annual report of the Lancashire and Cheshire Fauna Committee added the golden plover to an extensive list of birds recorded in inner Manchester, while in *British Birds* (November, vol. 26, No. 6, 1932), Mr. Eric Hardy added the hoopoe to the birds watched inside Liverpool after recording the same species (*British Birds*, August, vol. 26, No. 3, 1932) in Birkenhead.

Unusual Rainbow Phenomena

A NUMBER of correspondents have added further descriptions of unusual rainbow phenomena to the account by Mr. J. L. Horton of the display of June 26 (NATURE, July 8, p. 57). The month of June was unprecedented during at least the past sixty years for the number of thunderstorms, and was at the same time a generally sunny month, so that opportunities for seeing rainbows were unusually frequent. An account from J. O. Ewing, of bows seen from Brandon, Suffolk, on the evening of June 17, described three closely adjacent bows with the red farthest from the sun, of which only the outermost showed the complete range from violet to red, this being the brightest, while another bow much nearer to the sun is said to have shown colours in the reverse order. It appears possible, seeing that the effect was described from memory, that errors have been made over the colour sequences, as the bows corresponding presumably with the ordinary primary and secondary bows have the usual order of colour reversed, but even so the phenomenon was evidently very different from that described by Mr. Horton.

R. N. JONES describes something more similar that was seen from Liverpool on July 8, except that the bow lying just outside the secondary bow was not noted, and asks whether anyone has ever seen the two bows theoretically possible in which the sunlight suffers respectively three and four internal reflections inside the raindrop, which would occur between the observer and the sun. Mr. G. H. Harker writes of having seen the phenomenon noted by Mr. Horton on several occasions, the most recent being at Clifton, Bristol, on July 10. He points out that the supernumerary bow outside the secondary is the rarer; that both depend upon the existence of a sufficient number of uniformly small droplets; and that a mixture of droplets of various sizes tends to produce overlapping systems that may give a bow of varying curvature and with a varying colour sequence in different parts of the same bow. He refers the reader to Airy's theory of the rainbow given more than a century ago and to the extended treatment in Chaps. xvi and xvii of Bouasse and Carrière's "Diffraction".

Early Script in India

AN interesting inscription in a rock-shelter in the Sambalpur District, Bihar and Orissa, is the subject of a note, accompanied by a series of illustrations, by Mr. K. P. Jayaswal in the *Indian Antiquary* for March. It appears to be in a script representing a transition from that of Mohenjo-daro to the Brahmi, and is dated tentatively at about 1500 B.C. The inscription occupies a space of 35 ft. × 7 ft. The letters, partly painted, partly incised, would appear all to have been painted before being cut. There is no sign of the use of an iron tool. The inscription is unquestionably writing, and Mr. Jayaswal is of the opinion that the hand responsible for the inscription was accustomed to the use of the pen. The writing appears to have reached the syllabary (alphabetical) stage. The script resembles Brahmi more closely than any other, but a number of resemblances to Mohenjo-daro are noted. Notwithstanding the Brahmi cast of the inscription, it does not follow that the language is Aryan, and in view of the locality in which it has been found, it may be a pre-Dravidian Raksasa record, Raksasa being used as a generic term for the peoples dispossessed by the Aryans, now possibly represented by the Gônds.

Archæological Field Work in America

NOTWITHSTANDING the summary character of the reports in the annual "Explorations and Field-Work of the Smithsonian Institution", its publication is always welcome as an early source of information on recent activities in the scientific exploration of America, especially in archæology and ethnology, pending the issue of full reports. The comprehensive character of this publication which, as a rule, covers all the operations of the staff in the field, also serves to indicate the general trend of research. In the issue for 1932 (Publication 3213), for example, the problem of early man in America is attacked from several aspects. Dr. Aleš Hrdlička's archæological exploration of Kodiak Island, Alaska, and Mr. Henry B. Collins's investigations at Point Barrow, Alaska, have advanced the chronological and distributional classification of Eskimo cultures; Mr. Frank Setzler, investigating prehistoric cave-dwellers' sites in Texas, links positively for the first time the culture of the Big Bend area with the south-west; while Dr. Gerrit S. Miller, Jr. and Herbert W. Krieger have investigated the prehistoric cultures of islands in the West Indies with special reference to their early interrelations. Dr. Frank H. H. Roberts, Jr., continuing his excavations of Pueblo settlements in the south-western States, has carried a stage further the elucidation of the development of domestic and ceremonial buildings. Other investigations cover the mound-builders, the Indian tribes of eastern Canada and New York State and of California; and Miss Densmore continues her song-collecting activities among the Seminoles of Florida.

Geo-electric Methods in Search for Oil

RECENTLY geo-electric methods as applied to oil-field exploration have been regarded with some disfavour, but Mr. O. H. Gish in a paper on this subject (*Bull. Amer. Assoc. Petroleum Geol.*, **16**, No. 12, Dec. 1932, pp. 1337–1348) maintains that factors influencing this condemnation are subjective rather than objective. Many people still believe that electricity is endowed with a mystical power and thus the impostor has ample scope for his nefarious activities, while the *bona fide* geophysicist has perforce to qualify his statements. The impostor may forecast the number of barrels of oil obtainable from

a given site, while the geophysicist speaks only of indications good or bad. Electromagnetic and resistivity methods have enjoyed a measure of success in the exploration for oil. They are, however, at a serious disadvantage when compared with seismic and gravimetric methods, in that they entered the field relatively late and with inadequate theoretical equipment for the best interpretation of results. It is recognised that only in special cases will electric methods admit of unique interpretation, but, of several consistent interpretations, some may be eliminated as being incompatible with facts known to the geologist and others by employing different survey methods in corroboration or otherwise. In principle, therefore, it seems possible to determine from geophysical surveys, augmented by other available data, the approximate depth and features of petroliferous structures. Although electric methods may be more widely adopted by technologists in the future, there are still many errors in technique which have hitherto vitiated results and must first be eradicated. Moreover, it is not possible at this stage to determine whether the results from these methods compare economically with those obtained from gravimetric or seismic methods.

Electricity Supply and Fuel Consumption

THE Electricity Commissioners have recently issued a return of the fuel consumption and the electricity generated at the power stations of Great Britain during 1932 ("Generation of Electricity in Great Britain"; London: H.M. Stationery Office. 1*s*. 6*d*.) The number of steam stations has diminished by four per cent from last year, but the consumption of electricity has increased by about eight per cent, the coal consumption exceeding ten million tons. Although the number of oil engine stations has increased, their total output has diminished. The district showing the highest degree of electrification was south-east England and only in one area, northern Scotland, was the output less than in 1931. The trade barometer indicated by electricity consumption shows that there is little improvement in heavy industries. The advance that has taken place is due to improvement in the lighter industries and particularly to the large use that is now being made of electricity for domestic purposes. The average coal consumption in the steam driven stations per kilowatt hour developed has fallen from 1·82 lb. in 1931 to 1·74 lb. in 1932. As a rule the stations which have the maximum output are the most economical. The Portishead Station of the Bristol Corporation had an average fuel consumption of only 1·15 lb. per kilowatt generated. There were 23 stations the consumption at which was less than 1·5 lb. This compares with 1·7 in 1931. It will be seen that the generation of electricity in British power stations is now being conducted both efficiently and economically but there is still plenty of scope for increasing the efficiency of the methods of distribution.

Aluminium Production

AT the Edinburgh meeting of the Institution of Mechanical Engineers on May 30, Mr. G. Boex read an interesting paper describing the extensive electrical plant and the processes employed at the various works of the British Aluminium Co. in Scotland. As well as producing the metal electrolytically, the British Aluminium Co. manufactures alumina carbon electrodes. It has alumina works at Burntisland, where a chemical process is employed. At the carbon works at Kinlochleven, the electrodes necessary for three factories in the north of Scotland are produced. The electrolytic works at Foyers, Kinlochleven, and Lochaber are close to large hydroelectric stations where 33,000 kilowatts are already being used. The metallurgist and the physicist have been working for the last twenty years on methods of improving the quality of aluminium and its alloys. Alloys are now produced which, weight for weight, have three times the strength of steel. American manufacturers are laying down rolling mills capable of producing sections made of these alloys comparable with those made of steel. The increase in the first cost is more than offset by the advantage in strength for a given weight or by a definite reduction of the weight of a section. The metal aluminium can be made economically only by the use of electric power. Direct current in bulk is required. A total of about 26,000 kilowatt hours is required for the production of one ton of aluminium from alumina. The Company has routine laboratories at all its works and research laboratories at three of them. The aluminium works in the Highlands of Scotland have been a great help to the inhabitants both during construction and when operating. From the economical point of view it is hoped that the success of these undertakings will encourage the development of the smaller water power resources of the Highlands and that industries will spring up in their neighbourhood.

Commercial Bulb Production

FOR more than two hundred years the bulbs grown in Great Britain have been imported, chiefly from the Netherlands. Commercial flower production, however, has expanded so rapidly in recent years that the sum spent on imported bulbs is now very considerable, £1,470,000 being reached in 1931. There seems to be no reason why bulb-growing should not be successfully developed in England, and to this end the Ministry of Agriculture has issued an illustrated bulletin (No. 62), price 1*s*. 6*d*., entitled "Commercial Bulb Production". The term 'bulb' is used in its general sense and although the major part of the bulletin is devoted to the true bulbs of commercial importance (daffodils, narcissi, tulips and lilies) certain other 'bulbs' such as gladioli and irises are dealt with in detail, and much useful information is supplied on a number of miscellaneous 'bulbs' commonly grown in parks and gardens. After some account of the best type of soil, its preparation and manurial treatment, the planting, care of the crop, and methods for its propagation are described. In the case of the more important species, full information is given as to the selection of varieties most suitable for forcing, growing in pots or in the open, together with recommendations as to the best times for planting and lifting. Practical advice is also