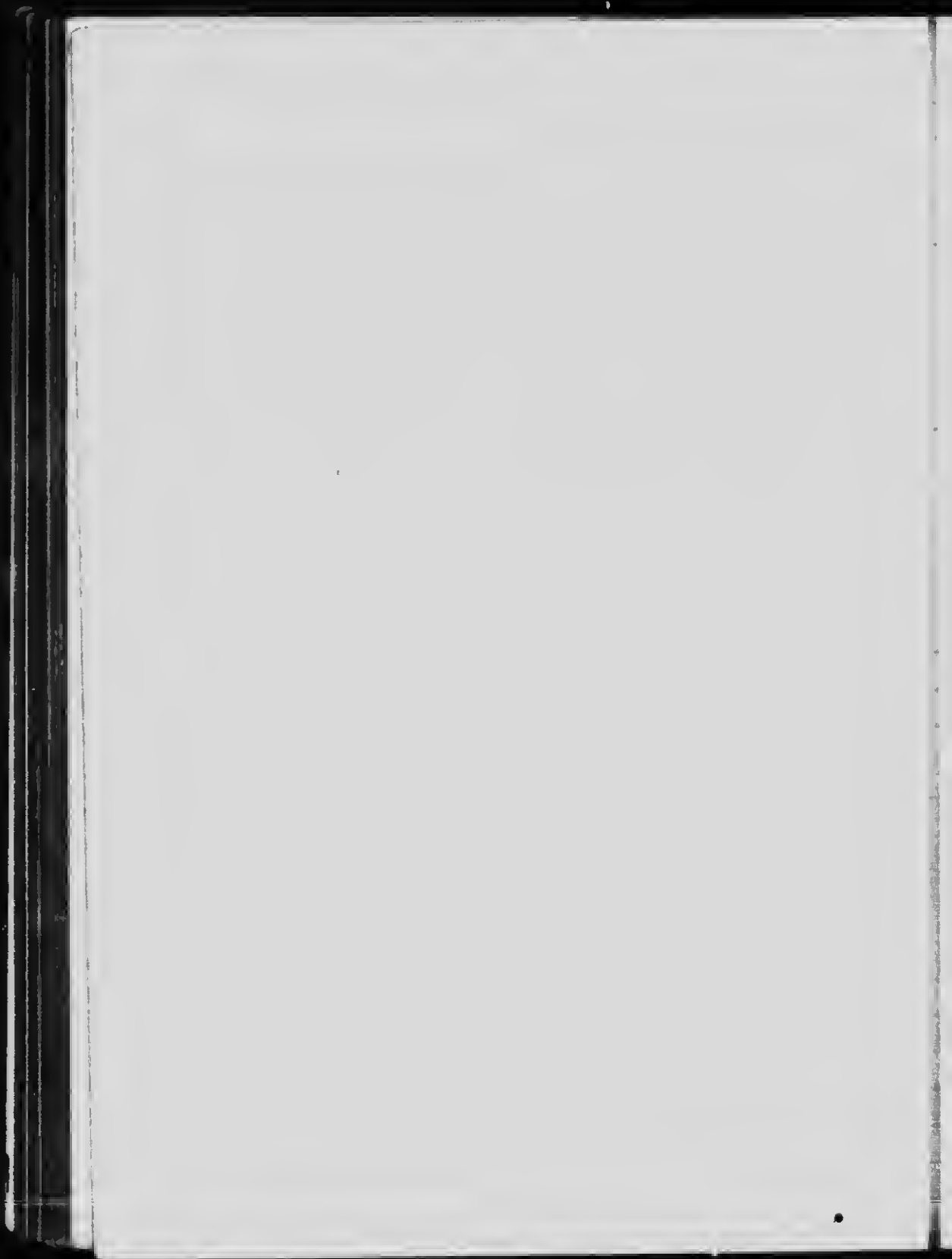


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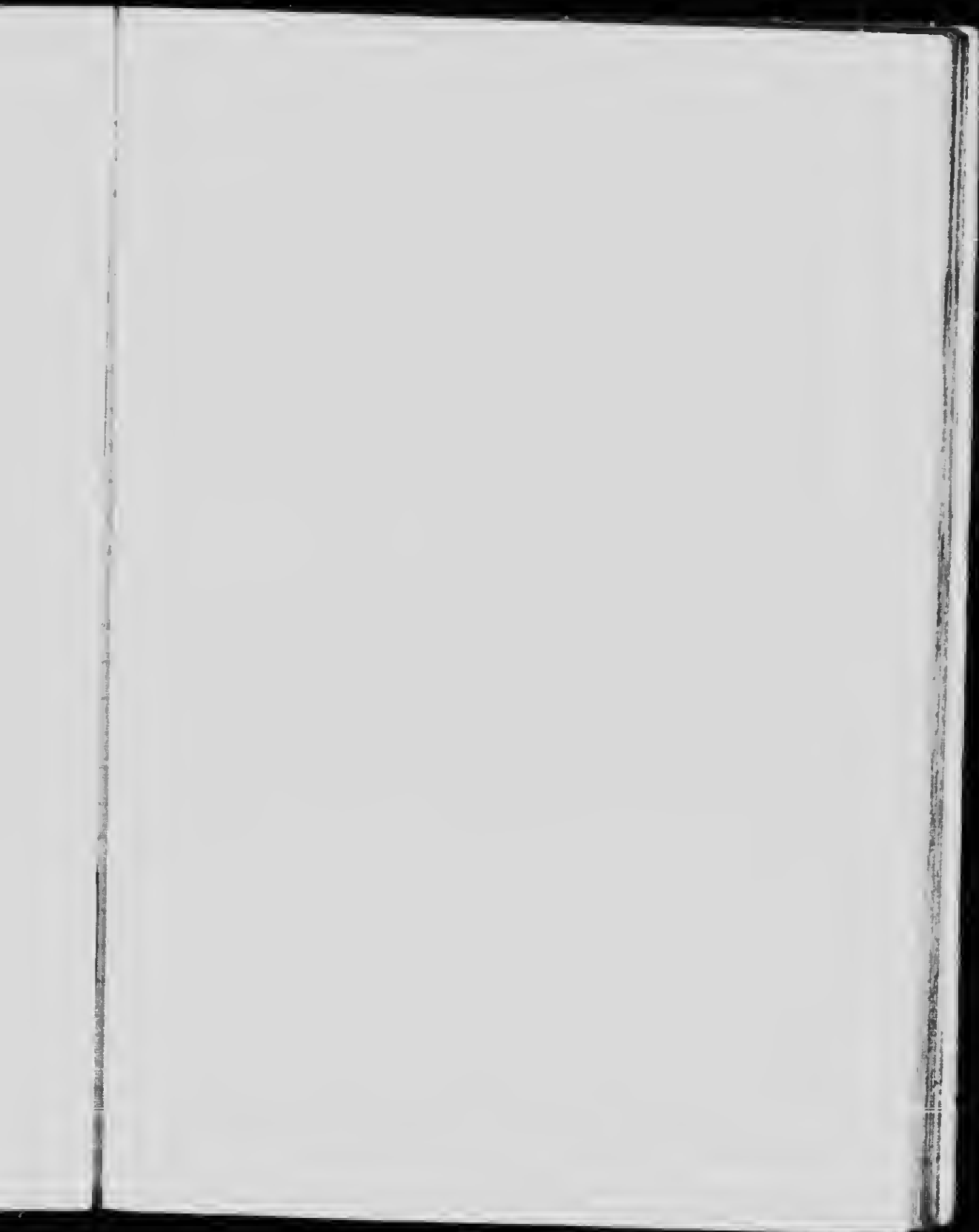




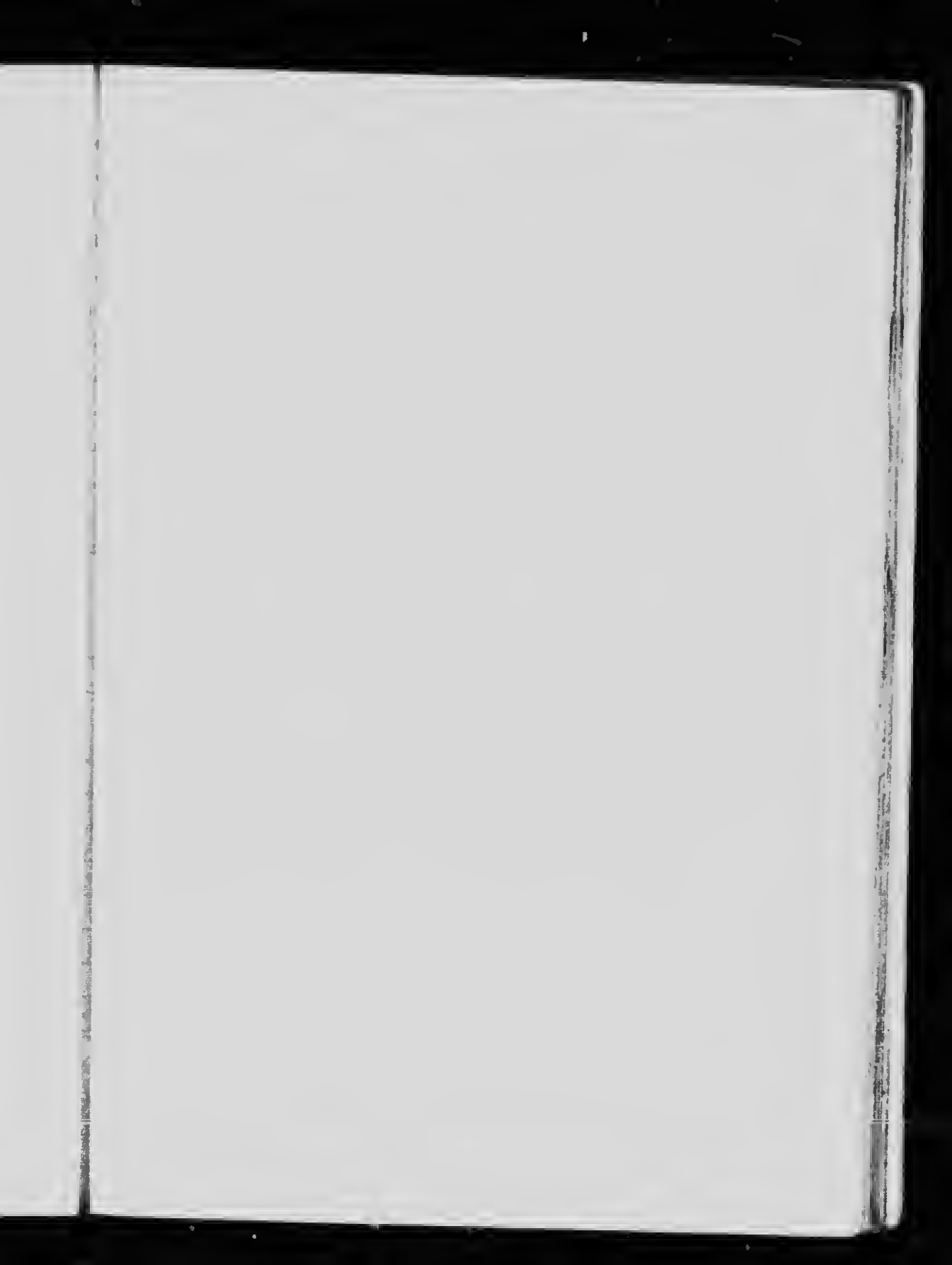




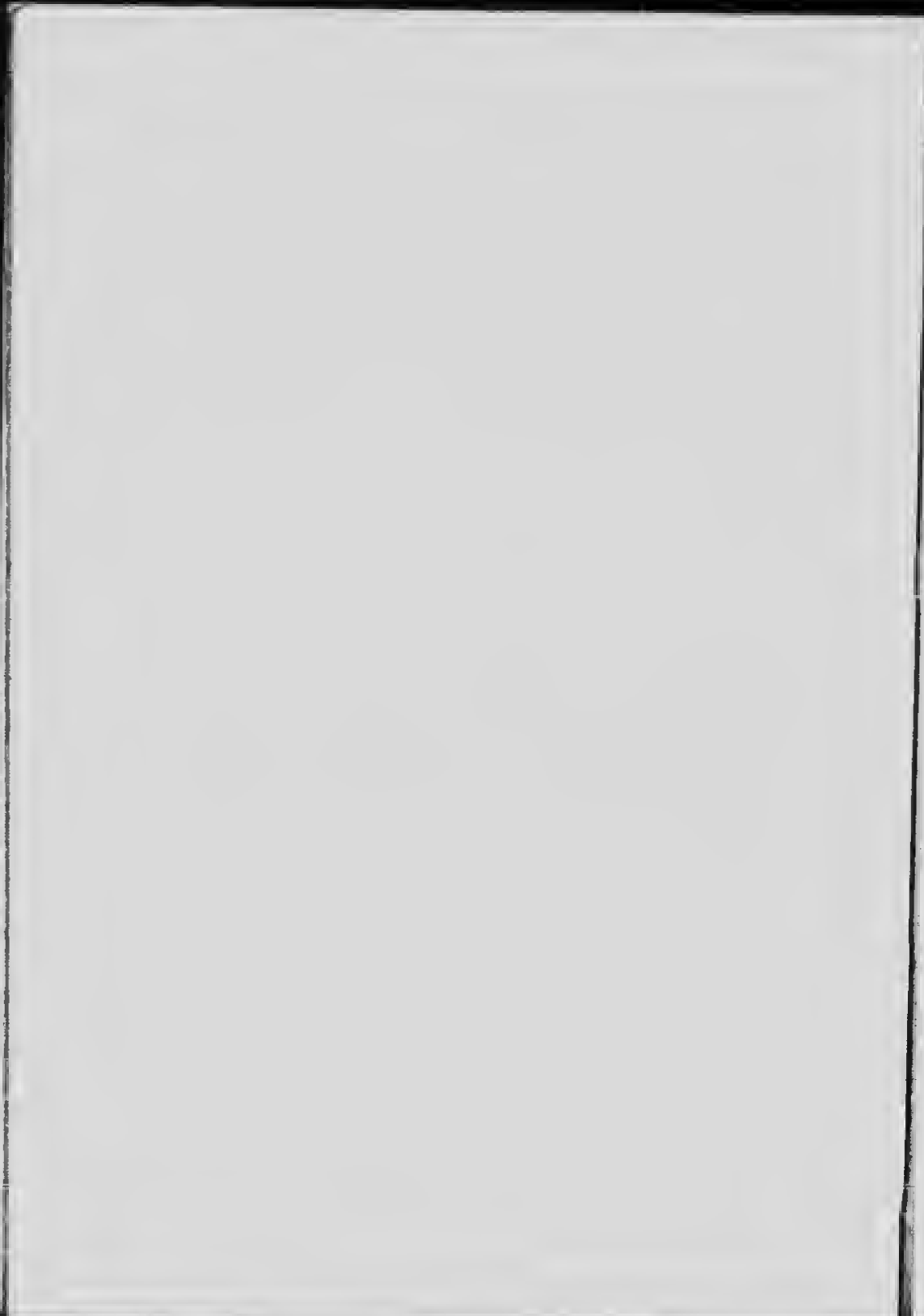


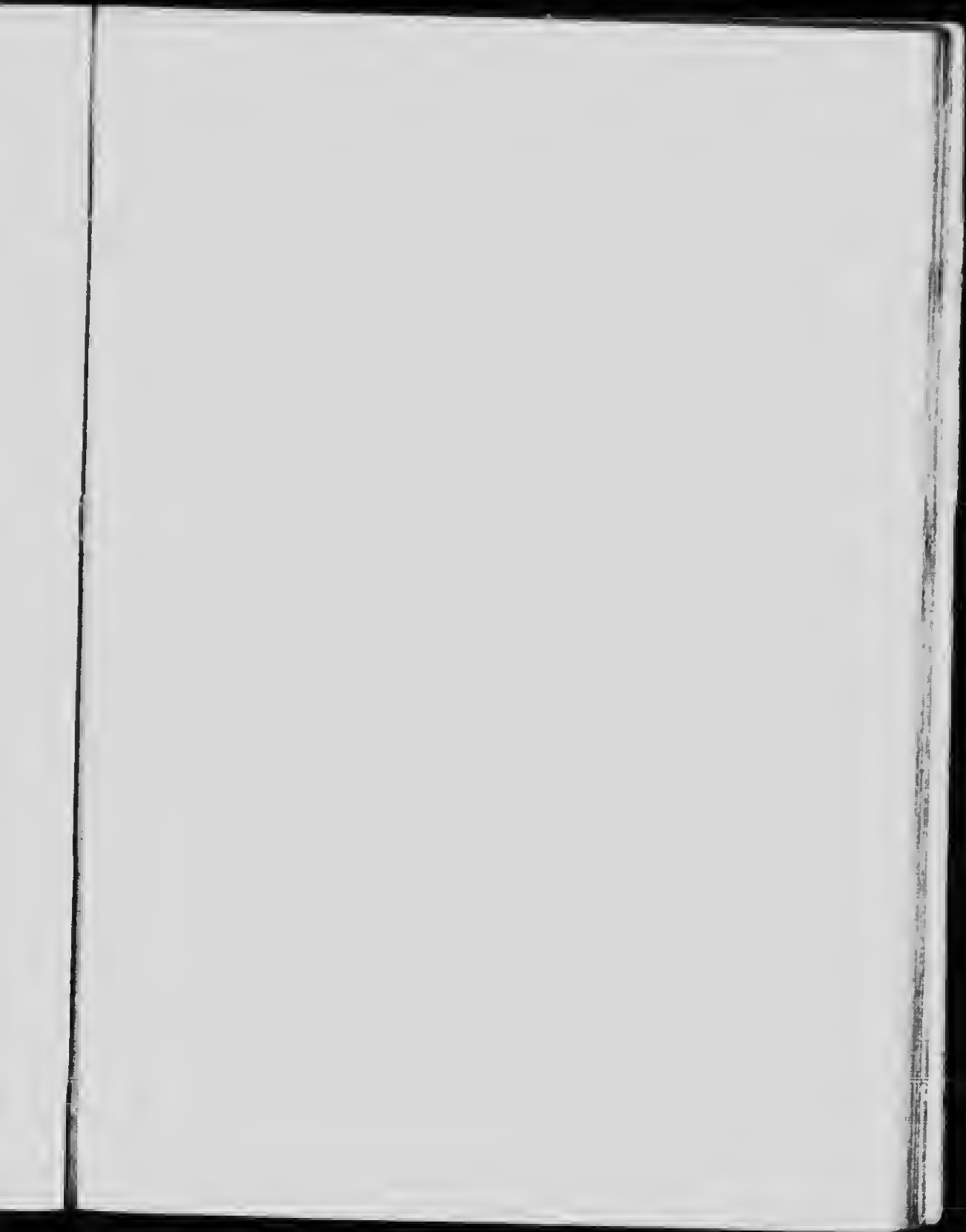


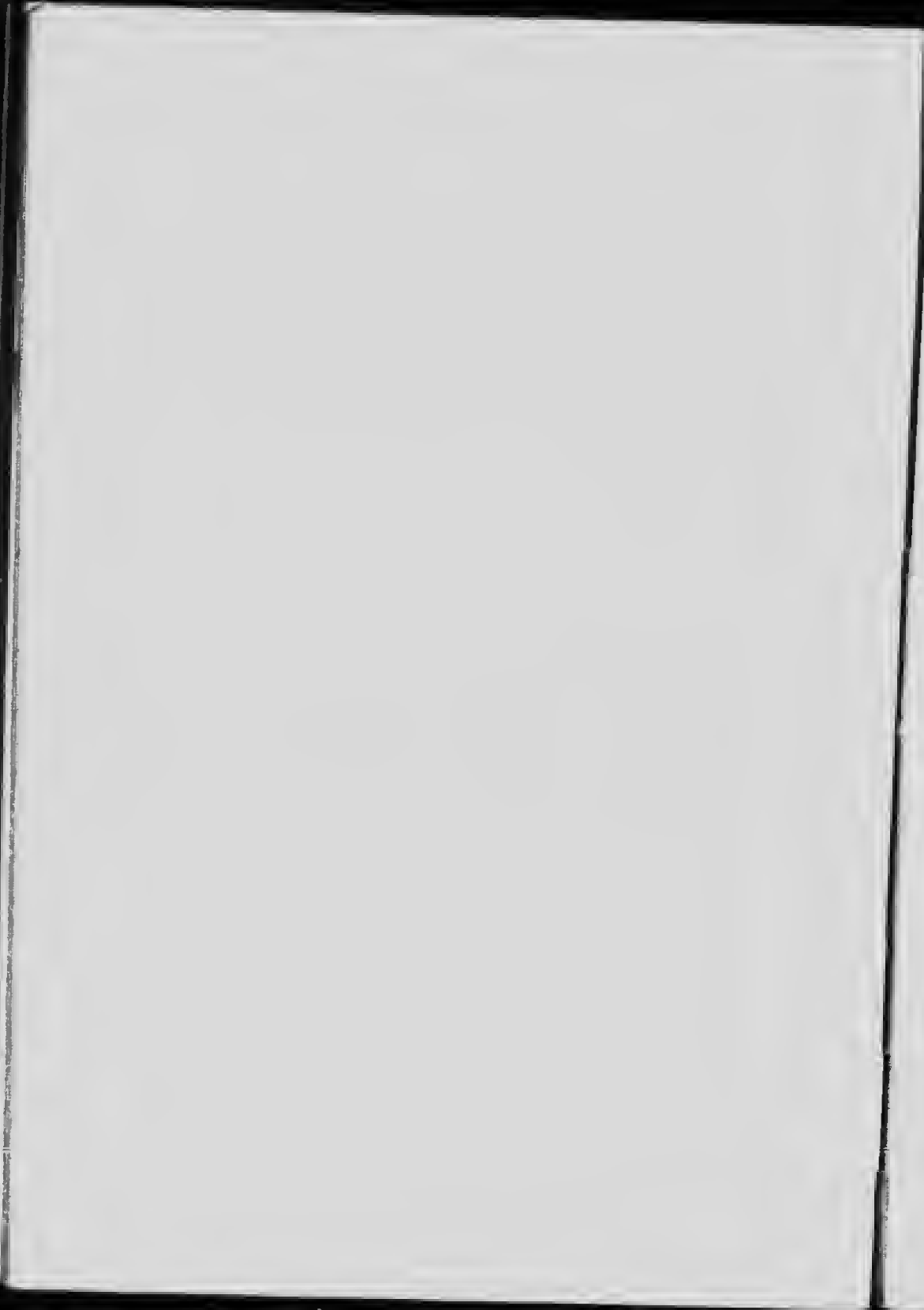


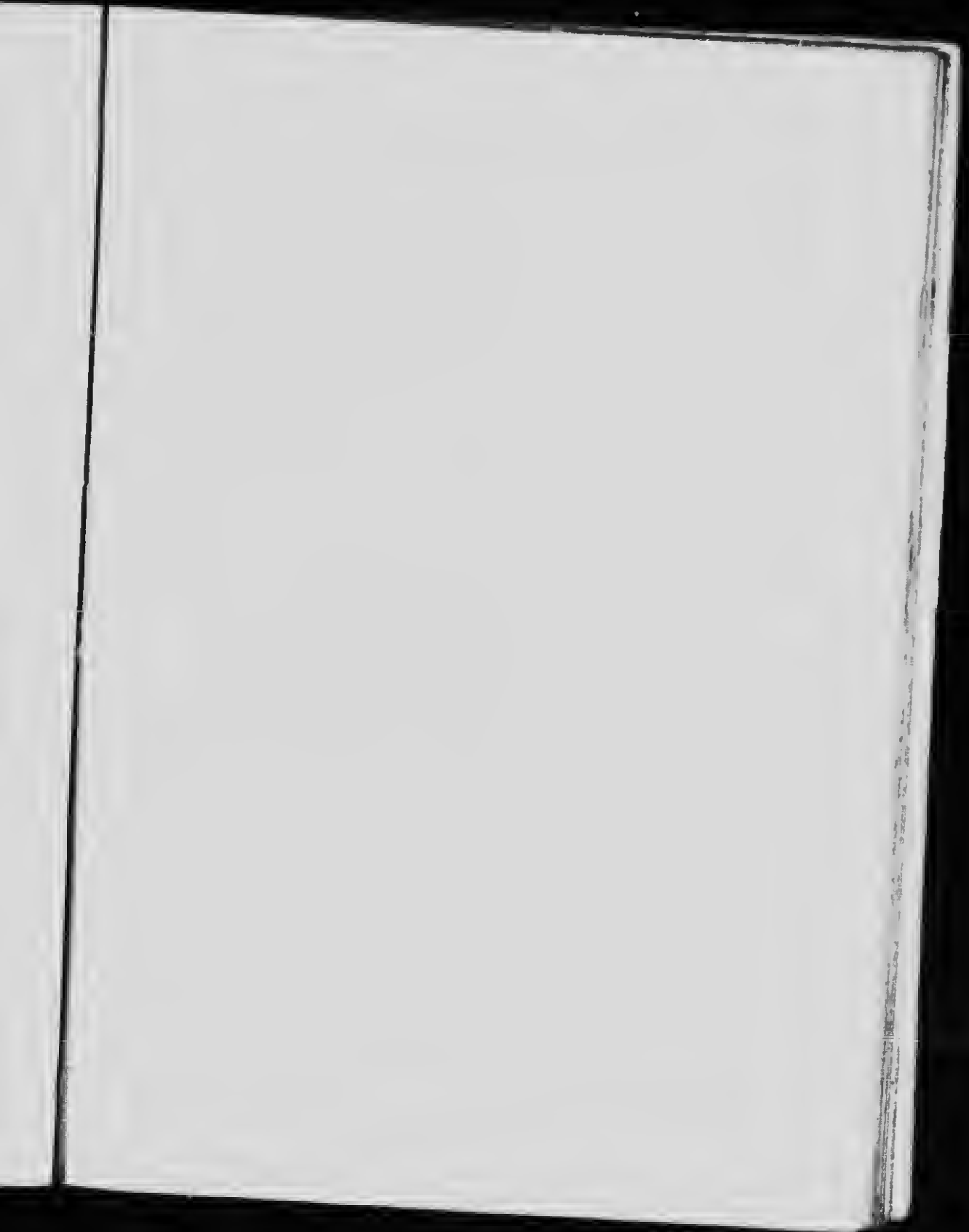




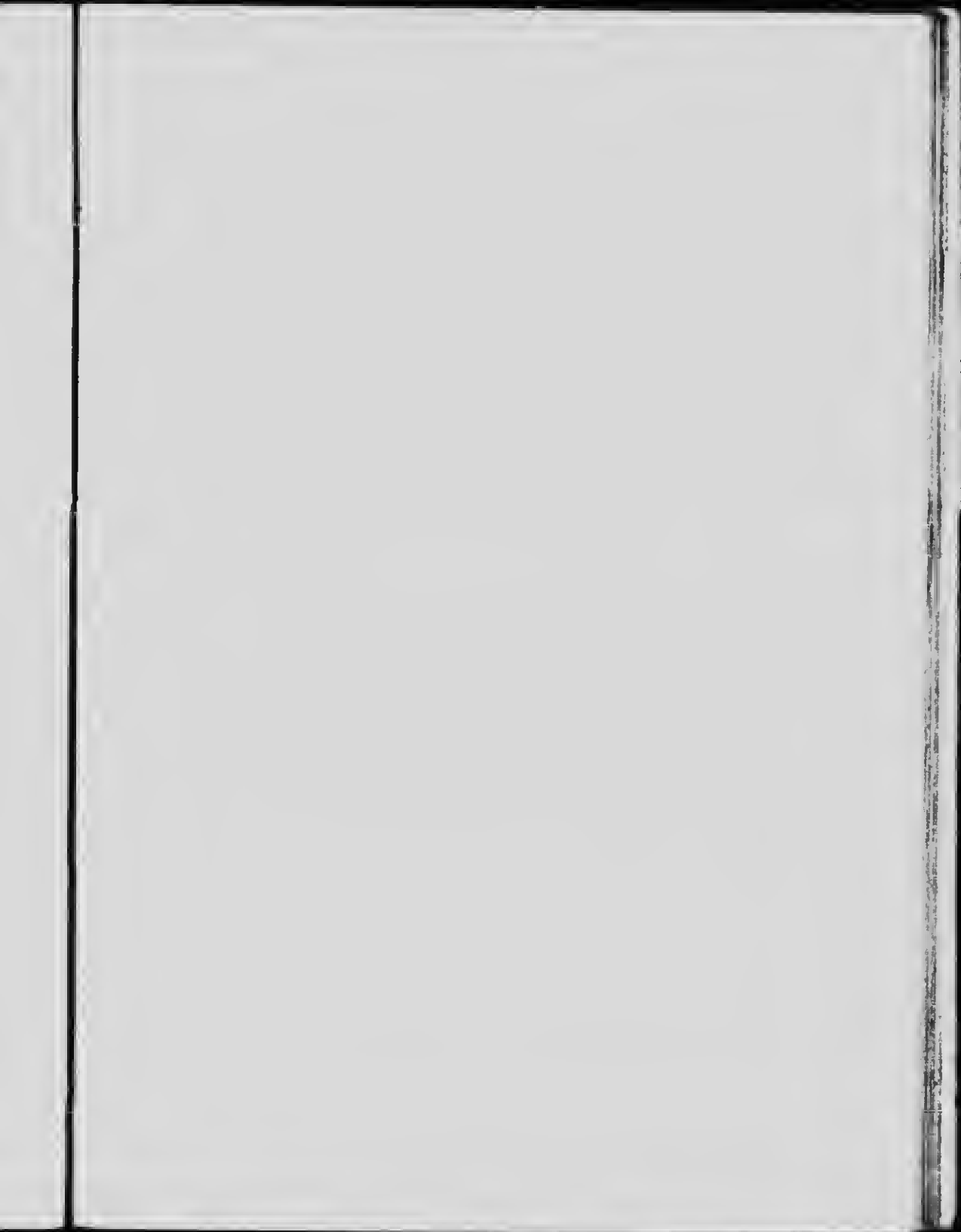




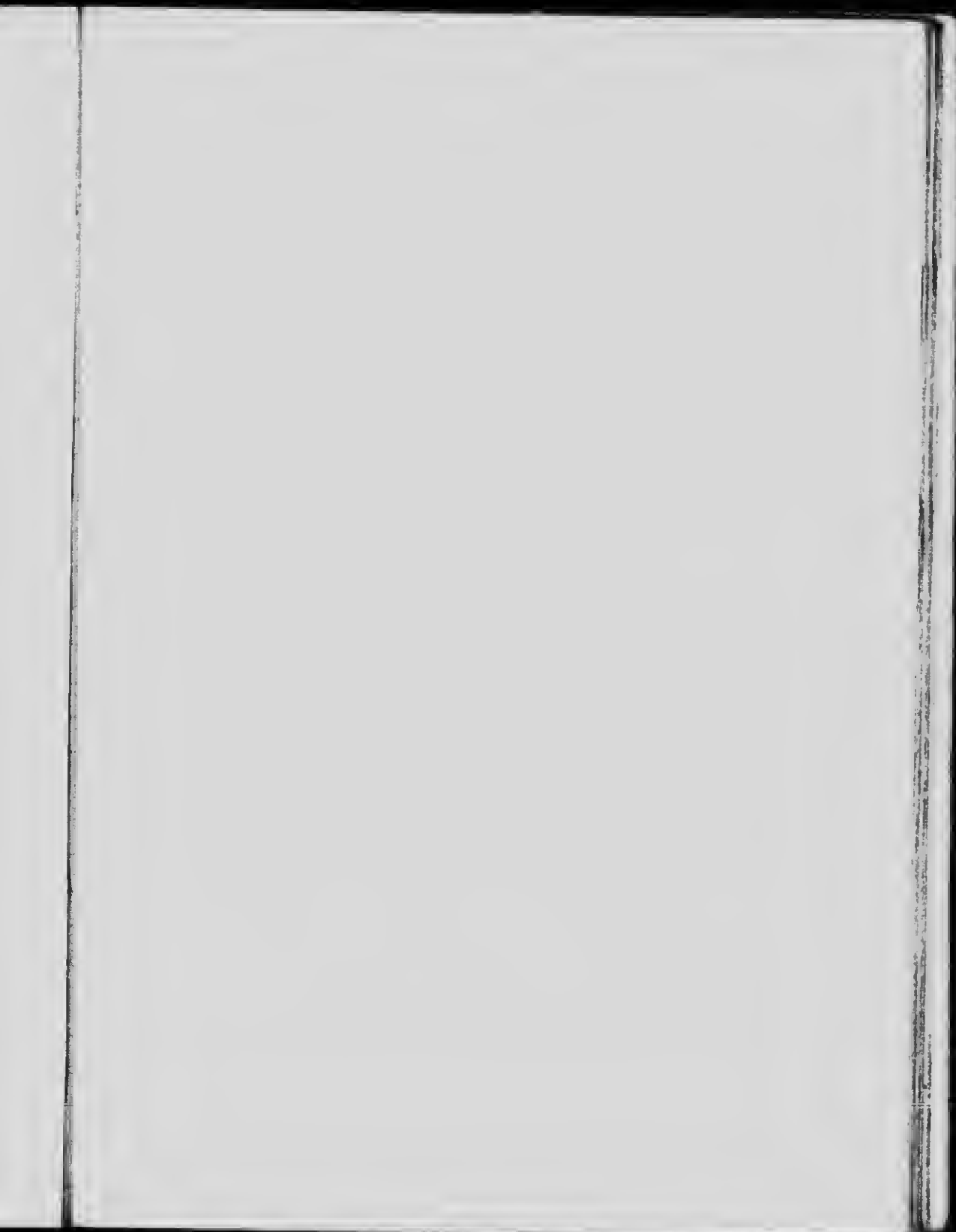




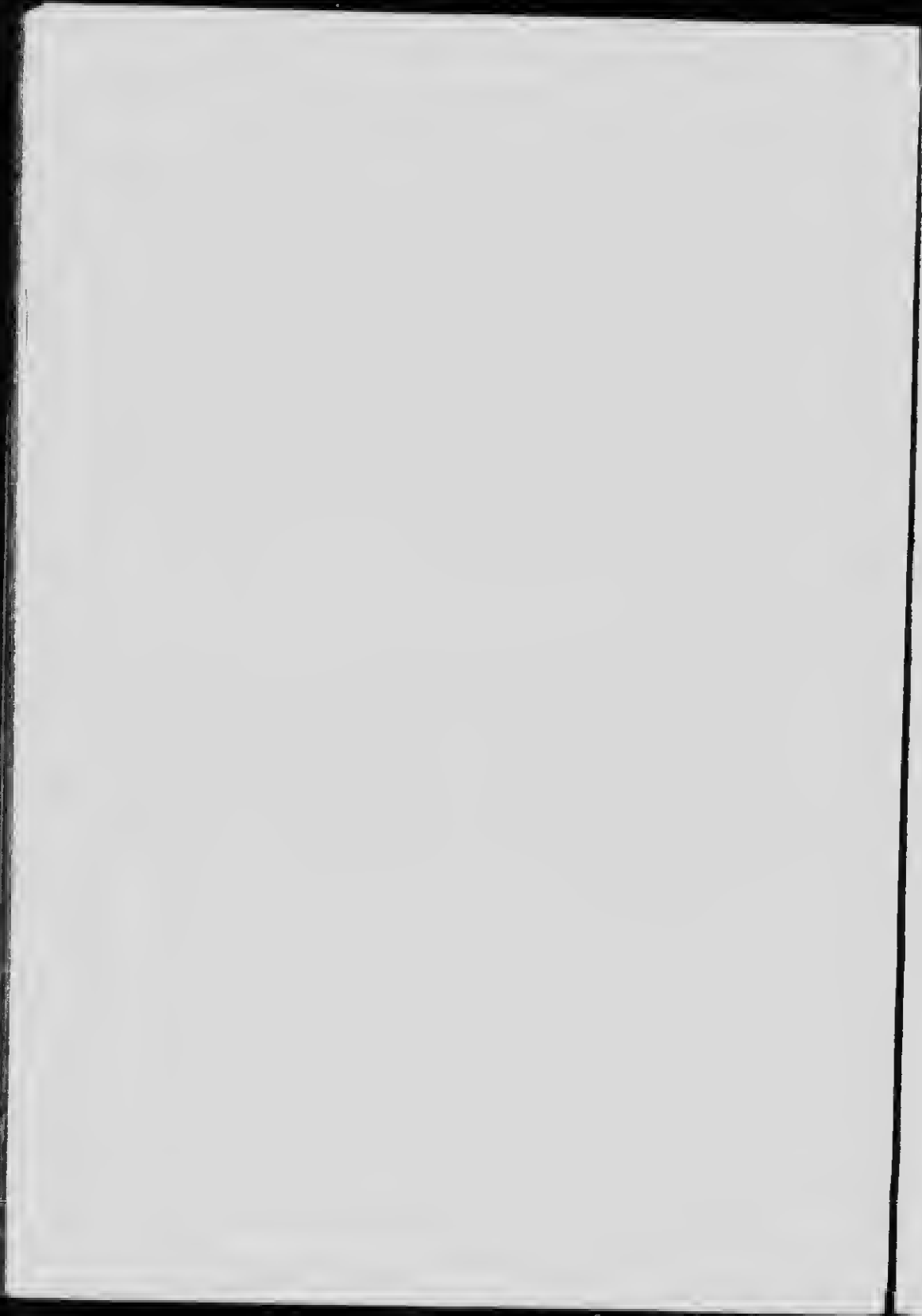




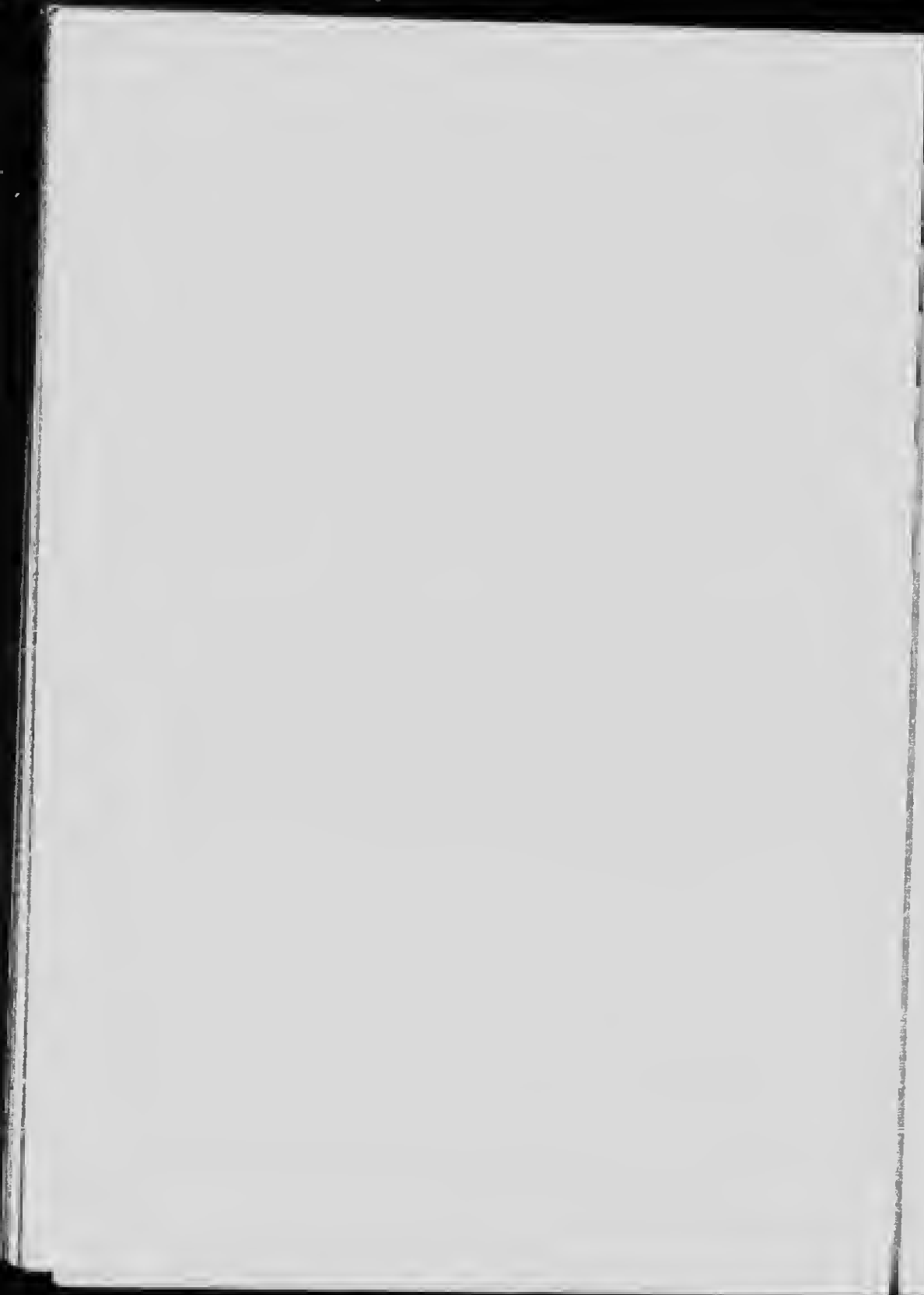


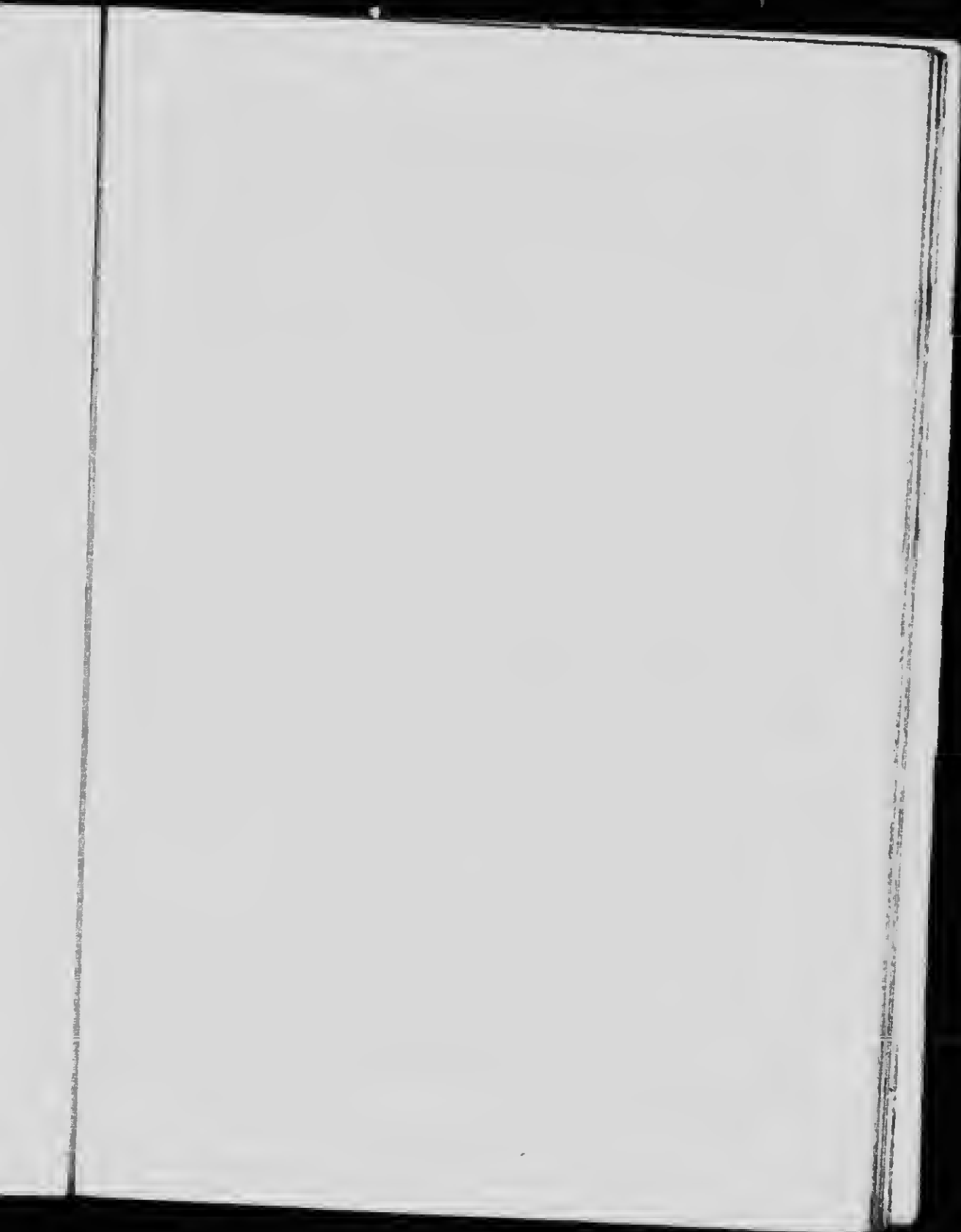


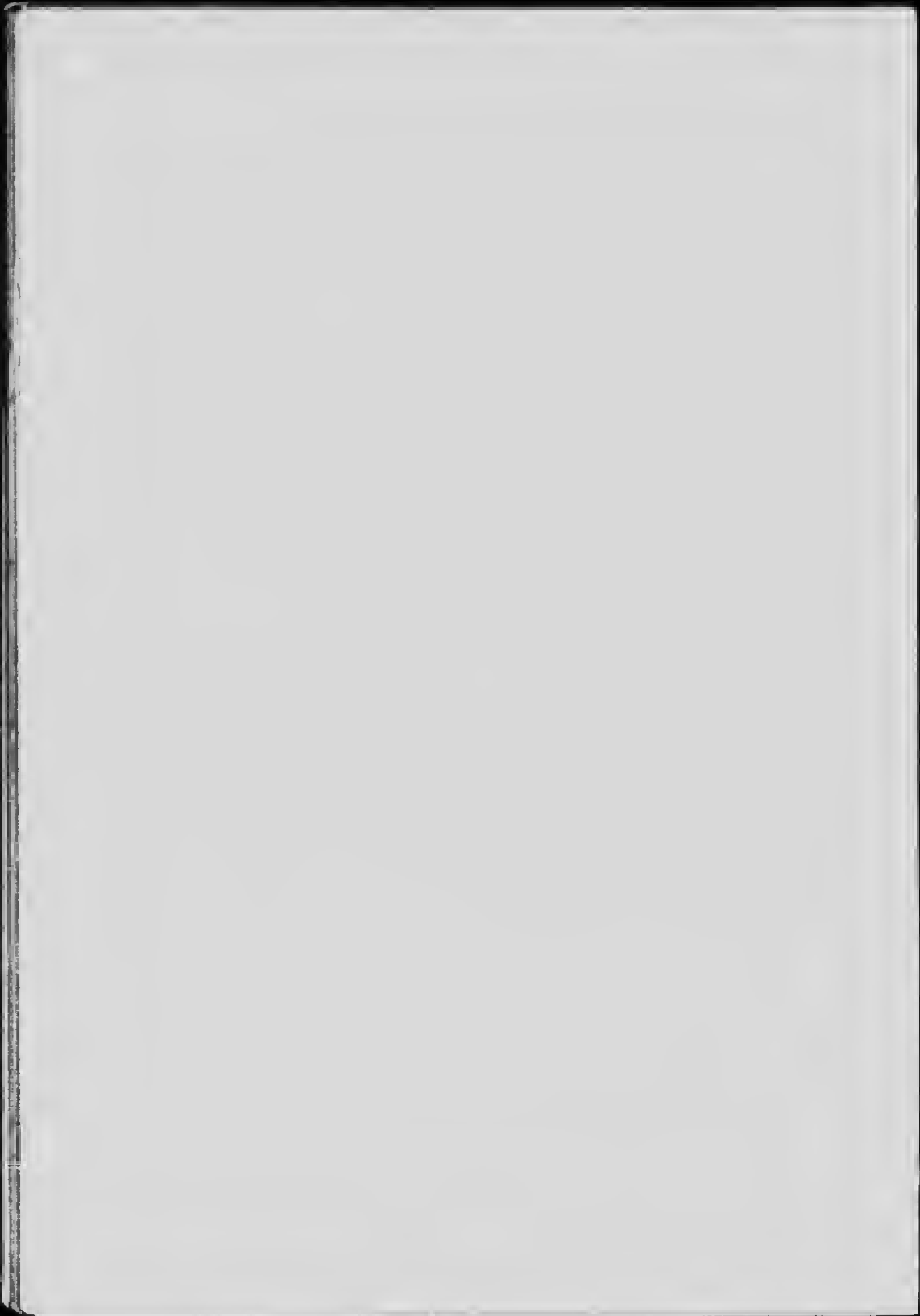












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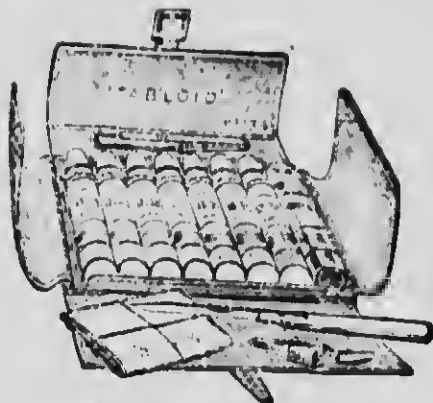
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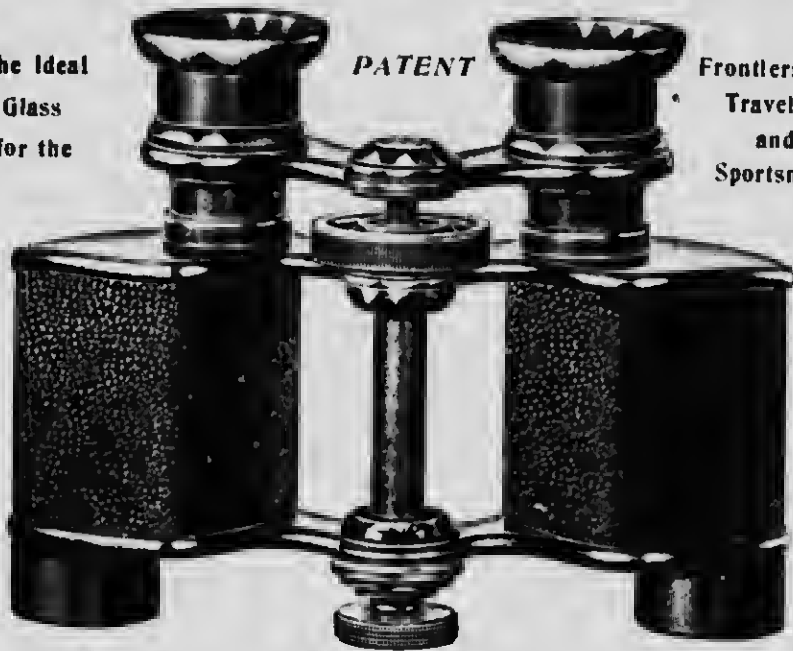
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