

MAP-READING.

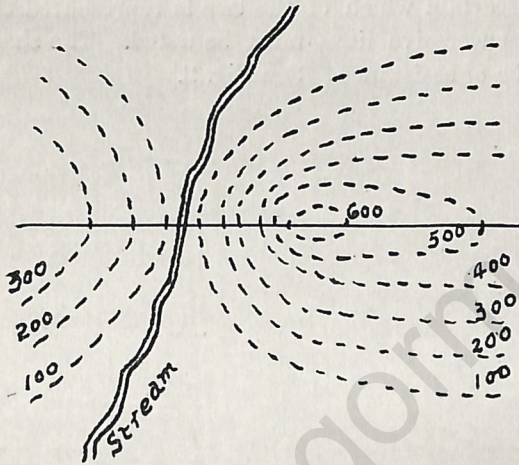
BY P. A. C.

I REMEMBER, years ago, a party of hill-climbers who were crossing a range of mountains situated in the Scottish Highlands. The day was wintry, and thick, rolling clouds of mist covered the slopes and dipped far down into the glens below. As the party ascended the hill, they passed a half-ruined bothy near which an old Highlander was stacking peats for the winter. As they approached, he ceased his work to turn and watch them. Seeing that they were bound for the heights above, he called to them to stop, and, hurrying across the heather, he begged them to go back, for he knew well the dangers of the treacherous mist. He was much relieved, however, when he saw that they carried a "sketch," as he called their map, and he sent them forward, but not without warning to "ca' canny." Of those travellers I know nothing, but I have met many mountaineers, climbers who have "bagged" thirty peaks, who yet know little or nothing of the country they have traversed, and are quite incapable of reading a map. Now, the first requisite for the city hillman is a thorough knowledge of map-reading. For his own comfort—it may be for his own safety—he must be able to set and keep a course over any country under any conditions. This he can only do with precision after years of practice, but much may be done to shorten this course of proficiency.

Before one can traverse unknown country with certainty and speed, one must be provided with an accurate map. A mounted map is, for all practical purposes, the most convenient for hill work. Folded back and bound between strong covers, it opens like a book at any particular spot, only exposing a surface of 7 by 7 inches. A map-case with a tale front is a most useful protection from wind and rain. The map is folded exposing the locality required, and placed inside. This greatly facilitates

application to the map on a wind-swept moor where the mountaineer so often finds himself.

INTERPRETING CONTOUR LINES.—Proficiency in map-reading is attained when the study of a good map enables



the reader to picture in his mind the appearance of the country portrayed, but this standard of proficiency can only be reached after long and careful study of the subject and much practical experience. The first step is to learn the conventional signs. These are to be found at the bottom of every one-inch map.

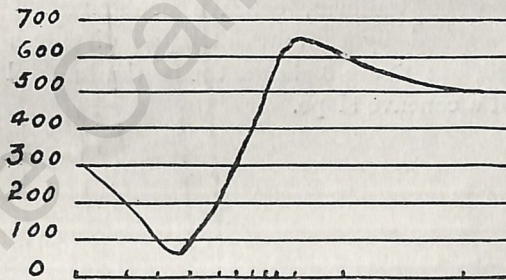


FIG. 1

Then one must become familiar with the system of contours. One must recognise when an ascent is steep, and when gradual; distinguish a concave slope from a convex slope; and be able to pick out the easiest route from point to point. To do these it is necessary to have in one's mind a close connection between the actual ground and the map. A few points may be tabled as regards the information conveyed by contour lines.

1. Where contours are close together, the slope is steeper than in places where the contours are further apart. See Fig. 1.

2. Where contours bend, they show either a spur or hollow. To ascertain which of the two is represented the numbering of successive lines must be noted. The shading, too, will be of assistance. See Fig. 2.

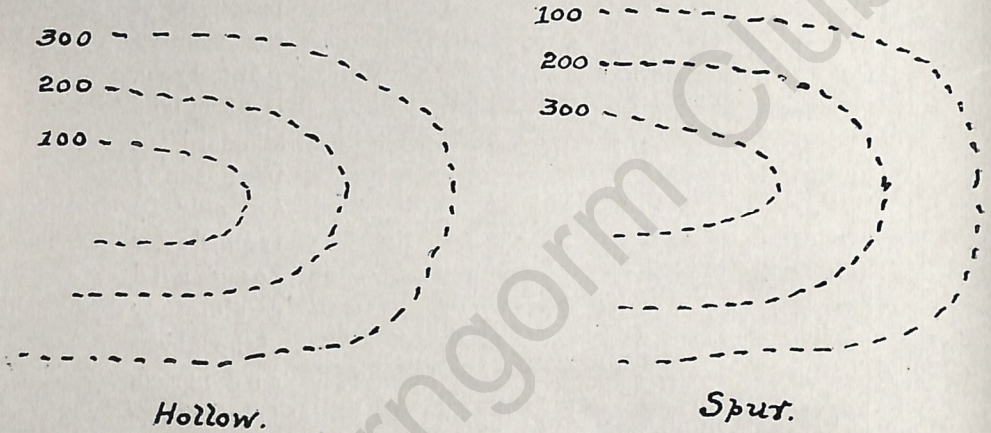


FIG. 2

3. Slopes may be uniform, concave or convex. A uniform slope marked by contours at equal distances is easily recognised, but figure 3 shows the section and plan of a convex and a concave slope.

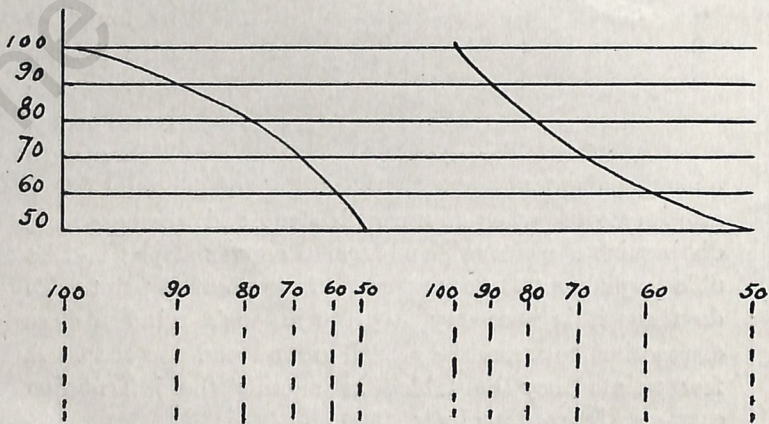


FIG. 3

All these must become familiar in the reader's mind, and to attain familiarity I have found the following exercises of the greatest service in learning and instructing in map-reading:—

1. Take your map to some high ground and examine it carefully. Try to imagine what the country before you looks like. Note every wood, road, and stream, the direction of each ridge and valley, the relative heights and the steepness of the slopes. Then, looking at the country, compare it bit by bit with the map. Note your errors and discover the cause of them. Careful use of a scale should be made when reading a map.

2. Reverse the process. Look at the country, study each feature, convert the distances to the scale of your map. When you have in your mind a fixed idea of what the map should look like turn to it and compare notes.

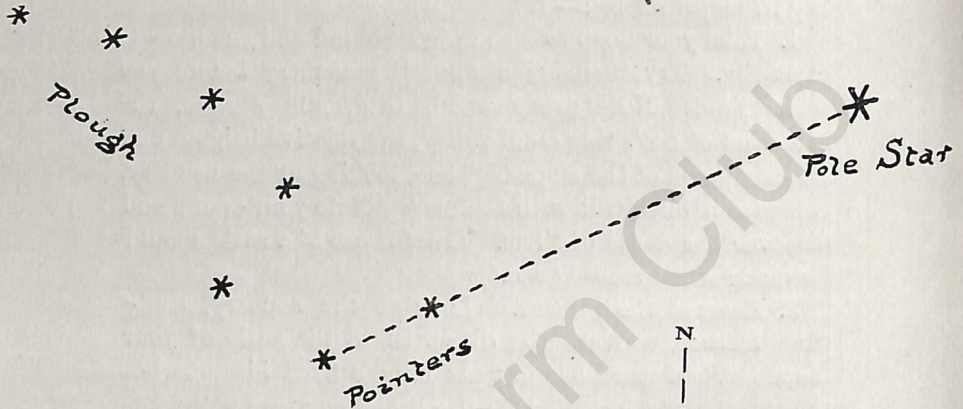
HOW TO USE A MAP.—The first thing one must do on taking out one's map is to observe the direction of north, then set the map, note the scale, and finally set a course. Methods of finding the north in broad daylight are as numerous as they are easy, and it is only necessary to mention a few.

1. By compass, allowing for variation.
2. At the equinoxes, the sun rises due east and sets due west.
3. At apparent noon, the sun is on the meridian. Apparent noon may, however, differ from mean noon (12 o'clock by a watch) by as much as 16 minutes, and therefore this method can only be taken as approximate.
4. Hold your watch horizontally, the hour hand pointing to the sun. Then the south line passes from the centre of the watch exactly between the point of the hour hand and the figure XII.

Having ascertained the north, it is then an easy matter to find any other point of the compass and to set a course accordingly.

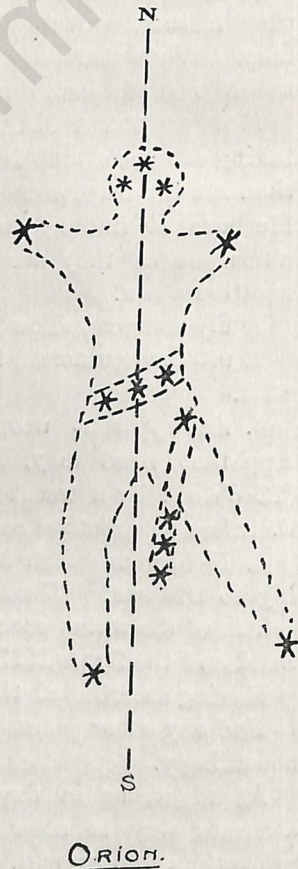
At night, as in daylight, the most convenient and accurate way to steer is by compass. Armed with a prismatic compass with illuminated dial, any one should,

after a little practice, keep an exact course. It is just when you require your compass, however, that you find you have not got it and you have to fall back on something



else. After a compass, the Pole Star is the best guide at night ; and so you must first learn to find that star. The Pointers of the familiar constellation called the Great Bear or Plough give the line to the Pole Star (See fig. 4). This is always within 28 of the True North.

But the Plough may be obscured by cloud, and so it is well to be prepared for that contingency. A substitute is found in the group which makes up the mythical soldier, Orion. A line from the centre star of the Belt of Orion, passing through that warrior's head, points to the Pole Star. Having found the north, select a star low down on the horizon and steer for it ; and as it climbs higher in the sky or sinks from view select another.



It was by a method such as this that Sir Garnet (now Viscount) Wolseley led an army of 17,000 men for miles across the trackless desert through the black Egyptian night, guided only by the Pole Star and the stars dropping one by one below the western horizon. When dawn broke he was scarcely a dozen yards from his course on the battle field of Tel-el-Kebir. Yet more wonderful is the story of Captain Lee, of the United States Army in Mexico, who afterwards became the famous confederate General. Over unknown and broken country, in a terrific thunderstorm, this intrepid officer groped his way with despatches to the Commander-in-Chief, with no guide save the wind and the lightning flashes. General Winfield Scott, who commanded the army, characterised this perilous adventure as "the greatest feat of physical and moral courage performed by any individual during the entire campaign."

Other methods there are of finding direction at night; but these are all somewhat complicated, and under ordinary circumstances the methods I have described should suffice.

HOW TO SET AND KEEP A COURSE.—To set a course is one thing; to keep the course you have set is another and a much harder task. In setting a course, so many side issues may enter—the strength of the party, or the desire for picturesque views, for example—that each case must be decided on its own merits, and according to the lights and capabilities of the individual traveller. But having decided on a course, one must stick to it. Any one may see the peak of a mountain standing out before him and make a bee-line for it over hill and through bog; but this slap-dash style of going is exhausting for any one, and disastrous for ladies. The maxim that "The straight road is not always the shortest" is often true; and it holds good here, if anywhere. The road for some distance before you should be carefully studied on the map, and the following points should be borne in mind.

1. In small-scale maps much detail is often omitted, and therefore it is necessary to check one's progress by time.

For example, you may see that a branch road goes off to the right about a mile ahead. If, at the end of ten minutes, you encounter such a road, you may be sure that it is not the one for which you are looking, because, unless you are a remarkably fast walker, you will not travel more than four miles an hour on a good road, and much less on a bad one.

2. Remember that you are traversing the country at a much slower pace than you are studying the map, and so the objects you have marked do not appear so quickly as you expect them.

3. Don't jump to conclusions. Take a comprehensive view of your path, and do not become alarmed because the track suddenly bends off in an unexpected direction. If you have advanced carefully, it will come all right.

4. When you are tired take care. That is the time when you become careless and anticipate. Every road you meet looks like the right one, and a careless turn may cost you miles.

5. If you are on a path, stick to it unless you know the way; better the wrong path than no path.

6. Don't be afraid to look at your map too often. You may see that the light is fading fast, and that in a few minutes you will be in darkness. Nevertheless follow your map. It is not wasted time, however great your hurry.

7. And, lastly, if it is getting dark, or you feel you are getting lost, do not rush wildly on hoping to find a path. Stop; take a pull at yourself; find your bearings, and quietly think out the best way of getting right again.

IDENTIFYING MOUNTAINS.—Passing from the subject of map-reading proper, we may turn to one or two adjuncts, which, though they do not strictly come under the heading of this article, may be of interest to the mountaineer.

One of the many rewards of the climber, after a stiff pull to the summit, is to sit in the midst of an admiring circle of friends and point out the various peaks around (provided he knows them). But I have seen so many feeble attempts and such gross errors that a word on "spotting" and pointing out hills may not be out of place.

The method *par excellence* is the use of the prismatic compass, but, as this instrument is not common amongst mountaineers, I will suggest another.

By means of a protractor and map, it is easy to measure the bearing of a hill—i.e., the angle between it and the north, or between it and another hill, measured at the observer's eye. To measure the angle on the ground without instruments is equally easy if three simple numbers are remembered as shown in figure 6.

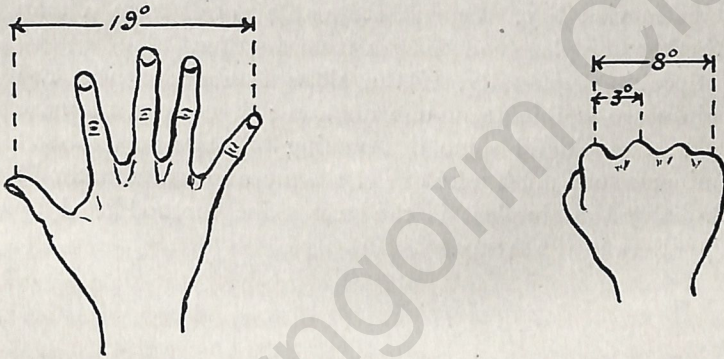


FIG. 6

1. The angle subtended by the thumb and fourth finger of a fully-extended hand at arm's length is 19° .
2. The knuckles of the first and second fingers of the clenched fist subtend an angle of 3° .
3. The angle subtended by the knuckles of the first and fourth fingers is 8.

Now, this may seem surprising at first sight, but after very little practice will be found quite accurate and most useful. I have often prepared diagrams giving the angles of the hills surrounding some vantage ground, and have thus been able to "spot" many peaks otherwise difficult to locate. And at other times, when application to a map was rendered impossible by a roaring hurricane, I have measured the angle to some unknown hill and spotted it later under the pleasanter conditions of a warm study and a broad map-table.

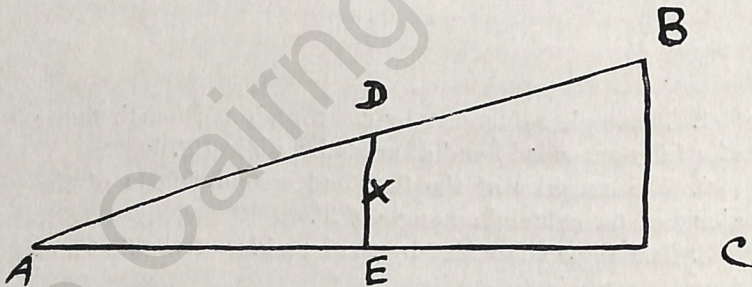
Yet another method of measuring degrees is by means of a watch. Holding the watch as in finding the south,

take XII as 0, and remember that each minute represents 6°. But this is neither so handy nor so accurate as the method described above.

A makeshift protractor may be constructed by taking the corner of a piece of paper and dividing the right angle by folding it three times. Each of the folds will then give $11\frac{1}{4}$ degrees. If necessary, further folds will give more minute divisions.

VISIBILITY.—Closely connected with identifying mountains is visibility. One must be able to tell from a map whether one place can be seen from another.

Speaking generally, if the slope is concave, the two points are visible from one another; if convex, they are not. But should some intervening hill rise to doubtful eminence, one must take one of the more accurate methods. Probably the simplest is the proportion method used by signallers in the Army.



Suppose the mountaineer wishes to know if, when he reaches A, he will be able to see B. He looks at his map and notices that D comes between and may possibly obstruct his view. He takes from his map the distance from himself to B—i.e., A to C; and from himself to D—i.e., A to E. He sees from the contours the rise or fall to B—i.e., C B, and can find the rise and fall to D that would make D exactly in alignment with himself and B by the following proportion. $AC : CB :: AE : X$. He then consults his map to get the actual rise or fall to D, the possible obstruction, and, according as it is greater or less than X, knows whether B is visible or not.

The diagram, of course, shows merely the theory of the method, but it is possible to find on the map and work out examples on paper where you can say with certainty that, standing on a wall, or bridge parapet, or some such thing, the object would be visible while from the ground it would not. It is only a case of accurate measurement.

On the vast expanse of map-making I must not embark, for I would wander from plane-table to clinometer, and from traverse to triangulation. Careless of the advice I have given, I have already strayed far from the course I set at starting. Nevertheless, I shall feel satisfied if these few points prove helpful to any one of the ever increasing "leaderless legion" of mountaineers.