EXPLORATION OF THE LLOYD GEORGE MOUNTAINS IN THE NORTHERN CANADIAN ROCKIES

By Dr. N. E. ODELL

AN Anglo-Canadian-American expedition, sponsored by F. S. Smyth, and consisting of seven members, was able during the past summer (1947) to carry out the exploration of the Lloyd George Mountains, which are situated in northern British Columbia. This mountain group lies just south of lat. 58° N., and only the foothill district to the south of it had previously been visited. The name Lloyd George Mountains, in honour of the late British premier, was given in 1916 by P. L. Haworth, who made a difficult journey to the lake, now named after him. It was Haworth Lake, fed by the melt-waters draining the Lloyd George Icefield, which was utilized by this year's expedition as a base.

We were an airborne expedition, and flew in a sea-plane in two parties, from a take-off some 250 miles to the southward. A reconnaissance flight was made from Haworth Lake (altitude *c.* 3,800 ft.) before the departure of the aircraft, and this revealed a vast snowy range lying to the north-west as well as the south-east of the contiguous Lloyd George Group. It is a highly complicated and deeply dissected mountain region, with the highest peaks approaching 10,000 ft. in elevation. The eastward flowing Liard River, bounding this belt of mountains on the north, would seem to form the true northern limit of the Rocky Mountains proper, as originally suggested by R. G. McConnell and again recently by M. Y. Willams[1].

The dominating physiographic feature, from which rise the highest peaks, all of which were ascended, is the Lloyd George Icefield, and its main *névé* covers some 45 sq. miles, but with dependent glaciers it is 90–100 sq. miles in total extent. Steep glaciers descend to an altitude of 4,000 ft. in heavily forested valleys, which are the haunt of bear, deer and other game. A very rich and beautiful alpine flora was found, particularly in July, up to an elevation of 7,000 ft. and more. More than two hundred species were collected, some believed new, and these were sent for determination to the Royal Botanic Garden, Edinburgh. The flora was quite as profuse as hundreds of miles farther south in the Canadian Rockies.

As to the solid geology, the district explored lies entirely eastward of the Rocky Mountain Trench, that great structural feature which separates the Rocky Mountains proper from the diverse ranges of the central portions of British Columbia. The latter region is underlain by sedimentary and volcanic rocks of Palæozoic and Mesozoic age, with immense batholithic intrusions, ranging in age from pre-Carboniferous to Tertiary, and considered to have been the source of the metallic mineral deposits of central British Columbia.

In contrast, the ranges of the Rocky Mountains eastward of the Great Trench are a series of highly folded sediments with representatives of practically the whole geological succession, but without eruptive rocks, and devoid of ore deposits.

The Lloyd George Mountains are carved out of a great thickness of Palæozoic rocks, which are overfolded towards the east and often display in individual peaks the characteristic tilted fault-block type of structure and so-called 'writing desk' form, so prevalent elsewhere in the Canadian Rockies. Mainly composed of hard limestones, the softer interbedded shales and slates, with the softer limestone, are normally highly folded and sheared. No extensive overthrust masses (*nappes de recouvrement*) were observed. Compression and shear have been responsible for the destruction of almost all organic remains, and only in one locality high up in a mountain face was found a fossil coral horizon which appears to be of Silurian age. The field collection made by me has yet to be worked out.

Regarding the glacial geology, an outstanding discovery was a large stagnant glacier, lying in a deep canyon-like valley, which was entirely blanketed in moraine, and upon which trees and plants were growing. This glacier, extending through a range of altitudes of from 4,500 to 6,000 ft., appears to be the only one of its kind which is known south of Alaska.

The glaciers of the region generally appear to be in a state of slow recession. The present summer snow-line lies at approximately 7,900 ft.

The survey, and other scientific work of the Expedition, was greatly hampered by the prevailing bad weather, which, throughout the Rockies during the summer of 1947, was the worst on record for forty or more years.

[1] Willams, M. Y., *Trans. Roy. Soc. Can.*, **41**, (4), 73 (1947).

CAMBRIDGE ARCHÆOLOGICAL EXPEDITION TO CYRENAICA

By C. B. M. McBURNEY, R. W. HEY and W. WATSON

THE first Cambridge Archæological Expedition to Cyrenaica, North Africa, took place during the summer of 1947. A total of three months was spent in the field, and the following were the principal results obtained.

The primary object of the expedition was to investigate the Palæolithic succession in the coastal area, and to correlate it, if possible, with any traces that might be found of a marine Pleistocene succession. Italian geological literature of the pre-war period mentions the presence of marine Pleistocene deposits in the Benghazi plain, and refers to probable Pleistocene shore-lines at several points along the Cyrenaican coast. So far as we know, however, no detailed study of these was ever undertaken.

Accordingly, the first part of our time was spent in an examination of the more accessible portions of the coast between Benghazi and Derna, in order to locate beach conglomerates, wave-cut terraces and other traces of high level shore-lines. These were discovered in fair abundance, though obscured in many places by masses of alluvial material. From the results obtained by levelling such features, it is hoped to establish the Pleistocene succession of sea-levels for this part of the coast. The highest shore-line of which traces were found was at some 80 metres, in the Derna region ; the lowest lay at about 6 metres and was preserved in most of the areas examined. The intermediate levels are still under consideration.

The cultural succession associated with these events proved most instructive. Traces of the Middle Palæolithic could be recognized at various points along the coast, and a few specimens embedded in the beach conglomerates can probably also be attributed to the same stage. A rich Levallois station was discovered five miles west of Derna and can almost certainly be associated with the terra rossa at 5 metres above sea-level.

On the other hand, an evolved Mousterian industry occurred in a silt deposit in a tributary of the Wadi Derna, associated with a vertebrate fauna and well-preserved plant remains. This deposit interdigitates with the high terrace of the Wadi Derna, which was surveyed down-stream to a point about three-quarters of a mile from the sea. There is no doubt that this terrace was formed in connexion with a sea-level much higher than the present, though further work will be necessary before an exact estimate of the height of this level can be given.

No traces earlier than blade industries of Upper Palæolithic or later date occur on the consolidated dunes which line the modern shore, and which presumably belong to the low sea-level of the last glaciation.

Detailed information regarding the form and associated fauna of at least one phase of these later industries was obtained from a cave discovered and excavated in the Wadi Cuf, fifteen miles from the coast. The two faunas, and the flora from the Wadi Derna, should provide considerable information on the Pleistocene climatic sequence of the east Libyan seaboard.

We should like to express our gratitude for the assistance afforded by King's College, Cambridge, and the British Museum, in defraying the expenses of two of the members of the expedition, and particularly to the Trustees of the Percy Sladen Memorial Fund for their generous grant, without which the expedition would never have been undertaken. The constant help and co-operation of the authorities of the British Military Administration of Cyrenaica was also an important factor in the success of the expedition.

A further visit in the near future, to amplify and complete these findings, is planned.

THE COMMON COLD

THE Cantor Lecture before the Royal Society of Arts, delivered on January 20 by Dr. C. H. Andrewes, of the National Institute for Medical Research, is an admirable summary of the essential features of our knowledge of that world-wide scourge, the common cold; and nobody is better fitted than Dr. Andrewes to state what we know and what we do not know about it. This problem is being attacked energetically by a research unit of the Medical Research Council in a hospital built at Salisbury during the War by Harvard Medical School and the American Red Cross, and eventually presented to the Ministry of Health.

If, as Dr. Andrewes showed, those who are working on this problem in Great Britain and other countries are only beginning to pick up clues to the solution of what is one of the most complex problems of virology, there is plenty of evidence that this relative ignorance will not persist for very long. All the portents, indeed, suggest that presently the common cold, like typhus, typhoid, cholera, smallpox, yellow fever and other plagues, will have yielded to human domination. But this will not come about without much patient research and, when that research has found the methods of control and cure, the co-operation of the public will be required. For, as Dr. Andrewes explained, the common cold, or more accurately, perhaps, the various varieties of it which probably exist, depend very much for their dissemination upon such human habits as sneezing, coughing, handkerchief-waving and so on—all of them habits which people will not readily alter to the degree that scientific control of infection requires.

The work of the Air-Hygiene Unit, the members of which are collaborating more and more closely with the workers on the common cold, demonstrates the importance of this aspect of the problem. It has been shown, for example, that handkerchiefs shaken in the air can disseminate very many bacteria, and other work suggests that impregnation of handkerchiefs with certain substances, among which phenyl mercuric bromide is promising, may make them less dangerous. Possibly the handling of infected handkerchiefs, rather than waving them about, may be an even more important means of dissemination of the organisms concerned.

Research on the common cold, like all work on diseases caused by viruses, was hampered until methods of cultivating viruses in the laboratory were discovered. Now that these are available, it is possible to use, for work on the common cold, the method of cultivation of viruses which has been more successful than any other, namely, their cultivation on the fertile hen's egg. American workers have claimed that they have successfully grown the 'cold' virus in hen's eggs; Dr. Andrewes and his colleagues, who are attacking the whole problem in Britain, have used the same techniques, but have so far been unable to confirm the American results. Dr. Andrewes discussed this point and suggested that probably the two groups of workers are studying colds due to different causes, the American type of cold being more like the condition known as sinusitis, whereas the British workers are studying the runny-nose type. Thus one of the important requirements is successful isolation and cultivation in the laboratory of the viruses concerned, of which there may be several.

Another great handicap in this work is the lack of a suitable experimental animal. The virus of human influenza will 'take' in ferrets, but the chimpanzee is the only animal so far known to be susceptible to the human common cold; and chimpanzees are expensive and difficult to handle. Human volunteers must therefore be used, and in his lecture Dr. Andrewes described the work being done at Salisbury where the Medical Research Council Unit has so far had the help of five hundred human volunteers. A sound technique has now been evolved; methods of storing and filtering the virus have been worked out; it has been shown that the incubation period of the colds studied was two to three days, and that the nasal secretions will not communicate a cold if they are diluted beyond 1 in 100. Bacteria-free filtrates of nasal washings from volunteers with colds have produced colds in about 50 per cent of subjects, and this has happened all the year round, with possibly a lower percentage of colds acquired during the winter.

This last point will surprise those who believe that cold and wet precipitate, or even cause, colds; but Dr. Andrewes made wise and salutary comments on this view in the section of his lecture devoted to the effect of the season and the weather, and in the interesting section on the incidence of colds in the Arctic and in Spitsbergen, where the outbreak of colds is intimately connected with the arrival and departure of ships from the outside world. This part of the lecture and also Dr. Andrewes' remarks on the value of the many cold cures that are constantly recommended should certainly be read by the "scores, perhaps hundreds" of people who have