

PROGRESS OF GEOGRAPHY.

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DURING the past half-century marked advances have been made in all the departments now included under the head of Geography, which has to deal with certain problems dependent on the constitution, configuration, and distribution of the surface features of the earth. In attempting to take stock of the results of the exploration of the unknown and little-known regions of the globe during this period, I think it is safe to say that we have to go back to the half-century which followed 1492 (when Columbus stumbled upon a New World) before we find a period so prolific. The two Poles have been reached and large additions made to our knowledge of the deep island-girt ocean which covers the Arctic basin, and to the vast ice-bound, mountainous continent near the centre of which the South Pole is located. The unknown two-thirds of the no longer "Dark Continent" have been more or less provisionally charted, and all but an insignificant fraction partitioned among the Powers of Europe. Great areas of North America have been surveyed, charted, and occupied, while much has been done for the exploration of Central and South America. The map of Asia has, to a large extent, been reconstructed, while the vast unknown interior of Australia has been traversed in all directions. Even much of Europe has been re-surveyed. A new department essentially geographical—oceanography—has been created as the result of the *Challenger* and other oceanic surveys.

Survey work not only in the official surveys, but also among explorers, has become more and more accurate, while methods and instruments have been greatly improved. These improvements, combined with the more thorough training available at the Royal Geographical Society and certain of the universities by would-be explorers, have greatly enhanced the scientific value of the results of exploring expeditions. Many of these in recent years have been accompanied by specialists, not only in strictly geographical subjects, but also in other departments of science—geology, biology, meteorology, anthropology, etc.—certain of the data of which are required in working out some of the problems with which it is the business of geography to deal. For, to quote from the presidential address of Sir Richard Strachey to the Royal Geographical Society in May, 1887:—

There is no greater difficulty in recognising the legitimate place of geography as one of the sciences of observation, because of the close relation that subsists between the matters with which it deals, and those that fall within the scope of other branches of science, such as geology or biology, than there is in assigning the like character to chemistry and electricity, because of the interaction of the forces with

which they specially deal, with those that constitute the principal subject of inquiry in other specialised fields of human knowledge.

Of course, apart from the gains to geography as an observational science, the other departments of science represented on these expeditions have greatly profited by the opportunity thus afforded.

The results of all this activity have been vast additions to our knowledge of the great features of the earth's surface, their constitution, their morphology, their distribution, their mutual relations, their influence on the distribution of all that the surface sustains, mineral, vegetable, animal, and, most important of all, man, of whom all the other factors form the environment. If we compare the maps of to-day with those of fifty years ago, they will afford striking evidence of the great additions which have been made to our knowledge of the face of the earth. The entirely unmapped has been enormously decreased, while marked progress towards accuracy has been made on the imperfectly mapped features. Great improvements have been made, especially in the British Islands, in cartography, both in the symbols adopted for indicating the physical features and in execution and workmanship. At the International Geographical Congress of Geneva in 1891, a great scheme was initiated for an international map of the world on the scale of 1/1,000,000. At subsequent conferences a series of regulations was drawn up to be followed by each country in producing a map of its territories, and a certain amount of progress has been made, though it is feared that the war has been a serious interruption. On the other hand, one important result of the war has been the production by the Royal Geographical Society, under the direction of the Geographical Section of the General Staff, of a map of Europe and the Near East on the lines of the international map which not only has proved of great service in connection with the war, but also will be of permanent value as the standard map of the extensive region dealt with. In general, it may be said that the maps and atlases of the present day reflect the marked advance which has been made in geography generally during the past half-century.

In recent years considerable progress has been made in geodesy. In 1899-1902 an arc was measured in Spitsbergen, while under the direction of the late Sir David Gill there was initiated the measurement of a great arc in Africa along the meridian of 30° E. If these arcs are connected through Asia Minor and Europe, a continuous measured arc of 105° would be obtained. The arc of Quito (Peru) has been re-measured under the direction of the French Academy of

Sciences, and it is hoped may be connected with the great arc in 98° W. which has been undertaken by the U.S. Coast and Geodetic Survey. Other arcs of special importance have been measured in Europe and Asia.

One of the great problems with which geography has to deal is that of distribution. It is obvious, on the face of it, that the many types of features which are distributed over the surface of the earth must have a potent influence on the distribution and activities of humanity, which lives and moves and has its being among them. There can be no doubt as to the influence of geographical conditions on history and other human activities, and perhaps even on race; but, as Ellsworth Huntington points out, the claims in this respect are often too vague to convince the sceptical historian. What we want is a more precise statement as to the nature and amount, the quantity and quality, in each case in this environmental influence compared with various other elements. Several attempts have been made to deal with the problem in recent years; definite areas should be selected and the problem worked out in detail on the spot.

In what precedes we have dealt mainly with the geosphere; but the hydrosphere is an important section of geography, both in itself and in its influence on the former. Hydrography is a convenient term to include the various forms in which water is distributed over the face of the earth—rivers, lakes, and the ocean itself. Potamology, or the study of rivers and their *régime*, has attracted much attention in recent years. Limnology, the study of lakes—depth, movement of their waters, distribution of life, physical nature of their basins—initiated by Forel in the 'eighties and 'nineties on the Lake of Geneva, has been continued in the Scottish lochs with voluminous results of high scientific value. But it is in oceanography that the greatest advances have been made during the half-century. A certain amount of work on a limited scale had been done in oceanic research, but it remained for the great *Challenger* Expedition during its 1872-76 cruise over the oceans of the world to create a new department of science under the name of Oceanography. This was followed by other similar expeditions in the *Siboga*, the *Planet*, and the *Michael Sars*, the result being a vast accumulation of data on the ocean in all its aspects—its depths, the nature of its bed, distribution of life at all depths, saltness, temperature, its surface and under-currents, and other features.

As the result of a movement initiated by the Royal Geographical Society in 1884, geography has obtained a place in education in Great Britain which it had never held before, while the standard of the subject has been raised to a much higher level. The subject has at last received ample recognition at Oxford and Cambridge and other universities in the kingdom, while radical reforms have been made in schools of all grades. On the

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university programme we have such heads as the Principles of Geography; Survey of the Natural Regions of the Globe; Land Forms and Morphology of the Continents; Meteorology, Climatology, and Oceanography; Human Geography in its Various Phases; Geographical Methods of Notation, and so on. This will show how high is the standard and how wide the field of the subject compared with the position even thirty or forty years ago.

Such, briefly, is a review of the progress of geography during the past half-century and its present position in this country. It has made vast advances in all directions and risen far above the lowly position assigned to it fifty years ago. Still it has by no means reached the position claimed for it by the late Sir Joseph Hooker; "it must permeate," he said, "the whole of education to the termination of the university career, every subject taught having a geographical aspect." Notwithstanding all that has been accomplished in the more or less scientific exploration of the face of the earth, much still remains to be done before our knowledge of its features is adequate. The great blanks which disfigured the map of Africa fifty years ago have, no doubt, been filled up, but it is doubtful if more than one-tenth of its surface has been mapped with anything like accuracy. Of Australia, large areas have only been provisionally mapped, and the same may be said of Asia. Even in the case of Canada and the United States much remains to be accomplished before these countries are as thoroughly mapped as the United Kingdom, India, and even Japan. Of South America, only fragments have been adequately mapped, and probably a million square miles are entirely unexplored.

Oceanography has by no means completed its task, though when Amundsen returns in four or five years' time he may be able to tell us all we want to know about the Arctic basin. While there is no need for a network of mapping on the Antarctic continent, still we desire further additions to our knowledge of its great features, its geology, its meteorology, as well as its resources, if there are any of value accessible. There remains ample room for work by trained explorers in many of the islands of the ocean. It is thus evident that plenty of work still remains to be done in exploration, in survey, in mapping, and in collecting the varied material which will enable the trained geographer to work out those problems which bear on the relations between man and his geographical environment. Happily, the marked educational advance during the last thirty years in the status of geography, and the great improvement in geographical education, have resulted in producing an increasing number of young geographers capable of dealing on scientific lines with the problems presented; in this respect we are rapidly approaching the standard which has for long been almost a monopoly of Germany.