

advocated that a modern plant should be set up by the railways in conjunction with the Department of Scientific and Industrial Research. No steps, however, have yet been taken in this direction.

Lightning Current Recorders

THE engineers of the staff of the General Electric Co. of America have computed that about 75 per cent of all interruptions to electric service are caused by lightning. In the *Electrician* of August 4 an account is given of a simple magnetic device which has been largely used for recording the currents that flow in the earth conductors of the lattice towers when the line is struck by lightning. Small pieces of magnetic material called magnetic links are mounted on brackets and installed within a few inches of the leg of the tower. At the present time, more than 2,000 of these links are in use on high voltage lines. The link is so placed and designed that the magnetism induced in it is proportional to the highest value of the lightning current. Line patrolmen working under the research staffs of the power companies test the links periodically for magnetisation. The magnetised links are sent to the research laboratories. By inserting them in a measuring instrument called a 'surge-crest' ammeter the pointer of the instrument indicates the maximum value of the lightning current. Currents up to 25,000 amperes have been measured. As the resistance of the 'earth' at the tower is sometimes high, this current may be reflected into the service line with ensuing damage or interruption of the power current. The overhead earth wire at present largely used as a safeguard against lightning was the outcome of previous experimental researches on voltages induced by lightning.

Freshwater Biology

THE report of the Freshwater Biological Association of the British Empire for 1932 shows notable progress in research, membership, and interest of universities and public bodies. The laboratories at Wray Castle, Westmorland, were inspected by a large number of the public on open day, August 10. The field apparatus was shown, as well as specimens of living animals and rare plants, including *Hydrilla verticillata*, a plant moderately abundant in Esthwaite Water, but unknown in any other locality nearer than East Prussia. The light-intensity at various depths in Windermere has decreased within the last decade, indicating enhanced numbers of blue-green Algæ due to increased pollution. The Bernheim rectifier photocell has come into favour because of its chromatic sensitivity and convenience in handling, galvanometer measurements giving direct values. Accurate work with a large system of thermocouples has revealed in Windermere a warm upper layer of water, or epilimnion, separated by an oscillating temperature discontinuity from a colder lower layer or hypolimnion. Inflowing streams carry warmer water, and floods, accompanied by wind operating as a mixing agent, tend to warm the lake, with a consequent increase in diatom numbers and improvement in trout fishing. The behaviour of

Planaria (flatworms) shows that the normal movement of the animals against the current is reversed during the reproductive stage, and also when the water is impure, a reaction which is more delicate than any system of chemical measurement. The epidermis of Planaria is sensitive to light, and its reactions to different temperatures are being studied in a thermostatically controlled observation tank. A new method of controlling a respirometer was shown, applied to estimating the rate of exhalation of carbon dioxide by newts. Colorimetric and electrical apparatus were shown for the measurement of salt concentrations, and microscopes showed the annual growth lines on fish scales.

Archæological Survey of Colorado

IN America the distribution of a physically homogeneous population over a wide and geographically diversified area has given a special significance to the study and determination of cultural similarities and differences and their distribution, for which in archæological studies, survey work is the first essential. The value of the intensive local survey in this connexion is illustrated by the third report of the Archæological Survey of Eastern Colorado, covering the work done in 1932, which is issued by the Department of Anthropology in the University of Denver. Dr. E. B. Renaud, professor of anthropology and director of the Survey, with his assistants and the help of residents, covered 4,071 miles, in which much previously archæologically unknown country was visited and more than a hundred new sites recorded. A journey of reconnaissance was also made in Nebraska. The point of special interest is that Prof. Renaud records the discovery of basketry and other remains in caves south-west of Fowler and north-east of Beulah. It now becomes known for the first time, through the systematic work of the Survey, that the Basket-Maker culture, previously recorded in Utah, Arizona, New Mexico, south-west Colorado and western Oklahoma, also extended so far north as the Arkansas basin in north-eastern Colorado. A second addition made in this season's work to the distribution map of prehistoric culture is the record from many new districts in Colorado and also Nebraska of Yuma and Folsom artefacts, the flaked points believed by many to have been used by hunting peoples of the Upper Pleistocene. On the other hand, the study of the pottery which appears in this report inculcates the necessity for caution in generalisation while the work of the survey is still incomplete. In the previous season the number of sites on which undecorated pottery and pottery decorated with the impressed cord pattern were found was about equal—twenty-three to twenty-five—but this year the decorated pottery sites outnumbered the undecorated by more than three to one.

Magic and Games

IN an interim report issued by the Smithsonian Institution, Washington, on recent investigations by Miss Frances Densmore in collecting songs among the Indians of the south-eastern United States, reference is made to magic connected with the