

per cent. For several years the average age of the alcoholic patients has shown a tendency to fall, young persons of 20-30 being more numerous than formerly. Alcoholism was found to be as frequent among the married as among celibates, but was more liable to affect the rural than the urban population. In 1936, for example, only 15.73 per cent of the alcoholic admissions were manual labourers, as compared with farm labourers who formed 47.25 per cent of these admissions. The measures suggested by Dr. Le Gall for the control of alcoholism in Morbihan include suppression of the privileges allowed to home distillers, limitation of the number of public houses, the creation of dispensaries of mental hygiene, special homes for inebriates, especially for relapsing cases, the promotion of sport, and the encouragement of propaganda in favour of non-fermented apple juice, which has yielded excellent results in some countries, especially Switzerland.

Earthquake near the New Hebrides

THE United States Coast and Geodetic Survey, in co-operation with Science Service and the Jesuit Seismological Association, has determined the epicentre of the earthquake of August 12 to be provisionally latitude 13° S., longitude 169° E. The instrumental reports from Manila, Sitka, Weston, St. Louis, Fordham, Pasadena, Honolulu and Philadelphia also suggest that the depth of focus from which the shock originated was of the order of 150 km., thus making a deep focus earthquake. The epicentre is to the north of the New Hebrides and north-west of Fiji, being submarine in character. No damage has been reported, either directly due to the shock or to any abnormal sea waves. The region concerned is particularly liable to earthquakes and it is also noticeable that the frequency of earthquakes having deep focus is greater than normal in the whole of the region extending from Japan to the south of Fiji and including the area in question. A new Milne-Shaw seismograph and high-precision clock with seconds regulator have recently been sent on loan to Fiji by the British Association Seismological Committee at the suggestion of the Seismological Committee of the Australian and New Zealand Association for the Advancement of Science to replace the old Milne instrument there. This new seismograph will be particularly valuable for obtaining data for the study of deep focus earthquakes similar to the one mentioned above.

Mathematical Reviews

THE American Mathematical Society has founded a new international mathematical abstracting journal to be known as *Mathematical Reviews*. The first number is to appear late in 1939 or early in 1940; the material to be reviewed begins with the latter half of 1939. It is proposed to review all fields of pure mathematics and also those of applied mathematics and mathematical physics which are of pronounced interest to mathematicians. The new journal, which will be issued approximately once a month, will contain several thousand reviews annually and will run

to approximately eight hundred large double-column pages. Prof. J. D. Tamarkin and Prof. Otto Neugebauer will be the first editors. The Carnegie Corporation has appropriated 60,000 dollars as a reserve for the new journal. The Rockefeller Foundation has made a gift of 12,000 dollars to cover some of the initial costs. Brown University is housing the project and aiding in the editorial work. The American Mathematical Society and the Mathematical Association of America are each beginning with a subsidy of 1,000 dollars for the first year. Annual subsidies are being sought from other organizations, and plans for the permanent financing of the project are being considered. On account of the generous subventions, the subscription price will be set drastically below actual cost.

PARTLY with the view of aiding indirectly in the support of this journal, the Rockefeller Foundation has made a handsome gift to Brown University for an experiment in the dissemination of mathematical publications through the distribution of microfilm. This money is to be used to augment the mathematical library at that University, a collection which is already internationally known as outstanding. Out-of-print journals will be put on film and made available to mathematicians; rare books of general use will be filmed; on request from a subscriber to the new journal, any article reviewed will be sent on film or as film-print. This service will be extended to all parts of the world at a price not exceeding cost. It should be of greatest value to mathematicians in the smaller universities and colleges, and should be a factor in encouraging young men to continue with their investigations.

Matter and Radiation

No. 704 of Hermann's "Actualités" series is by Prof. Louis de Broglie, editor of the volumes on theoretical physics, and is entitled "Le Principe de Correspondance et les Interactions entre la Matière et le Rayonnement". It extends to 170 pages (Paris: Hermann et Cie. 50 francs). The first 48 pages give an account of Maxwell's equations and their extension by Lorentz to cover electrons; the electromagnetic theory of dispersion; the theory of quanta; the correspondence principle introduced by Bohr in 1916; and Heisenberg's representation of the atom by a matrix of quantities all of which are directly observable. Then the principle of wave mechanics is introduced according to which the movement of material corpuscles is based on a certain equation of waves developed from the Hamiltonian function of classical mechanics. It is then shown that wave mechanics includes the correspondence principle and leads to a theory of the interaction of radiation and matter which, though not strictly logical, may be regarded as a first approximation. Later sections deal with the diffusion of light energy by matter, first without change of wave-length, then with such changes as are illustrated by the Compton and the Raman effects. The volume concludes with a study of photo-elec-

tricity in which the light quantum passes completely to matter, that is, the photon is annihilated. As one would expect from the author, wave mechanics is treated with great clearness and there is no attempt to represent the theory as having resolved all difficulties; on the contrary, at each partial success its incomplete nature is commented on and the requirements of a more complete solution are specified.

Egg Storage

A DESCRIPTION is given in the *Electrical Review* of September 15 of the Chelmsford Egg Supply Co. (1934). This company utilizes a process for the preservation of eggs which, it is claimed, keeps them fresh indefinitely. It is said that, if eggs are frozen below 28° F. they crack, so that storage by freezing is impracticable. Storage in gas is better, but it takes time for the gas to percolate through the shell. The company has, however, overcome this difficulty. Every egg has a small air space at the top. This increases as the egg ages. By means of a pump the air is extracted and replaced by carbon dioxide and nitrogen under a pressure of 250 mm., this pressure being maintained all the time the eggs are in storage. The eggs are stored in large cylinders each holding 234,000 eggs and are kept at a temperature of 30° F. Each refrigerating unit is driven by a 6 h.p. motor, and in addition, two extra motors are employed, 5 h.p. and 2.75 h.p. respectively, for circulating the water and ammonia. The gas-tight cylinders in which the eggs are stored look like large boilers. An additional chamber held at a much lower temperature is used for freezing liquid eggs, that is, those which have been accidentally cracked, and are sold to local bakeries. The factory is also a national mark packing station capable of dealing with a million and a half eggs a week. The electricity taken per annum from the public supply is nearly 60,000 units. As this load is very nearly constant, and is heaviest during the summer months, the load factor is excellent and an attractive tariff is available. The seasonal difference in the price of eggs practically makes up for the cost of storage.

Extensions of Carrier Telephone Systems

IN the quarterly edition (No. 17) of *Nippon Electrical Engineering*, published in English by the Institute of Electrical Communication Engineers of Japan, there is an important paper on carrier telephone systems which make use of lighting and power distribution lines. It is written by N. Shinohara, Y. Hirano and M. Yoshioka, and contains many useful experimental and theoretical results. They point out that the economies effected by using existing power and lighting circuits as part of the carrier system make it possible to extend communication to out-of-the-way districts, as, for example, farming districts, fishing villages, lighthouses, etc. This will make possible the rapid cultural development of these places. They consider first of all the use of high-tension distribution lines as part of the carrier frequency transmission circuit. In the past this has

been done by two systems; the first is called the metallic circuit system and the second the ground return circuit system. Although the first system excels the latter so far as low attenuation and noise are concerned, the second is the system which is more commonly employed owing to its greater economy and trustworthiness. The authors state that in utilizing the high-tension distribution line it is best to employ the ground return circuit system. The most commonly employed types of high-tension systems are the single-phase two-wire type and the three-phase three-wire type. The height of the wires above the ground is not uniform, but, where the line is even, the average height is about seven metres. By considering a single copper wire 5 mm. in diameter at a height of 7 metres above the ground and at a temperature of 20° C. and a frequency of 50 kc., they compute that the speed of the carrier waves is nearly equal to the speed of light and that the attenuation constant is very small. They conclude by describing a method of designing a circuit by a new telephone system which they state will be the most suitable for a rural district. They show how much more economical the new system would be than the one at present in use.

Oceanographical Results from Central America

IN July and August 1938, the President of the United States, the Honorable Franklin D. Roosevelt, undertook an inspection cruise and fishing expedition from San Diego, California, to Pensacola, Florida, by way of the Panama Canal, aboard the U.S.S. *Houston*. Between July 16 and August 9 some 5,888 miles were covered and fourteen different collecting stops were made, distributed among the possessions of five different nations: Mexico (Lower California and Socorro Island), France (Clipperton Island), Ecuador (the Galapagos Islands), Costa Rica (Cocos Island), and Colombia (Old Providence Island in the Caribbean). Dr. Waldo L. Schmitt of the United States National Museum accompanied the expedition as a naturalist. The results are published in a series of papers of which four are before us: "Decapod and Other Crustacea" (with Introduction and Data) (Smithsonian Miscellaneous Collections, 98, No. 6, Pub. 3531) by Waldo L. Schmitt; "Molluscs" (Pub. 3535) by Paul Bartsch and Harald Alfred Rehder; "A New Holothurian of the Genus *Thyone*" (Pub. 3537) by Elisabeth Deichmann; and "Two New Gobioid Fishes" by Isaac Ginsburg (Pub. 3539), May-June 1939. A number of new species of Mollusca are described, and lists of species given from the various collecting grounds.

Grass Drying

A REPORT on fodder conservation with special reference to grass drying by E. J. Roberts has been published by the Agricultural Research Council (H.M. Stationery Office. 2s.). This is the third report on the subject, and embodies the results of the most recent experiments carried out with the co-operation of agricultural organizers, colleges and experimental farms in Great Britain. A detailed account