A. J. Martin, J. T. Thompson, and G. A. Hart. Mr. Silcock dealt with a new method now at work at Rothwell, in which, after removing grit, the sewage is pumped on to a revolving fine-mesh screen, then taken to deep percolating bacteria beds, then through sand filters, and discharged.

In the section of preventive medicine an important paper was read by Dr. Robertson (Birmingham) initiating a discussion on tuberculosis. He pointed out that more human suffering is due to tuberculosis than to any disease, that it was produced by infection derived from cases of phthisis, from milk, and possibly from meat, and developed slowly after the germ is taken into the system. He emphasised the importance of milk and meat in carrying infection, and pointed out that more than 30 per cent. of dairy herds are infected. In this connection more attention should be given to the ventilation of cowsheds. Dr. Woodcock (Leeds) followed with a paper on the physique of the phthisical as a means of diagnosis, whilst Dr. Trevelyan (Leeds) discussed the methods of preventing infection from those already suffering from the disease. An interesting discussion followed, and a resolution was passed "that the Health Congress wishes to direct the attention of agricultural societies to the great assistance which they might render to the community by making it one of their conditions in offering prizes for dairy cattle that the animals should be free from tuberculosis."

Subsequently papers were read on the protection of the food supply. Imported and canned foods were dealt with by Dr. H. Williams (London) and Dr. W. F. Dearden (Manchester), whilst Dr. Savage (Colchester) discussed the administrative measures for examining food supply in general, Mr. W. G. Barnes (London) advocated measures for eradicating tuberculosis from the milk supply, and Dr. Stedman explained methods of administering the "Dairies' Order." In the bacteriology section papers were contributed by Mr. J. Johnstone; on the significance of leucocytes in milk as indicating a need for detailed examination, by Dr. Savage (Colchester); on the catalase of milk as an indicator of disease, by C. Revis (London); and on the growth of the bacillus tuberculosis, by Dr. Moore and R. S. Williams (Liverpool). In the latter the important observation was made that the bacillus will only grow between certain definite limits of oxygen pressure, being equally stopped by absence of oxygen or by more than 60 per cent. To stop and kill the organisms completely about 70 per cent. of oxygen must be present, which does not interfere with the majority of other organisms tested. In the same section a joint paper was read by Prof. Grünbaum and Dr. M. Coplans (Leeds) on the selective action of preservatives, in which they discuss the effect of different preservatives on the growth of organisms. Papers were also contributed by Mr. J. C. G. Ledingham (Aberdeen), on the bacteriology of summer diarrhœa; by Dr. S. G. Moore (Huddersfield), on the advantages derived from its notification to the authorities; and by Dr. Buchan (St. Helens), on administrative measures for its reduction.

An interesting series of papers was read in the engineering and architectural section on water supply and treatment of trade water, and in the section on industrial hygiene lead poisoning, its pathology and prevention, abstracts of which, from want of space, cannot be given.

Sir Charles Cameron gave an attractive popular lecture on underground and overground air.

During the congress the University of Leeds took advantage of the occasion to confer degrees *honoris causa* on the president of the congress, Colonel T. W. Harding, and on Sir James Crichton-Browne, F.R.S., and Major Ronald Ross, F.R.S.

LANCASHIRE FISHERY INVESTIGATIONS.[1]

THE report of the Lancashire Sea-fisheries Laboratory at Liverpool for 1908 gives evidence of sustained investigation into problems that demand several years' work for their solution. The articles are in almost every case continuations of those contributed to the report of 1907, and it is therefore unnecessary in a brief review to do more than summarise the findings of the several workers on the fishery questions with which they have been so long occupied.

Prof. Herdman gives a further instalment of results obtained by tow-netting with modern nets in the Irish Sea. This method of obtaining the floating or drifting organisms is now becoming more delicate, and the catching power of the nets is more accurately known than was formerly the case. The object in view being an exact determination of the distribution and fluctuation of the "plankton," no trouble is too great and no determinations are too laborious to deter the director of the fisheries work. Accordingly, this paper contains an immense amount of data both as to methods and results with regard to the seasonal and local variations in this fauna, and also with reference to the influence of conditions upon its abundance and behaviour. The statistical work involved in such a report is very great, and the credit of these laborious tables is due to the zeal of Mr. Andrew Scott. On the whole, the results of 1908 show the correctness of the conclusions arrived at in the previous contribution to this "intensive study" of plankton round the Isle of Man, but they also demonstrate some seasonal divergences which are in all probability of considerable importance to fishermen, as affecting the arrival of spring or autumn migrants. The only criticism that we feel justified in making upon such a heavy and valuable undertaking is the absence of any analysis of the light-factors that influence plankton, but we hesitate to press this criticism, as Prof. Herdman has not published the whole of his results.

Of the more striking fishery papers, attention may be directed to Mr. Johnstone's important experiments on quarantining mussels. Mr. Johnstone has determined the degree of bacterial pollution in a number of shell-fish taken from Welsh and Lancashire bays, and finds that the contamination, though, as a rule, not serious, is probably due to general contamination of the water or sea-bed in these districts. In some cases, however, the pollution is more serious, and, by transferring these heavily infected mussels to cleaner open water, Mr. Johnstone finds that in four days' quarantine the maximum amount of sterilisation is effected. The bare fact, of course, has long been known, for oysters infected by typhoid, for instance, but this report is a continuation of that more extended investigation which is needed in order to enable fishermen themselves to increase a healthy supply of shell-fish near the larger towns. Mr. Johnstone also contributes papers on the temperatures of the Irish Sea, on the growth and migration of plaice, on parasitic growths in flat fish, and a joint paper with Capt. Weigall on the outfit of the fine new boat, *James Fletcher*, which the Lancashire Sea-fisheries Committee commissioned recently. In addition to these papers, the wider aspects of biological investigations are not overlooked, and we are glad to see that Dr. Bassett has continued his hydrographical study of the Irish Sea by a further analysis of its salinities. It is to be hoped that aid will be forthcoming to provide the Lancashire committee with a member of staff specially devoted to such work.

Lastly, reference must be made to an excellent *résumé* of the method for finding the coefficient of plankton-nets (in regard to catching power) by Mr. Dakin. This gentleman's elaborate study of Pecten, forming an appendix to this report, has been noticed already in these columns (May 6, p. 273), and we may merely, therefore, refer to it as an example of the good results obtained by bringing different methods to bear upon the study of an organism.

[1] Report for 1908 on the Lancashire Sea-fisheries Laboratory at the University of Liverpool and the Sea-fish Hatchery at Piel, No. xviii. Pp. 366+9 plates. Drawn up by Prof. Herdman, F.R.S., assisted by Andrew Scott and J. Johnstone. (Liverpool, 1909.)

ORIGIN AND RITES OF GYPSIES.

IN the *Journal of the Gypsy-lore Society* for April Miss D. E. Yates publishes a translation of a paper by Prof. R. Pischel, originally published in the *Deutsche Rundschau* for 1883, on the home of the Gypsies. Reviewing various references to the origin of this race, he comes to the conclusion, on the evidence of philology, that the Gypsy dialects are closely connected with those of Dardistan, and he accordingly fixes this region as the original Gypsy home. This view is based largely on materials collected by Drew, Biddulph, and Leitner. It is unfortunate that this opportunity was not taken to

utilise the results of Dr. Grierson's linguistic survey, which now supplies ample glossaries and grammars by which the problem may be solved. Pischel's view is accepted by Dr. Grierson in his chapter on the languages of India in the first volume of the Report on the Census of India for 1901. He regards the Indian origin of the Gypsies as fully established, and while it is doubtful from which Indian tribe they really sprung, he believes that they spoke one of the non-Sanskritic Indo-Aryan tongues, which are by him grouped under the heads of Shína-Khowár, Káfir, and Kalasha-Pashai. The work of Sir G. Robertson on the Kafirs of the Hindu-Kush also supplies materials which might have been utilised in re-editing Prof. Pischel's paper.

Mr. E. O. Winstedt contributes to the same number of the journal an interesting paper on the Gypsy rites connected with birth, marriage, and death. It is a good collection of material, much of which has been gathered from comparatively obscure sources, but it is to be regretted that before publication it did not pass through the hands of a competent student of comparative ethnography. Among birth rites, he notes the customs of laying the child on the ground, the passing of the mother and baby through fire into which, among some of the subtribes, drops of the father's blood are allowed to fall. In connection with marriage, we have references to the customs of exchanging wives; the use of the broomstick and tongs as marriage symbols; the lifting of the bride over the doorstep; the exchanging of vows over a dead horse or hen; the blood covenant; the dance upon layers of sweetmeats; the custom of placing lighted candles, eggs, and apples in a stream; a custom, probably misinterpreted, of so-called marriage by capture; methods of divorce; and the curious custom, which has Indian parallels, of the father-in-law cohabiting with his daughter-in-law during the youth of his son. Among death rites, he mentions that of burning the clothing and other property of the dead man at the time of his burial, a custom of which various interpretations are suggested; interment without a coffin; disinterment of the dead; and the pouring of liquor on the grave. The variance of custom among the different Gypsy groups points to the conclusion that they have assimilated much from the races with whom they successively came into contact. It is now probably too late to fix the exact provenience of customs such as are described in this paper. If this could be done it might furnish valuable material for the investigation of the origin of this mysterious people.

CLIMATOLOGICAL REPORTS.

THE climate of the island of Norderney (lat. 53° 43′ N.) forms the subject of part iii., vol. xxxi., of *Aus dem Archiv der deutschen Seewarte*. The observations were very carefully made several times a day for nearly ten years (between 1880 and 1890) by the late Mr. O. J. Ommen; the instruments and exposure were not all that could be desired, but Dr. R. Assmann, of Lindenberg, has taken great pains to correct these defects, as regards temperature, by comparisons with hourly observations at Hamburg, Bremen, &c., the result being that the paper becomes a very useful contribution to the meteorology of the coast of East Friesland. The moderating influence of the sea upon the air temperature is plainly shown; the autumn and winter months have higher, and the summer months lower, temperatures than the Continental stations; the yearly variation at Norderney is only 17·1° C., while at Berlin it is 19·2°. It is interesting to note that the equinoctial gales maintain their old reputation at Norderney, the stormiest months being March and October.

The year-book of the Austrian Meteorological Service for 1907, which has recently been published, contains, as in previous years, hourly (1) readings or means at observatories possessing self-recording instruments; (2) daily observations and monthly summaries at a number of selected places; and (3) temperature and rainfall tables for all stations. Many of the stations are situated at great elevations, and the data are consequently of especial interest. The observations at purely rainfall stations are not included in the year-book, but are published separately by the hydrographic department. With the aid of the Academy of Sciences, the Austrian Meteorological Society and other bodies, the investigation of the upper air by means of balloons has been regularly continued, and the detailed observations are published in the *Anzeiger* of the academy. The reports of earthquake phenomena at various stations are also published in the *Anzeiger*, and, in addition, a weekly report is issued. This special service was taken over during the late Prof. Pernter's administration, and to it the office owes its present name, "Zentralanstalt für Meteorologie und Geodynamik." In connection with its system of weather telegraphy, forecasts are sent by wire daily, free of charge, from April to November, to all post and telegraph offices in Austria; to south Tyrol they are sent all the year round.

The report by Captain H. G. Lyons, director-general of the Survey Department, Egypt, on the rains of the Nile basin and the Nile flood of 1907, contains valuable statistics of the monthly and mean rainfall at a large number of stations in and near the Nile basin, with particulars of the lake- and river-levels of 1907 and previous years. The rainfall at Lake Victoria was 20 per cent. to 30 per cent. in defect, and caused famine in parts of Uganda, while on the Bahr el Jebel, the White and Blue Nile, the rains were mostly weak and irregular; the basin of the Atbara alone had a fair amount. The Nile flood was late in commencing, and very weak throughout the year; the volume of water which passed Wadi Halfa and Aswan respectively, between July and October, was only 0·65 and 0·60 of an average flood. That a flood which was so complete a failure should not have had a disastrous effect on Egyptian agriculture, Captain Lyons remarks, is due to improvements in the irrigation system of recent years and to rains on the Abyssinian tableland in the early part of the year. The investigation of the rainfall of Abyssinia is of great importance in estimating the supply of water, but there is at present an almost complete absence of trustworthy observations. The stations established by the Italian Government in Eritrea furnish most valuable results for understanding the meteorological conditions of the eastern Sudan; telegraphic rainfall reports sent daily from Addi Ugri in August and September rendered important assistance in connection with forecasts of the flood.

The year-book and rainfall report for 1908, issued by the Norwegian Meteorological Institute, have been received. These volumes contain:—(1) Hourly readings and means for Christiania, observations taken three times a day at selected stations, and monthly and yearly summaries at other places; (2) daily rainfall values at 200 stations, with monthly and yearly summaries and other details at 449 stations, and yearly amounts and averages for each year from 1867. The charts showing the yearly distribution of rainfall (isohyets) for each 200 mm. clearly exhibit the effect of the rugged land on the water-laden currents from the Atlantic. The isohyets on the western coasts show amounts of 2000–3000 mm.; these amounts rapidly decrease to 1000 and even to 400 mm. in the interior of the country. The weather forecasts issued by the institute are generally very accurate; those for the Christiania district show an average success of 88·3 per cent. This result is to some extent due to daily telegrams from Iceland and Færöe Islands, and to reports of weather at British stations, now received through the medium of the Deutsche Seewarte.

PROCESSES FOR THE FIXATION OF ATMOSPHERIC NITROGEN.

THE fixation of atmospheric nitrogen on a commercial scale has already been the subject of articles in NATURE (February 8, 1906; August 30, 1906; July 23, 1908). The method used by Birkeland and Eyde depends upon the well-known fact that an electric arc may be broadened out into a fan shape under the influence of a magnetic field. Through the arc thus formed air is driven. Since, however, only a small portion is raised to the temperature necessary for the reaction, while the greatest part serves for cooling, the gases escaping from the Birkeland furnace at a temperature of from 600° C. to 700° C. do not contain more than from 1 per cent. to 2 per cent. of nitric oxide. For further cooling, the gases