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Geography in the university

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reports of cricket and football matches, one is disposed to fear that the private reading of boys, which largely used to consist in reading books of history and books of travel, is perhaps not quite so general as it was some thirty or forty years ago. I am quite sure that nothing helps a boy more to take an interest in geography than if he forms a taste for books of travel, and if his teacher encourages him to do so and talks to him about what he has read. I am glad to think your Association has begun to receive so much support and now sees such a useful field opening before it. May I, in conclusion, express to the meeting, and in particular to you, Mr. Freshfield, who have done so much for geographical science as a traveller, and have so frequently and forcibly dwelt upon the value of geography in education, my hearty sympathy with your efforts, and my hopes that they may be crowned with success?

GEOGRAPHY IN THE UNIVERSITY.

By A. J. HERBERTSON, Ph.D., F.R.S.E., F.R.S.G.S.,

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I. THE UNIVERSITY IN RELATION TO MODERN LIFE.

UNIVERSITIES, in addition to their other functions, have always aimed at training the men who are to shape the destinies of their country and of their time. There has never been a time in the world's history when trained leaders were more needed. The modern world has become, at least in its material details, much larger and more complex than the world of the middle ages, when soldier and priest, doctor and lawyer, were the only professional men. Never were so many careers open to young men as at the present day. This fact is reacting on our universities, which are gradually enlarging their scope and their staff to meet modern requirements. It is not, as some suppose, a deplorable concession to commercial materialism that the Universities of Birmingham, London, and other cities should form faculties of engineering, economics, or commerce, or that the ancient University of Oxford should possess a School of Geography. A generation hence it will be considered as serious and honourable a duty to train administrators, financiers, and merchants as it is to-day to prepare clergymen, lawyers, and doctors for their work in life. This is not to belittle the universities into schools for teaching bread-and-butter subjects, but rather to prevent the otherwise inevitable divorce between the man of action and the man of ideas. The task of the universities is to fit young men to play their part worthily in the fierce struggle for distinguished existence in a world-wide arena. It will be a crime as well as a disaster if the men who are to shape the destinies of the next half century are out of touch with the wider culture which a university can and should supply, and

through our universities losing touch with the widening interests of individual and national life.

The importance of this can hardly be exaggerated. The prizes of success in the life of practical affairs are extraordinarily great in comparison with those offered by what are still commonly distinguished as *the* professions, to which may now be added the modern callings of the schoolmaster and the literary man. The capable young man, especially of the British and American type, is more and more attracted to the former at the expense of the latter, and is reluctant to spend three or four of the most important years of his life in work which has no tangible relation with his future life. In the immediate future the quality of the raw material coming for university training will tend to fall off, giving more and more semblance of truth to the assertion that graduation in a university is not graduation in a school of life. Lamentable as this would be from the point of view of the university, it would be infinitely more lamentable from the point of view of the individual and of the nation.

This is not the place to discuss this problem in all its bearings, but there is one aspect out of many in which we as geographers are specially interested, and to which we may profitably turn our attention.

II. THE VALUE OF GEOGRAPHY AS A UNIVERSITY SUBJECT.

From the outset of its career this Society has striven to promote the development of geography as a science, and to further the growth of a rational tradition of its application to education. There can be no question in the minds of any members as to its value in education. All agree that few subjects are capable of being used as effectively in training the powers of observation, description, comparison, and classification, and of developing the imagination and widening the sympathies of the pupils. Here is the great World of ours with its contrasts of mighty ocean and great continent-islands, with its vast traversable plains and its lofty barrier mountains, with its arid, uninhabited deserts and its rich alluvial lands with their teeming millions. To-day this world, which was formerly broken up into a number of independent groups of men, isolated by bounding sea, desert, or mountain, is becoming one vast community whose distant elements are coming into closer and closer contact as means of communication improve.

The study of this world is (1) highly educative, (2) of the greatest practical value, and (3) is peculiarly essential in modern education.

(1) Geography is one of, if not the most, educative of subjects. This involves the question, What is geography? It is not summarised in Bradshaw and Whitaker, as was suggested in a recent report. Neither does it consist of mapmaking. Nor is it a hotch-potch of the elements of other divisions of science. It is an independent subdivision of science which deals with problems of distribution—more specifically with the subdivisions of the Earth's surface. It may be contrasted with those branches of science which are concerned with one class of phenomena, *e.g.* the non-vital of the physicist or the vital of the

biologist, or the purely mental of the psychologist, or with one class of forms, *e.g.* the rocks of the geologist, the plants of the botanist, the human beings of the anthropologist. Each of these has a distributional aspect which its students must regard. It is just as true to say that they are all geographers because they must take geography into account, as to say that the geographer is a physicist, geologist, biologist, etc., because he has to take the results of these divisions of science into account. They are inter-related. The geologist, anthropologist, and many other men of science have to make use of the work of geographers as the geographer has to utilise their work. Each supplies the geographer with material which he combines, and so returns it in a more elaborated and useful form. The geographer, taking the facts of geological, climatological, biological, and other distributions from the works of those who have specialised in these subjects, compares them, and shows their interrelation in the different regions of the globe. The geographer co-ordinates phenomena in space, as the historian, in the widest sense of the word, co-ordinates them in time. He is essentially synthetic, and if he is analytic, it is only to be more synthetic. This synthetic discipline of geography is of the greatest educational value, and meets the wants of those who cry out, and rightly cry out, against the excessive subdivisions of knowledge. It unifies the separate sciences, it trains the senses in concrete observation and in the discussion and interpretation of physical, economic, and other statistical data applied to distributions, and above all it stimulates the imagination and the sympathies. It is an essential department of the modern humanities.

(2) Although few dispute the practical value of geography, as a rule it is greatly under-estimated. Geography is not to be ranked with shorthand, or commercial practice, or even a modern language studied for its commercial utility. It is not merely a tool of the business man and the politician, of the military man and the sailor. It gives an added power to the man of affairs, if he is taught to see, think, and act geographically. It suggests possibilities of as well as limits to expansion. No sane man expects to gather figs from thistles, but many costly attempts have been made to do equally impossible things through ignorance of geography. On the other hand, a comparison of distribution, such as the geographer attempts, often yields valuable practical results; for instance, the correlation of a certain rainfall with the sheep-rearing capabilities of a land: in South Australia with 8 to 10 inches of rain per annum eight or nine sheep can find food in a square mile; with 20 inches in New South Wales, 640 can.¹ This in turn affects the density of population, the possibility of railway construction proving profitable, and many other distributional problems of practical significance.

Geographers are only at the beginning of their task of interpreting environment. It is obvious that as they come to understand better the essential elements of each region and arrive at satisfactory classifications of the varied regions which make up the World, they will more and more supply a fund of condensed experience which can be drawn upon

¹ *Scottish Geographical Magazine.*

by students of geography at will. As an example, we may choose the Mediterranean type of climate, of warm, dry summers and cool winters, where most rain falls in the winter half-year. With it we associate certain cultivated plants and certain economic conditions. A geographer who has studied these in the Old World Mediterranean area knows the salient facts about the climate and economic products of six other parts of the globe—Southern California, the southern valley of Chile, the south-west corner of Africa and Western Australia, and the south of South Australia and Victoria. He has only to learn how local variations in configuration, soil, density and capacity of population, the development of means of transport, and other factors, cause secondary differences in these primarily analogous areas.

3. Such facts are of incalculable importance to the leaders in the modern World. The uttermost ends of the earth have nearly been compassed, and the lands divided among the nations. The pioneer explorer and the pioneer conqueror are giving place to the scientific student of a limited area and to the administrator. Sir Harry Johnston has in his day played all these parts, but his successor is essentially of the latter type. The soldier has turned administrator in Nigeria and many other Protectorates. The adventurer becomes merchant. The manufacturer is not content with his mills in Lancashire, but starts factories in India or China. The financier buys claims in Klondike, corners the wax product of South-West China, and controls the traffic of half a continent. Even the old learned professions are affected. The new missionary spirit takes cognoscence of local conditions; the doctor sends his patients to Bohemian baths or dry karroos; the jurist has more and more to deal with international law; the journalist records and comments on the affairs of the universe with supreme composure and confidence; the schoolmaster has all these men to mould in their early years.

For the world's sake, as well as for our country's and our own, we must have in this twentieth century as full and intelligent a knowledge of the World as possible. Ignorance of geography produces frequent friction and occasional wars, stupidity in commercial enterprise, hasty and reckless counsels in our journals, and loss of life, or the worse loss of prestige in the soldier. Be it politics, finance or commerce, missionary zeal or the mere pursuit of health or pleasure, our end will be more effectually attained if we have studied environments.

III. THE TEACHING OF GEOGRAPHY IN THE UNIVERSITY.

If geography is to be a university subject, how is its study and teaching to be organised in the university? In Oxford, Cambridge, and London special departments have been formed; in Birmingham and the University Colleges it has been handed over to the geologists, historians, or economists. The latter is a temporary expedient, admittedly due to lack of money. In continental universities geography is an independent department with a staff of its own. In Paris there are three departments of geography—physical, general, and colonial—in the Sorbonne alone, one at the Collège de France, one at the Ecole des

Hautes Etudes, one at the Ecole des Sciences Politiques, one in the great Ecole Normale, one in the Ecole des Hautes Etudes Commerciales, one at the Staff College at St. Cyr, and it is taught by special teachers in many other higher educational institutions. This list gives some idea of the numerous interests which a fully equipped geographical department must be prepared to meet.

In our country the geographer in the university is hampered at every turn by the insufficient teaching of geography in our schools, which again by a vicious circle is due to its neglect in the university, so that on the one hand teachers have had no training in geography, and on the other depreciate the subject as not a "paying" one. An immediate result of this is that the first year's course in geography must be elementary—not superficial, but elementary—general rather than special, suggestive rather than informational, giving a geographical bias to the mind of the student. After the first year specialisation is necessary, and will depend on the other interests of the students, unless these are primarily geographical, when a fuller all-round training is essential.

The student seeking at the university a general culture will follow the general course on geography. We may divide those who require special courses in geography into two groups—the theoretical and practical students, those who mean to devote their life to study, and those who study to fit themselves for a life of action. Of the former group, those specialising in climatology, oceanology, geology, biology, anthropology, history, and economics will normally choose geography as one of the minor subjects for their honours course. The future men of action—business men, teachers, civil servants, politicians, journalists, soldiers, etc.—will also require special courses. Those more advanced studies may be arranged in four groups—(1) physical geography; (2) economic geography; (3) political geography in the widest sense, including historical and military geography; (4) educational geography.

A large staff is necessary to carry out the ideal programme. At present we must consider what can be managed by a staff of one or two. The first provision to be made is for a general course of lectures on the principles of geography and on the great regions into which the World can be divided, supplemented by a practical class meeting both in the field and in the laboratory, to study the different notations of the geographer, more particularly the various methods of mapping topographical and other observational and statistic information, as well as the interpretation of maps, charts, and diagrams. This practical class would not attempt to make trained explorers or cartographers, but by a series of simple exercises would give the student an idea of the more important principles which guide these specialists in their work, and permit him to use their results intelligently. This should suffice for the pass degree.

The advanced work must be planned so that a student choosing geography as one of his honours subjects may graduate in two years after completing the general course. As an honours subject it should be divided into at least three divisions—(1) physical; (2) political;

(3) économic—at least one of which, along with a minute knowledge of the geography of selected regions, should be studied. The courses for honours students should be so planned that at least once in two years a sessional course would be given which would meet the needs of honours students in other subjects who wished to work at only one section of geography. The British Isles should be one of the regions selected for special study at least every other year, and might be alternated with a course on Greater Britain. This would leave two sessions for the treatment of other countries. For geographers and other research students post-graduate work would be specially planned to suit individual needs.

In the immediate future, those preparing to be teachers and business men are likely to form a majority of the students of the geographical department of most universities, and the advanced teaching should first be made to suit their requirements. With only one lecturer or professor of geography in a university this would be best attained by laying most stress in all advanced lectures on economic problems, and differentiating between the economic and educational students in their practical and tutorial work, the former being more statistical, the latter either more physical or more historical according to the other work of the student. This plan has the advantage of specially training the teacher in economic geography, the aspect of it with which he has to deal in evening colleges and schools, and even in the upper classes of secondary schools, where, however, such specialisation should be introduced with the greatest caution, and only in the case of pupils over fifteen or sixteen. It would, however, induce him to give in his lesson to younger pupils many economic illustrations, which is as desirable as too early specialisation on commercial geography is the reverse.

Gradually as the universities recognised the importance and necessity for their undertaking to prepare the administrator, politician, and journalist, political geography, in its actual and historical aspects, would be emphasised. With a staff of two this might be undertaken from the beginning, one member specialising in human geography in the widest sense, leaving the other to develop the equally important physical geography, without which political geography becomes vague and unprofitable.

The geographical department must be in close touch with other departments of the university, and ought to be recognised as part both of the faculty of arts, and of the faculty of science, as well as of the faculty of economics or commerce where such a faculty exists; for geography is related to both the humanities and the physical and natural sciences. It should be open to both arts and science students to select it as a pass subject, and those who take it as an honours subject should be permitted to select the other subjects either from the other arts subjects, or from the other science subjects. It is noteworthy that in Germany, where as a rule the teacher of geography must have a special training in the subject before he is allowed to teach it, geography is the one subject in the final examination for the teacher's diploma which may be chosen by both a student of arts and of science, and he who selects

geography as a major subject is permitted to take the minor subjects either from those in the arts, or from those in the science group of subjects.

IV. THE EQUIPMENT OF THE GEOGRAPHICAL DEPARTMENT.

It has been said that a good teacher needs no apparatus, or that he should improvise it. No doubt much can be done, and should be done, on a blackboard with a piece of chalk. The skilled labourer, however, is worthy of the best tools, and it is part of the training of a geographer to know his tools, from a compass to a volume of statistics, and to know how to handle them. All teachers of science, from physicists to anthropologists, recognise the value of proper appliances for practical study and for the adequate illustration of lectures. The geographer needs his scientific instruments as much as the physicist, his museum of types as much as the zoologist, and a well-lighted laboratory as much as an anatomist. Lectures, demonstrations, work in field, laboratory, and library are all essentials and must be provided.

The cost of providing buildings, fittings, apparatus, books, globes, maps, views, and other essentials of a geographical department, and the endowment necessary to keep these up, to pay an adequate staff, and supply two or three scholarships, would undoubtedly be great if carried out on the same scale as modern physical, chemical, or biological departments. Such a geographical department would be not merely a great teaching centre and an important place of research for the solution of theoretical and practical problems, but would be an institution collecting information about the diverse countries of the world, classifying it topographically, exhibiting the results in diagrammatic or map form for those who chose to visit the university geographical institute, summarising it by its publications for the public, and through its staff supplying information for merchants, administrators, explorers, soldiers, and others—even the holiday-maker—who chose to consult them.¹

In the present paper, however, we have to consider not the ideally best, but the immediately practicable. In a number of cases it is not necessary to begin *ab initio*, for in centres like Edinburgh, Manchester, and London, part of the work is already done by the geographical societies. In organising any geographical department, this should be taken into account so as to avoid any overlapping the work already done by the geographical society, the chamber of commerce, and other public bodies with geographical interests and activities. There should also be the most cordial co-operation among these institutions, so as to prevent unnecessary reduplication of material. Even if a geographical department could draw on the resources of such societies and public bodies, it would still need a large equipment of apparatus and of books, maps, and views

¹ In a paper by the writer on "The Position of Economic Geography in Education" in the *Journal of the Manchester Geographical Society* for 1899, some additional observations will be found on this point, and also in a paper which will shortly appear in the *American Journal of Geography*, dealing with the ideal geographical institute.

selected for teaching purposes, leaving to the geographical societies and other bodies the collection of reference material.

Coming to the approximate minimum equipment required for teaching purposes, there must be suitable rooms both for lectures and for practical work.

In the lecture-room, in addition to black-boards and diagram-screens, there must be a lantern, and if possible a double-headed lantern which would throw two pictures on different screens at the same time, and thus permit a comparison between two maps or between a map and a view. A collection of the best wall-maps, and of slides of maps, diagrams, and views, is indispensable.

The laboratory should be furnished with large tables, with desks and cases for storing apparatus, maps and books. Among the instruments should be an ordinary and prismatic compass, plane-table, alidade, clinometer, sextant, level, theodolite, barometer, thermometers (including boiling-point and deep-sea forms), planimeter, measuring and drawing instruments of all kinds, and a good camera. Globes should be procured which illustrate not merely political or orographical distributions, but also geological, climatic, biological, and economic ones. A collection of models is highly desirable, especially such as illustrate typical regions (*e.g.* Heim's models of parts of the Alps) or typical land forms (*e.g.* the Harvard models).

Too much care cannot be bestowed upon the selection of maps. When Professor Reclus's disc maps are completed they will be essential as the only ones which depict the regions of the world on the true curvature in a uniform scale and in uniform design. The larger-scale maps and charts should be so selected as to illustrate regions of special physical or historical interest, and at the same time different styles of cartographic work. The best available general maps illustrating orographical, geological, climatic, biological, anthropological, economic, and historical distributions should be procured. The best text-books in English, French, and German should be on the library shelves, a selection of the most important geographical monographs and gazetteers, atlases and classical books of travel, as well as of statistical annuals and reports, and some of the more important geographical periodicals.

V.

The geographer, then, is he who seeks out the laws relating to different orders of phenomena associated in space, who inspires youth with true conceptions of the ordered greatness of the World whereon he lives, who shows forth the dignity of Man in his achievements as a co-operator with Nature, and at the same time the humility of Man controlled by his environment.

A geographer is at once a patriot and an internationalist, keenly alive to the necessity of stimulating the full development of local activity and resources, yet world-wide in his outlook and sympathies. The one is essential to the other, for each part of the World is now so closely linked to every other part, that healthy progress in one is favourable

for all. The geographer is a student of the world of peace as well as of the theatre of war—the exponent of the environment to be dealt with in any venture, commercial or military, political or missionary. He must have time to study and to travel, and in return, the fruits of his observations and his thoughts should be given to his pupils and to the world. It seems to the writer that one of the most important duties of geographer is to show forth sympathetically the conditions of other countries to the younger generation in the university, and on occasion to the public, and thus help to remove prejudice and foster good feeling, which is so essential for the rapid harmonious development of this complex world in the twentieth century.

A BOTANICAL SURVEY OF SCOTLAND.

By WILLIAM G. SMITH, B.SC., PH.D., Yorkshire College, Leeds.

(*A Paper read before Section E at the British Association, Glasgow, 1901.*)

AN observer, after some experience of travel in Britain and abroad, acquires the impression that landscapes differ, the hill-region from the plain, the northern from the southern, a cold region from a warm or temperate. Differences in the vegetation assist largely in fixing this impression; thus a region of cornfields and woodlands contrasts strongly with the grassy or heathery moorland. Geological features give character to hill and dale, while the nature of the underlying rocks or other deposits, and the presence or absence of stratification, dip, and jointing have an effect on the surface vegetation. Geographical and climatic features, altitude and latitude, degree of exposure to sun, cold, wind, and rain, together play an important part in determining the distribution of plants, and in modifying the soil for plant-life. The influence of man in a country like Britain is also no minor factor in making a landscape.

In the records of travellers, description is assisted by reference to dominant features of vegetation; thus Humboldt (1806) distinguishes nineteen plant-forms as characteristic,—palm, cactus, bamboo, grass, etc. In Britain to mention cultivated fields, pine woods, or heather moors is to recall scenes once visited. The use of maps to demonstrate the features of a country is evident. The orographical map with heights and depths coloured according to a scheme of tints is a great advance on a black and white map, however well supplied with contour-lines and other information. Geological maps with the various formations indicated by distinctive colours are now prepared for many countries. Facts regarding rainfall and other climatic features are also conveyed by maps rather than by statistics. But the distribution of plants is as yet recorded on maps only in the most superficial way. The existing vegetation charts, found in recent atlases of physical geography or in works devoted to plant-geography, are based on the assumption that the relations between