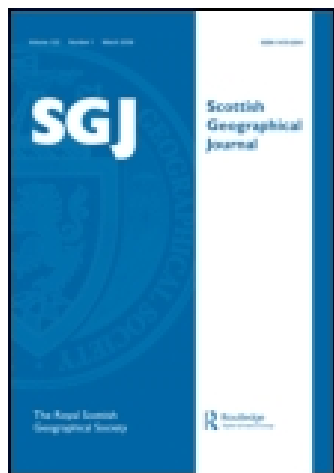


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Publisher: Routledge
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UK



Scottish Geographical Magazine

Publication details, including instructions for authors
and subscription information:

<http://www.tandfonline.com/loi/rsgj19>

Geography in relation to war

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Published online: 30 Jan 2008.

To cite this article: G.B. Mackie (1917) Geography in relation to war, Scottish Geographical Magazine, 33:11, 498-507, DOI: [10.1080/14702541708554878](https://doi.org/10.1080/14702541708554878)

To link to this article: <http://dx.doi.org/10.1080/14702541708554878>

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on the "United" States of Mexico, and they will learn that the form of government is of far less importance than the moral character of the people who rule, and a free republic may be only a polite and popular name for a cruel autocracy of the most reactionary and tyrannical order.

Mr. Spence briefly describes Mexican history, society, family life, statesmanship, literature, art, religion and sports, in the first eight chapters, and the provinces and larger towns, ranches, and mining districts in the next three. Aboriginal and savage Mexico, and the Revolution and future prospects, form a fitting end to a well-planned and very useful little epitome that all who wish to gain much information in a condensed and handy form would do well to read.

GEOGRAPHY IN RELATION TO WAR.

By G. B. MACKIE, Lieut., 9th Officer Cadet Battalion.

(With Figures.)

It would doubtless be possible at the present time to over-emphasise the importance of this subject, but I do not intend to plead for anything that cannot be amply justified on purely educational grounds. Not that I consider that a military bias to subjects that have a military bearing would be more injurious than beneficial. Even to-day only a few, who have been able to see the innermost workings of our military machine, realise how ill-fitted was our pre-war education to become the foundation of a sound military training; and if it is admitted that the subject-matter of Geography, including therein the cognate parts of the sciences from which it borrows, has more military significance than all the other branches of standard curricula taken together (and I do not see how this can be honestly denied), there can be no question about the necessity for a radical readjustment.

But it is not expedient meanwhile to insist on these melancholy facts. If I can reveal their existence sufficiently to cause them to be recognised when the days of peace return, my whole purpose will have been achieved. I hope, besides, to be able to give my suggestions a direct appeal. The most immediate obstacle is the inadequate geographical equipment of the average teacher and of most inspectors. For this the teacher is not to blame. He is not encouraged to specialise; when he does, his motive is generally love of the subject for its own sake; and while his appointment is in the hands of that most incompetent of governing bodies, a School Board, he serves his own interest better by studying and laying to heart the crude psychology of the average School Board member. The only practical way out of the difficulty is a general realisation among teachers that constant preparation and pioneer work are more essential to themselves than to their pupils. As the great majority of the secondary teachers of to-morrow are at present junior officers, the future can safely be left to look after itself.

The value of geography as an instrument for mental discipline and the cultivation of the imagination is not generally recognised. It is usual to claim the former virtue for every young science, and it is not my purpose, nor have I the space, to insist on it here; but modern education certainly does little for the latter, which is one of the most important parts in the make-up of the successful soldier. Geography rivals literature in its power to stir the imagination, and, when formal education is finished, although literature may be absent, the material of geography is always present. Every wind that blows issues the challenge: "Whence come I? What is the secret of my birth?" And the so-called inscrutable hills have the magic of their origin displayed for him who runs (and knows their language) to read.

I.—MAP-READING.

I have often felt recently that it would be better not to attempt to teach map-reading at all than to teach it badly. Bad teaching invariably results in a desire never again to see a map, which has become more formidable in its apparent inexplicability than when unknown. In the words of a distinguished officer, what too often happens is that a map to a badly taught student becomes a kind of monkey-puzzle. It is much more important that the average person should know how to read a map than that he should be aware of the principles upon which it is made. Many people who cannot read a large-scale map intelligently know every process of its construction. It seems to be taken for granted that ability to read a map will follow from a knowledge of how its makers worked. Whether this is true or not, I know from experience, both as a student and as a lecturer, that there is no subject requiring more careful and laborious teaching than map-reading, no matter what may be the age or the attainments of the student; and in war so much depends on familiarity with the use of maps that it is hardly possible to exaggerate the importance of thorough training. As well build a rudderless ship as send an officer into the field to whom a map is a kind of monkey-puzzle. The neglect of map-reading is probably due to the dangerous tendency to regard it as self-evident, or to consider that it is confined to ability to realise the relief as represented by contours, etc.

Some sort of description is necessary for every feature. Take, for example, inland water. The following remarks on the subject should help to facilitate map-reading, clearing up, as they should do, many apparent anomalies, which are the bugbear of the beginner.

Where colour-printing is used, there is happily a universal practice to represent water in blue. Except in the case of contours crossing ice, every blue line on a map symbolises water. When the line is sinuous, and does not run parallel to contours, the water is flowing under natural control. When it is straight over a considerable distance, the channel has been (*a*) made, or (*b*) artificially controlled by men. In the first case it is a drainage ditch or an irrigation waterway or a canal; in the second, a canalised river. Flanders, especially the region near the coast, is covered by a network of drainage ditches. The straight stretch of

the Leven, where it emerges from Loch Leven, is an example of a canalised river in the home country. When water runs parallel to contours, whatever the nature of its course, it is confined within a canal. There is no mistaking canals on continental maps, since they have their own conventional sign. French maps have also an elaborate system of conventional signs for weirs, locks, etc.

The inland water of a region, once it has been picked up, should be studied in relation to the devices used to represent the relief. It should, in fact, be regarded as one of these. Water flowing under natural control will always be traversing the lowest ground in its immediate vicinity. It therefore marks the lowest points of valley floors and assists materially in defining the ridges. Its course tends to be from contour to contour by the shortest available route. There are many apparent exceptions to this rule in Flanders, where streams repeatedly cross the same contour. This is due to the flatness of the country. At the first crossing the stream is confined within artificial banks above the ground level, which is the height represented by the contour; at the last crossing it is flowing at a lower level than the ground level. Similar conditions prevail with regard to lakes, marshes, etc.

Few maps are so easy to read as the British one-inch Ordnance Survey, and a proportion of the great multitude of maps recently produced for official use should be available after the war for purposes of comparison. It would be useful, too, if other than local Ordnance Survey maps could be purchased in quantity at a low rate. Abundance of material undoubtedly stimulates effort and makes for efficiency; scantiness of equipment and restriction of facilities are greatly responsible for much of present-day backwardness. I wonder how many secondary schools in Scotland possess a prismatic compass as part of their geographical equipment.

There is so much that is essential in the teaching of map-reading that there is no time for any of the non-essentials by which school-practice has become overloaded. I mean—to cite one of the least pernicious—such exercises as the calculation of the size of a given area. Apart from anything else, such calculations, arrived at by school methods on small-scale maps, are quite inaccurate. On the other hand, there can be no better test of a student's ability to read a map than to have him write a description or draw a sketch of what he would be likely to see if looking at the country from an aeroplane or walking along a road.

Map-reading is essentially a practical subject. The first topographical map a student uses should be one of a countryside he knows well, preferably that of the district in which he is stationed. He has his mental pictures ready-made before he endeavours to associate them with the symbols on the maps. The less usual features should be seen and named in the field—knolls, *rideaux*, cols, spurs, etc. It is only in the field that certain facts can be made apparent—*e.g.* that a strip of wood, when closely approached, may cease to be a bar to vision, and that an unmapped line of hedgerow trees may completely hide the country beyond.

Practical map-making can be made to subserve map-reading, and this seems to me its chief justification. In this connection plane-tableing is excellent. It is at once rapid and accurate. More use might be made of map-enlarging and filling in unmapped detail. Within the limits of available time, these things cannot, in my opinion, justify their inclusion for their own sake, but one of the most notable charms of Geography as an educational science is the way in which the various departments can be made to dovetail into each other.

II.—THE PHYSICAL SIDE.

There is so much on the physical side that is of value to the soldier that I cannot even indicate it all here. I propose to deal only with those items which for one reason or another appear to me to have some special interest. One of these is underground water, a subject of which many students never hear, but which has an important bearing on numerous activities. In trench-warfare it is the chief problem to be faced. One of the greatest advantages of our recent victories in Flanders is the fact that we have lowered our winter water-table. We have, so to speak, turned the water-tables on the enemy. It is not generally known how closely, even in certain deserts, the water-table approaches the surface. The following facts also are not readily apprehended—(i.) that the water-table seldom conforms precisely to the lie of the ground; (ii.) that the long-standing pools that appear in depressions in winter or during long, rainy spells are an emergence of the water-table above ground level; (iii.) that water percolates very slowly through the ground—a movement sometimes aptly described as “seepage”; (iv.) that to attempt to drain ground below the water-table is to plough the sands.

Consider the ground represented in Fig. 1 (exaggerated for the sake of clearness) with reference to entrenchment. If the line is going to



FIG. 1.—The position of the water-table with reference to ground slope, in summer and winter.

The continuous line represents the surface, AB is the winter, A_1B_1 the summer, water-table.

run from east to west, and if the winter water-table is six feet below ground level at the summit of the knoll, this position will always be suitable for fire trenches, and it will be possible at all times to drain off ground water into the depression. As the trench line descends the slope, however, the water-table approaches the surface, and at no time will it be possible to have a dry fire trench. Here a combination of trench and breastwork will be necessary. In winter the depression will be untenable; in summer only breastworks will be possible. If, midway down the slope, a fire trench has been made in summer, when the water-table was six feet below the surface, rising to three feet in winter, no

practicable method will keep the trench dry in the latter season, because no trench pump can drain away the water-table.

Suppose now we consider the knoll to be a ridge or *rideau* running north and south, and the depression a longitudinal valley, with one trench line on or near the crest, the opposing line being midway down the slope. The former line could easily be kept dry at all seasons. The latter has now two water difficulties:—(i.) it receives the drainage from the enemy trenches, and (ii.) it has the much more formidable embarrassment of having the water-table only three feet below the ground level, and supplied by the mighty reservoir of the ridge. It must, therefore, be

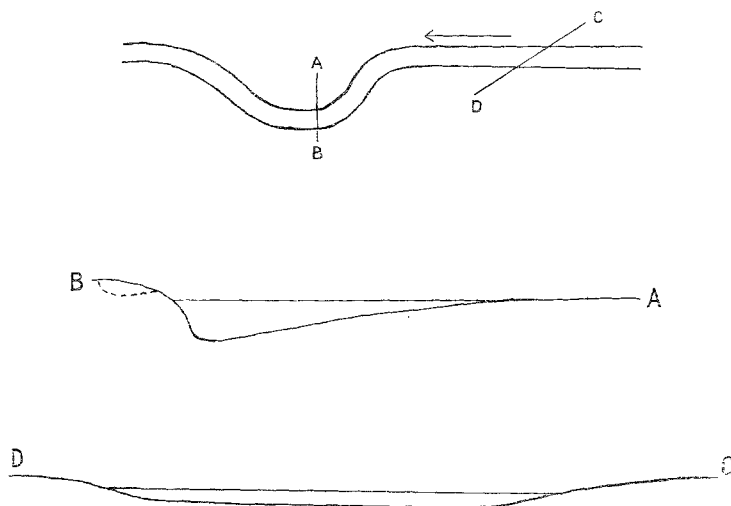


FIG. 2.—Diagrams to show favourable sites for fording rivers.

The uppermost sketch represents a river, the arrow showing the direction of flow. Below are cross-sections indicating the probable depth conditions along the lines AB and CD.

permanently water-logged. The further it is pushed down the slope the greater will its water difficulties become.

Similarly, a knowledge of the nature of soils, subsoils, and the relative hardness and porosity of rocks is also of much value in connection with entrenching. It is interesting to note that porous rock (*e.g.* chalk) absorbs poison gas, which is slowly exuded long after the rock has been saturated.

Of prime importance to the soldier are the nature and the shape of the beds and the speed of the rivers that bar his way. A knowledge of the life-history of a river, in fact, adds considerably to his efficiency, in which case, *e.g.*, he will not be likely to look for a ford where that convenience does not exist.

Thus in the case of the river represented in Fig. 2, an examination of the cross-section A B from the right bank would seem to indicate that this was a favourable place for a ford, especially if, as often happens

in nature, the left bank had collapsed along the dotted line, leaving, apparently, a landing-place excellently covered from fire and view. At the right bank in C D a greater depth is more quickly reached in the same horizontal distance, but the complete sections show that C D is the only practicable place. The dynamical explanation of these cross-sections will be found in any good text-book.

III.—WEATHER AND CLIMATE.

Here again everything that is acknowledged to be good practice is useful knowledge to the warrior. The modern British soldier may be called upon to face any condition of weather and to campaign in every climate except the Arctic. Obviously, the more he knows about them all the better will he be able to combat their rigours. The errors that can be made through ignorance in this matter are hardly credible; *e.g.* the sending to Mesopotamia of alleged bullet-proof vests consisting of several inches' thickness of a thickly woven woolly material. Here again I must limit myself to a few examples.

The problem of dealing with gas clouds, offensively and defensively, is largely wrapped up in considerations of weather and climate, and when we remember that at all seasons the prevailing winds in Flanders are south-west, it is difficult to understand why the German introduced this barbarous form of warfare, at anyrate on this front. He has to depend for the most part on uncertain local winds. His meteorological service labours under far greater disadvantages than ours, because the distribution of pressure over Germany is of far less moment to us than the records of Atlantic stations. We are aware, for example, not only of the approach of cyclones, but of when they are due to arrive at the western front. The sending of gas clouds over an enemy front is entirely at the mercy of the weather, and the fact that European weather comes mainly from the west has enormous advantages to us. This is a large and interesting subject, about which I would like to say more when the time is more opportune.

Whatever resolutions may be arrived at by future international conference with reference to poison gas, its use will remain for ever one of the great facts of the present war, and much interest will be added to the following studies if their intimate connection with gas clouds is pointed out:—

- (a) Estimating the speed of the wind;
- (b) Deducing from a weather chart what will be the direction of the wind at a certain place at a stated time;
- (c) The construction and use of wind vanes.

Over such exercises as the construction of wind roses those I have enumerated have the merit of producing original results.

Fig. 3 (p. 504) is a wind vane, which is the invention of Captain Ross of the Western Area Gas School. The mechanical part is an ordinary letter balance, which can be purchased for about one shilling. Fig. 4 (p. 506) is a wind vane designed by Captain Learmonth of the Scottish Command Gas School.

There are few facts connected with the origin and effects of winds that do not at one time or other take on military significance. This summer at a certain part of the Ayrshire coast used by troops as a bathing-place the water seemed warm one day and cold the next, although there appeared to be little variation in the temperature of the air. On the first day, however, the wind was on-shore, off-shore on the second.

What weather means to the infantry soldier only the infantry soldier can fully realise. The great natural obstacles that so impeded armies in the past have been largely overcome. A wide river is no great hindrance

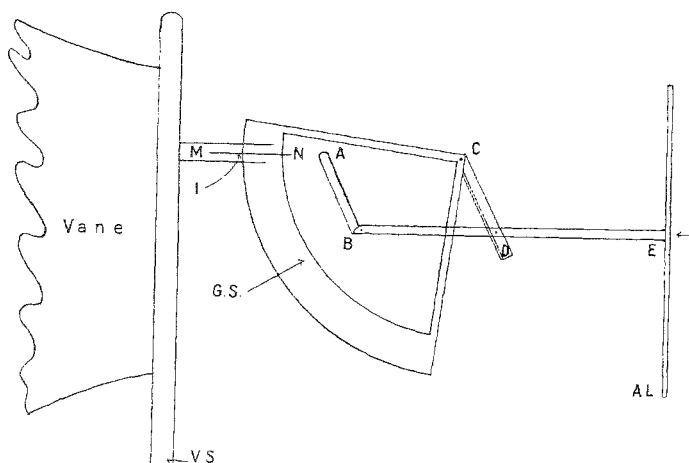


FIG. 3.—A simple form of Wind Vane.

The anemometer consists of a thin aluminium disc (AL) fixed perpendicularly to the rod BE, which is connected by means of a metal stirrup at D with a quadrant, bearing a graduated scale GS, which is calibrated from a standard anemometer, and with the horizontal support by the metal strap AB, hinged at A and B. The quadrant is pivoted freely at C, and ABCD is a hinged parallelogram which allows the rod BE to move freely and horizontally according to the pressure of the wind, the variation in pressure being recorded by means of the graduated scale on the quadrant. I is an indicator (MN) fixed to the horizontal support, and VS the vertical support of the vane. The direction of the wind is shown by the arrow.

to a well-equipped modern army with its pontoon bridges. The Italians have scaled lofty mountains that stood between them and their objective. We have thrown railways across the desert sands, entrenched in solid rock, and cut through tropical jungle; but the "fifth element" that Napoleon found in Poland—mud—still frequently leaves us baffled. Mud is the result of frequent rain, heavy soil, soft rock, high humidity, and absence of sunshine. The removal of any one of these factors makes a very great difference to military operations. Even if all the others remain, for example, the presence of hard rock makes it possible to keep the roads in good condition, and roads are the arteries of an army.

Mud is the greatest enemy the British army has had to face in France, and the only one it feared.

IV.—THE HUMAN SIDE.

GEOGRAPHIC CONTROL.

Britain being a democratic Empire, with possessions and dependencies in every continent, a well-informed public opinion becomes not only a desideratum, but a necessity to imperial well-being. It is not enough that we should aim at familiarising the adolescent mind with the Empire as it is; in some respects it is more necessary that we should throw light on the framework of adjacent countries in which the Empire is set. In our educational perspective, therefore, the Balkans and Asiatic Turkey should loom large. From a broad, national point of view intimacy with the main facts concerning those regions is more important than, for example, a similar knowledge of China or Burma. Further, social intercourse and business relations extend our acquaintance with such regions, but too often countries whose significance to us is mainly political, become nothing more than names when school life is past. Ignorance of the Near East has been to me the most conspicuous geographical failing of the great majority of people in this country since the war began. Wherever we may look for a military decision, the Near East is the pivot on which political readjustment must swing. If Antwerp is "a pistol pointed at the head of England," the Baghdad railway in German hands is a gun pointed at the heart of the British Empire.

Further, the obsession of domestic politics is obscuring the importance of the Empire to us at home. Bereft of its possessions, this country would sink to the level of a third-rate power. It could not support one-half of its present population without a readjustment of activities that would take many years to accomplish. It could not rise on the wreck of its dead self as Germany may. How many realise the latent power of Germany, even if she should accept to the uttermost the terms we demand of her? She has borne the brunt of this world-shaking war without outside assistance. Her resources are still only in the development stage; she has vast stores of minerals as yet hardly tapped. Our greatest mistake has been to underestimate her material strength. Our overweening self-confidence, which is such a prolific source of revenue to our yellow press, has been nothing more or less than geographical ignorance. This is even more striking in the case of Russia. Every schoolboy is familiar with tittle-tattle as to how Swiss mountaineers spend their winter evenings, but he is left to imagine that the Russian peasant is cast in the same mould as the man he sees working in his native fields. He knows the manners and customs of the dwellers in the tundra and the steppes, but of the inhabitants of the great plains, who are the Russian people, he knows nothing.

This is the fault of the system and of the teacher. To take the system first: Geography should be compulsory as long as a pupil

remains at school, provided there is a qualified teacher. The time allotted to it is quite inadequate. That there is no more time available is so much "let-well-alone" nonsense. The dawdling days of coercion

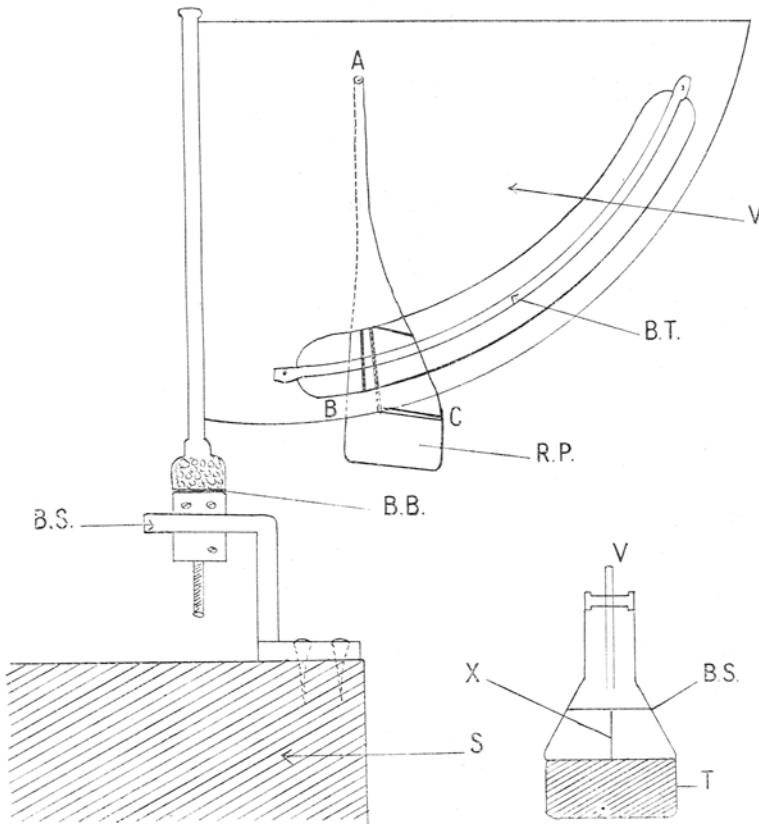


FIG. 4.—Another form of Wind Vane.

The instrument consists of a quadrant tin vane (V) fixed to a hollow rod that is free to rotate on ball bearings (B.B.) in all directions; wind direction is thus accurately obtained. A calibrated brass strip (B.T.) is let into the outer part of the vane. A rectangular piece of tin (R.P.) is suspended at A, and is always at right angles to the direction of the wind (line BC). The angle its surface presents to the wind decreases as it moves up, but this is allowed for in calibrating. B.S. is a brass support, and S the support of the whole. The anemometer is shown in elevation in the small figure, where V is the edge of the vane, B.S. the brass support, X a post by means of which readings of the strength of the wind are read off from the calibrated strip. T=tin support.

in subjects that have no value, except for their own sake and for mental discipline, must be ended, if we are not going to commit national suicide.

So much for this aspect, since this is not the place for a philippic. The dependence of the pupil on the teacher is here greater than in any

other subject except literature. The Geography teacher must be well read. The text-book, which is the pupil's stand-by, should appear to him as merely so many avenues of approach to his full knowledge—a kind of index to keep fresh his memory of authorities. In these days, when school age may extend into the early twenties, fulness of knowledge is a debt to the student, who after all is responsible for none of the handicaps that dog the teacher's path, and even in this age it is still worth something to move in the world of men, and to be able to step into the midst of futile argument and display irrefutable truth.

Of inestimable benefit is a well-selected geographical library. Home-reading from this library should be encouraged in the same way as home-reading of literature. A school that is well equipped with apparatus and books can hardly fail to produce creditable pupils.

CONSTANTINOPLE AND THE STRAITS: THE PAST AND THE FUTURE.

By MARION I. NEWBIGIN, D.Sc. (Lond.).

It has now become widely recognised that Near Eastern questions played a very large part in bringing about the great war, and that hopes of prolonged peace in the future can only be entertained if an adequate solution of these is found. This being so, there is everything to gain from a free and full discussion of all aspects of the problems involved, among which the geographical are certainly not the least important. We have published here a number of articles dealing with various sides of the geography of the Balkans, but have hitherto given no special attention to the question of the desirable future political position of the Bosphorus and the Dardanelles and of the city of Constantinople. Advantage may, therefore, be taken of two recent publications¹ in order to indicate some of the main geographical facts which bear upon this subject.

The two publications are markedly different in purpose and outlook as well as in bulk, for the one is a short pamphlet and the other a book of considerable size. But to some extent they supplement each other, for Mr. Dominian writes from the geographical point of view, while Dr. Phillipson and Mr. Buxton deal primarily with political and legal problems, and offer a definite solution of the question mentioned on their title-page. Their absorption in legal technicalities to a certain extent obscures the geographical factors, and it is here that Mr. Dominian's small pamphlet becomes specially helpful. It throws light incidentally, for example, upon certain statistics in regard to the trade

¹ *The Question of the Bosphorus and Dardanelles.* By Coleman Phillipson, M.A., LL.D., Litt.D., and Noel Buxton, M.A., M.P. London: Stevens and Haynes, 1917. Price 12s.6d.

The Site of Constantinople: A Factor of Historical Value. By Leon Dominian. Reprint from the *Journal of the American Oriental Society*, vol. xxxvii., 1917.