

Besides, I considered it of the utmost interest to attempt some hauls far out from the coast-banks on an oceanic deep plain with depths descending to 3000 fathoms. Altogether we have carried out twenty-two hauls at various depths with this large trawl.

It will be seen that our trawl had a greater capacity than any of the appliances previously employed, and that it can therefore, without doubt, be recommended for investigations of the deep-water fish-fauna. This is especially the case where it is requisite to have many individuals for examination. For invertebrate organisms, on the other hand, smaller and more handy appliances may be preferable.

Essentially new types of fishes the trawl cannot be said to have taken. But the material we possess furnishes a good picture, especially of the uniform fish-fauna to be met with along the slopes of the coast-banks of Europe and Africa from the Wyville Thomson ridge down to Cape Bogador, and it also shows clearly the sharp transition from the southern to the northern side of the Wyville Thomson ridge, which the *Triton*, the *Knight Errant*, and my own investigations, amongst others, had previously demonstrated.

The hauls at great depths (about 5000 metres) were no doubt few, perhaps too few; but they accorded with each other and with the hauls made by previous expeditions, more especially those of the *Challenger*, *Travailleur*, and *Talisman*, in indicating that the actual eastern deep-ocean plain of the Atlantic is especially poor in all kinds of higher organisms and particularly in fish. It might, by some naturalists, be regarded as a desert region. A fuller discussion of our observations must, however, be reserved for a more comprehensive publication.

JOHAN HJORT.

THE ASSOCIATION OF TEACHERS IN TECHNICAL INSTITUTIONS.

THE annual meeting of the Association of Teachers in Technical Institutions was held at the Northern Polytechnic, London, on Saturday, November 5. In moving the adoption of the annual report of the council, Mr. J. Wilson (Battersea Polytechnic), the retiring president, stated that any further extensive progress in the general technical and scientific education of this country depends upon the adoption of certain educational reforms, for most of which public opinion is now ripe. These reforms may be briefly summarised as follows:—(1) elementary education to be more practical or constructive; (2) compulsory attendance at day or evening (preferably day) continuation schools, with a limitation of the hours of labour of adolescents; (3) the institution of "technical-secondary" schools; (4) the linking of the elementary school through the continuation and secondary school to the technical school; (5) the increased provision of scholarships, with adequate maintenance grants, so that the qualified day and evening technical student may receive the highest possible technical and scientific training. These suggested reforms are all quite practical, and their adoption would entail but relatively little strain upon the financial resources of this country, while the commercial and educational results would be of incalculable benefit.

Attention was directed to the promise held out in the Prefatory Memorandum to the recent Board of Education regulations for technical schools, that the Board would take action, in the near future, with respect to certain of the more pressing of the educational reforms just referred to. A significant statement in the memorandum, relating to the payment of grants for technical instruction to institutions of university rank, together with the recent formation of a "University Branch" at the Board of Education, emphasises the modern tendency towards bringing the English universities within the purview and influence of the national educational authorities. The hope was expressed that this would result in the opening wider of the doors of the university to the community, and a closer connection of the universities with all phases of educational effort in this country.

The recent regulations of the Board of Education respecting the registering of the attendance of day and evening students at technical institutions were criticised adversely,

inasmuch as by considerably increasing the time and attention to be devoted by the teacher to the merely mechanical work of registration, they inevitably detract from the efficiency of the teaching as a whole.

In discussing the first volume of the minutes of evidence submitted to the Royal Commission on University Education in London, Mr. Wilson stated that in this evidence there appears vague and unjust criticism of the higher work of the London polytechnics, generally based upon want of knowledge of the work these institutions are now doing.

The president of the association for 1910-11 is Mr. Barker North, of the chemistry and dyeing department, Bradford Technical College.

METEOROLOGICAL RELATIONSHIPS.

PROF. H. HILDEBRAND HILDEBRANDSSON is continuing his important series of papers on the centres of action of the atmosphere, and the fourth communication, recently received, is entitled "Sur la Compensation entre les types des Saisons simultanées en différentes régions de la Terre" (*Kungl. Svenska Vetenskapsakademiens Handlingar*, Band 45, No. 11). In his third paper he suggested that the principal cause of the different types of seasons depended very probably on the condition of the ice in the polar seas, and the evidence he brought forward was such as to show that this view had very much in its favour. In the present communication he makes a closer study of these compensations between the types of simultaneous seasons in both winter and summer seasons, and extends his researches to North America. He further directs attention to some analogous results which he finds exist in the southern hemisphere. Thus he finds both in winter and in summer that there occurs an opposition between the north and south of both Europe and of North America, and also probably between the sub-polar regions and sub-tropical regions of the southern hemisphere. There is also, in general, an opposition between the north of Europe and Siberia.

Special attention is directed to some regions where this opposite nature of seasons is in some years less pronounced, and Prof. Hildebrandsson points out that these districts are intermediate between the main centres of typical action, and are therefore dependent on the intensity of the latter. This communication is accompanied by several plates of curves, and these should be closely studied in connection with the text. There is little doubt that these researches will in time open up a field for the future forecasting of seasons, but it is important to bear in mind that so intimate are the meteorological associations between very widely separated regions on the earth, it behoves the investigator to take a very broad view of the subject, and not confine himself to one small portion of the earth's surface.

Mr. E. T. Quayle, of the Australian Commonwealth Meteorological Bureau, has recently (*Bulletin* No. 5, March) published the results of his investigations in relation to the possibility of forecasting the approximate rainfall for northern Victoria. At the outset he states that it has long been his conviction that ordinary statistical methods must prove inadequate, and that they do not enable the essential differences between the weather of successive years to be grasped. In his study of the storm systems as they have affected Victoria he has made a classification of them, and on this he bases his method of forecasting. The storms which affect Victoria and bring the rain belong to two main systems, one called "Antarctics," which originate in the southern seas, and the other called "Monsoonals," which are of tropical origin. The first-named he divides into two classes:—(a) *Antarctics*, when their centres are too far south to be identified; and (b) *Antarctic cyclones*, when their centres can be located inland or over Bass Strait. The monsoonal low depressions he divides into three groups:—(a) *monsoonal troughs*; (b) *monsoonal dips*; and (c) *monsoonal cyclones*.

By the use of isobaric charts the number of occurrences of each type of disturbance was taken out for each month for the years 1888 to 1909. As the northern districts of Victoria receive most rain chiefly from monsoonal de-

pressions or the fronts of well-developed Antarcics, a typical rainfall curve of the northern areas was constructed. Thus for each half-year the low- and high-pressure systems passing Victoria were counted, and alongside the numbers thus obtained were placed the figures for the rainfall over the northern areas and the mean air pressure and temperature for Melbourne. The comparison brought out the result that an excess in the number of summer monsoonal disturbances was followed by an excess in the winter rainfall in seventeen cases out of twenty-two.

Mr. Quayle then evolves a rough rule for predicting the approximate winter rainfall over northern Victoria, giving the weights of two, one and one to the number of monsoonal disturbances, mean pressure, and mean temperature, respectively, for the preceding summer. Noting the coincidences of sign only in the values he evolves for the calculated winter rain, he finds that they are in agreement with those for the actual departures from normal of the winter rains nineteen times out of twenty-two, and in serious agreement in two cases only. It is unfortunate that, owing to lack of daily isobaric charts, the period could not have been extended over more years; nevertheless, the system may be used tentatively, and the results will be watched with interest.

THE LATITUDE OF ATHENS.¹

IN the volume referred to below M. Eginitis describes the varied activities that exercise the staff of the National Observatory of Athens and of the smaller institutions that his zeal has called into existence and made to yield results useful to science, both as regards seismology and meteorology. It seems not a little strange to find well-remembered names like Thebes, Sparta, Naxos, Samos, and many others famous in the past, figuring in this list, and playing a new rôle by contributing climatic observations made on approved lines with modern instruments. Of the last mentioned of these stations, that on the island of Samos, the author remarks, "malheureusement, elle a été complètement détruite, le jour du bombardement de cette île, en 1908, par la flotte turque," recalling a struggle which seems more in keeping with its ancient history than its effort to accumulate meteorological observations.

But the real serious piece of work here described is the attempt to determine the latitude of Athens, a problem that interested Ptolemy, who recorded the value $37^{\circ} 15'$, placing the city some 45 kilometres south of its true site, even when allowance for all known sources of error is made, a larger error than is usual in similar determinations in that age. But error seems to cling to this unfortunate coordinate, for M. Eginitis informs us that the latitude for the Pantheon given in the "Connaissance des Temps" is about $6''$ too small. In striving for the nicest accuracy, the director has found the problem to be one of extreme difficulty. He has employed two methods and two instruments, and the results do not coincide. He has employed the Horrebow-Talcott process, carried out by means of an instrument originally intended for a meridian circle, but by removing the microscopes and adding a level, adapted to that particular form of observation. Later, through the generosity of M. Syngros, he was supplied with a modern and excellent meridian circle by Gautier, the construction of which was supervised by M. Lœwy. This instrument was used for determining the zenith distances of both circumpolar stars and stars of known declination, the zero being derived from nadir observations only.

The interest in the discussion consists in the different values obtained after reversing the instrument. The difference is constant and rather larger than has been noted elsewhere. Like the R-D term in similar inquiries, it refuses to yield a satisfactory explanation, however ingeniously solicited. There is no attempt to determine the actual variation of latitude, though the observations extend over a considerable period, nor, as we think, is

sufficient attention paid to the possible effect of a "magnitude equation." The inquiry is of a purely instrumental character, and is directed mainly to the legitimacy of employing an arithmetic mean of the values obtained in the two positions of the instrument. If this conclusion is warranted and offers the only possible means of correctly determining the latitude, M. Eginitis is justified in insisting upon the necessity of reversion and of providing for the operation in the construction of the instrument. But as the director promises further experiments and a more rigorous attempt to eliminate all possible sources of error, it will be desirable to pause before offering any criticism or accepting the result as final.

EDUCATION IN TECHNICAL OPTICS.

THE reawakening of the British optical industry which began with the first years of this century brought with it a demand for the provision of special technical education in optics. The Northampton Polytechnic Institute, from its situation in Clerkenwell, where much of the London optical industry is centred, was particularly suited as a centre for such work, and optical classes were begun there as a branch of work in general physics. The optical trade, however, regarded these classes as being of little value, and in 1902 a new syllabus was adopted and a special department of technical optics was instituted. Since that time this department, under Mr. S. D. Chalmers, has developed very considerably and done much useful work for both day and evening students, but the scope and value of this work has been continually hampered and further development has been completely blocked by want of proper space and equipment. This unsatisfactory state of affairs has been fully realised, and the governors of the Northampton Institute have acquired the necessary land on a site opposite the institute, and have had plans prepared for a complete "Opto-technical Institute"; for the erection and equipment of the building they are, however, dependent on a grant from the London County Council.

The County Council or its predecessors in authority, the School Board, has been repeatedly approached in this matter. A deputation from the Optical Society in 1902 led to a grant which resulted in the establishment of the optics department at the institute; for a time this was supplemented by a grant from the Company of Spectacle Makers, but this has subsequently been replaced by a trade fund, collected principally by the efforts of Mr. J. Aitchison and administered by the Optical Society. In 1905 the Optical Convention sent a deputation to the London Education Committee; this deputation was headed by Dr. R. T. Glazebrook, and included a large number of influential men connected with the science or industry of optics, but, although favourably received, no practical steps resulted for five years.

Now, however, there appears to be a definite prospect that this want of our optical industry may soon be met in an adequate manner. This is indicated by a circular letter issued a few weeks ago by the L.C.C. Education Officer to members of the optical trade in London. In this letter the members of the trade are asked to state their views as to the need for an Opto-technical Institute in London, and to indicate to what extent they or their employes would take advantage of any facilities provided, and what benefits they would expect to derive from such teaching. The letter concluded by inquiring whether, in the opinion of the trade, an expenditure of about 30,000*l.* for a building for such a purpose would be justified, and the general scheme of the new institute as proposed by the Northampton Institute is indicated. This comprises a series of large teaching laboratories and lecture-rooms for instruction in all branches of optics, lens-working and general instrument design and construction being provided for, as well as the theoretical and experimental branches of the subject. The new institute would accommodate 300 to 400 day and evening students, complete day courses as well as evening classes being contemplated.

Fortunately there is every reason to believe that the optical trade will respond to this circular letter in a manner which will fully justify the London County Council in proceeding at once with a scheme which is really of

¹ Anna'ès de l'Observatoire National d'Athènes, publié par Demé ríus Eginitis, Directeur de l'Observatoire. Tome v. Pp. ii+592. (Athens, 1910.)