

## “ DEAD RECKONING.”

BY G. R. SYMMERS.

It is highly desirable that everyone who goes in for hill walking should be familiar with the art of route finding. By this it is meant that they should be capable of making their way from place to place by map and compass whatever the weather is like. To acquire this art, the first step is to become thoroughly familiar with the handling and working of a compass, and the second to be able to read a map correctly. In this article I do not intend to touch on the question of how to manage a compass nor yet on how to read a map. It is assumed, then, that you, reader, are either familiar with both these subjects, or that, since you first picked up this *Journal*, you have made yourself familiar with them. The subject, therefore, of this essay is the application of the compass and the map to your adventures amongst the high hills.

I have said that it is highly desirable for everyone who tramps on the hills to acquire this art of finding their way about, but I would go one stage further in the case of those, either self-appointed or elected by common consent, who lead a party. To such this knowledge is essential. Nobody has any right to take on the responsibility of leading a party without this knowledge and some experience of its application, particularly during the winter months when weather conditions are so fickle and variable.

Some of you will probably say, “ Yes, that’s all very well, but how are we to acquire this art if we never have a chance of putting it into practice ? ” There are two ways in which this difficulty can be overcome. Firstly, you may be acquainted with someone able to initiate you by taking you

out with him and explaining what he is doing. Secondly, and I think this is the better method as it inspires self-confidence, you can work up the practice yourself. In what follows I hope to give you some help on the subject.

It should be stressed as a fundament at this point that during any climbing expedition you should be able at any time to take out your map, indicate a particular spot on it and say, “We are here.” It is simply looking for trouble to let bad weather or mist overtake you without knowing your precise location on the map. Unless you know your exact position when the guiding landmarks are blotted out by mist or snow your compass and map are almost useless. This, of course, results from the fact that “dead reckoning” depends for its accuracy on the following provisions: the location of the point from which you are starting, the direction or bearing of the point you wish to attain from your starting-point and its distance from that point. If you don’t know where you are, then you cannot obtain from the map any of the factors you require.

Now, how can practice in this art be acquired so that it can be put into operation when the need arises? I would suggest that this can be easily and most enjoyably carried out as an adjunct to Saturday afternoon or Sunday walks. The first thing to find out is how many paces you take to cover a mile and how long you take to do it. Find out from the map how far it is between two easily recognisable points on either side of a moorland tract and then walk from one place to the other, counting your paces on the way and also noting the length of time you take to cover the distance. The number of paces and the time taken, each divided by the number of miles traversed, are the two figures you require. Do this over a few different types of upland country, some undulating, some uphill, some downhill, some in heather, some in grass, and some with boulders. Each walk should be from 3 to 4 miles in length so as to get a reasonable average result and cut down the effect of mistakes in counting. After you have carried out some expeditions in snow and obtained a similar set of figures,

then you can reasonably assume that by counting or by looking at a watch you will be able to say how far you have travelled from a known point under almost any conditions. As a practical example of the use of this data, suppose that to reach a certain point you have to traverse a map distance of  $1\frac{1}{2}$  miles, and that you know it takes twenty-six minutes and 2,200 paces to walk 1 mile over this type of country. You may therefore assume with reasonable accuracy that after having counted 3,300 paces, and thirty-nine minutes having elapsed since starting, you have travelled  $1\frac{1}{2}$  miles. Consequently, in mist or when visibility is bad, at the end of that period you should be on the look-out for the object you have been heading for, and if you have been walking in the proper direction you should be very close to it.

In what goes before I have outlined two methods of determining distance travelled, one method based on time and the other on counting the number of paces made. Both have their advantages and devotees. The time method, the one which I myself practise, suffers from the disadvantage that calculations have to be made at every halt, otherwise it is much less unwieldy, because a mechanism is provided to do your counting and this releases your attention for other matters.

So far we have been dealing with the side of "dead reckoning," which corresponds in the case of navigation to the log. In fact, the methods applied in "dead reckoning" as we are dealing with it here are merely a simplified version of those used in navigation at sea. Avoiding a digression, however inviting it may be, we must now consider the question of direction. The necessity of being able to steer a good course is as important as is the ability to know when one has travelled the distance one desires. Again, practice in this art can be obtained under normal conditions, and can very well be had in conjunction with the experiments made to obtain the other data with which I have already dealt. Let us consider a typical expedition of this nature. For this purpose, let us assume that you are going to walk from a point A on one side of a moorland, say the Hill of

Fare, to another point B on the far side of it. The expedition is to be carried out in fine weather so that there is no danger of getting lost or of falling over any cliffs on the way, but to add interest to the walk you must make believe that there is a thick mist shrouding the country and that it is impossible to see more than 20 yards. To perfect this illusion you must resist the temptation of looking for point B and heading for it when you approach, but rather continue on your course as if you were unable to locate its position. If a point B can be chosen so that it is concealed from your path of approach so much the better, because the tendency to cheat in such small matters is inherent in most men—and, just possibly, women!

Your equipment for purposes of route finding should consist of a 1-inch Ordnance map of the district, a scale divided into inches and tenths, a watch, and, preferably, a liquid compass marked in degrees. The advantage of the liquid type over the ordinary needle instrument is that it is not nearly so sensitive to vibration and can be held and read in the hand while walking, whereas stops have to be made every time the other kind is examined. By an inspection of the map it is possible to determine the bearing of your objective point B from point A with reference to true north, that is to say, in relation to a line running parallel to the side of the Ordnance sheet. To this angle or bearing add the magnetic variation for the year in which you are making the journey. Then scale the distance from A to B on the map. All this preliminary information can be worked out at home with the aid of a protractor until proficiency is attained, after which it can all be done outside. Now assume that you are ready to start from point A. Hold the compass with a mark on the case on the side remote from your body pointing directly in front of you; if your instrument has a lid with a window and a hair line on it, open the lid and point the hair line straight in front of you. Then turn yourself round until the bearing you obtained from the map, as indicated on the rotating disc of the compass, coincides with the mark on the case of the instrument. This indicates the direction in which you have to move. Look

at your watch and, if you have already been experimenting, then estimate the time required to reach B. Once launched on your course, you have to go up hill and down dale, through or over everything encountered on the line between A and B. If you like you can count your paces, but it is rather wearisome and subject to big mistakes. Look at your compass frequently, as you must keep that mark on the case opposite the correct bearing figure on the floating disc. If you find that you have wandered a bit to one side of your course, then try to make a compensating correction by going a similar way on the other side. After doing this, because you should then be back on your correct path, you keep pushing along in the proper direction again. If you traverse the side slope of a hill, it is necessary to watch your instrument very carefully to avoid the attraction of gravity on the straightness of your course. When you have travelled the estimated length of time by watch take stock of your immediate surroundings and determine the value of the error you have incurred by these methods. On the other hand, if you are finding out the length of time or the number of paces required in moving from A to B, then it will be necessary to continue until on a level or at right angles to your objective. In any case, it should be possible with care and a little practice to arrive after walking 2 miles from your starting-point within a circle of 200 yards diameter with your objective point at its centre. That is to say, at the end of a 2-mile walk you should be within 100 yards of the point for which you have been heading. On a shorter course your possible error should naturally be proportionately smaller and on a longer distance greater.

By carrying out experiments of this nature and finding with what degree of certainty he arrives very close to his objective, the beginner gains confidence, and will know what to do when he is overtaken by bad visibility on the hills. He should then know how to extricate his party, and will derive a great deal of pleasure in so doing. In fact, he will probably soon be climbing in misty weather just for the pure fun of navigating himself from place to place. That



GLENCOE PEAKS—SUNRISE

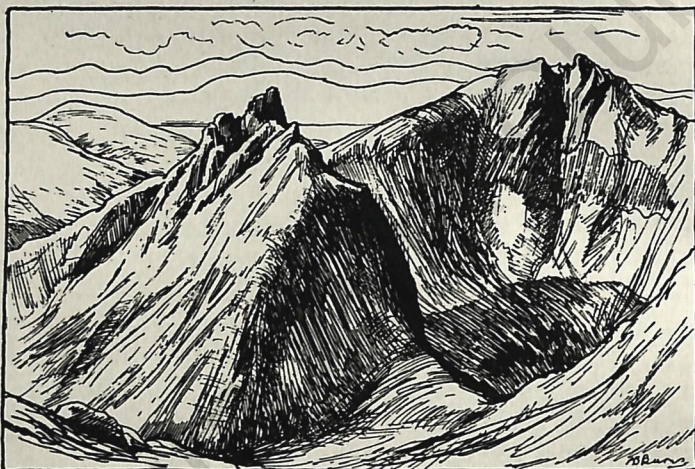
*Hugh D. Welsh*

it has this effect I know from experience. It so warps one's sense of proportion that for a time, while one is mastering the details of the art, one longs for mist, and is dissatisfied with sun and frost and distant views.

Before I finish this long discourse I should just like to add one or two hints on “dead reckoning” in its application to walking amongst the high tops. It is often better to pick up an intermediate point or several intermediate points, thereby setting two or more courses, rather than to steer one very long line between two remote stations. In this way the error which may be incurred by walking a long way in a slightly wrong direction is reduced. Again, advantage should be taken of the help provided by such natural features as the edges of corries, and on the west coast of Scotland by the lines of sharply defined ridges. With regard to the former, care should be exercised in walking along them in the winter, when they are often heavily corniced and the lip extremely difficult to see in blowing snow or thick mist. Particular vigilance is necessary when a high wind is blowing snow into the corrie at right angles to the line of the edge, because these are the conditions favourable to the formation of a new and soft cornice, the lip of which is not the safest of places to walk. Further, once a leader is appointed amongst the members of a party, then when he decides on a certain course of action it is the obligation of that party of climbers to fall in with his wishes, to help him when he *asks* for assistance, but never to impede him either with advice, conversation, or mutiny.

Hippocrates has said, “Walking should be rapid in winter and slow in summer, unless it be under a burning heat. Flethy people should walk faster, thin people slower. . . . Fat people who wish to become thin should always fast when they undertake exertion and take their food while they are panting and before they have cooled, drinking beforehand diluted wine that is not very cold.” The Father of Medicine gives a lot of useful advice which can no doubt be applied in many cases, but the whole point of this article is an attempt to show that a Saturday afternoon walk in

summer or a Sunday outing in winter can be turned into something more than a mere "constitutional"; it can become a mild mental exercise, an application of common sense to walking.



Cir Mhor and Caisteal Abhail, Arran.