

easterly winds and severe weather which were experienced at the time.

HENRY TOYNBEE,
Marine Superintendent

Meteorological Office, London, March 27

Extracts from Meteorological Log of the Ship "Timaru," Capt. D. Fullarton

1886 March 15; Noon Position, Lat. 48° 31' N., Long. 8° 16' W.

"A great many small land birds about us; put about 60 into a coop, evidently tired out."

1886 March 17; Noon Position, Lat. 48° 30' N., Long. 7° 34' W.

"Over 50 of the birds cooped on the 15th died, though fed. Sparrows, finches, water wagtails, two different small kinds of birds, names unknown to me, one kind like a linnet, and a large bird like a starling. In all there have been on board over 70 birds, besides some that hovered about us for some time and fell into the sea exhausted."

Variable Stars

I HAVE to express my indebtedness to Mr. Castell-Evans (*NATURE*, March 25, p. 486) for drawing my attention to Prof. Meldola's valuable memoir of 1878. Occasionally I cannot help passing over a paper of great interest; and, much to my regret, I did not read Prof. Meldola's until to-day. According to his theory there is "... actual combustion taking place in the atmosphere of a slowly-cooling star previously at a temperature of dissociation." The previous existence of elements is assumed throughout the memoir; and it is these which undergo "actual combustion," and of course give rise to compounds capable of the dissociation referred to. Prof. Meldola proceeds to show that dissociation of compounds and actual combustion of elements may very well lead to a "periodically unstable chemical equilibrium."

For my part I was not writing about combustion, but about polymerisation; not about compounds, but about elements; and nothing was said about dissociation. Chemical effect, moreover, was expressed by an equation totally different in form from dissociation equations.

There is thus a perfect distinction between my work and that of Prof. Meldola. He is, so far as I am aware, the originator of the theory that the variability of a star may depend on actual combustion of elements, followed by dissociation of compounds. I regard this theory as having considerable value, and great probability. But it has obviously nothing whatever to do with my own.

EDMUND J. MILLS

Glasgow, March 27

Colours in Clouds

I AM afraid I cannot give any further details to aid Mr. Backhouse. My object was to point out that the presence of coloured fringes is not very rare, though they require suitable means to see them.

I do not think the dark blue tone is very material. Mr. Backhouse will, however, see that it implies a general absence of glare and illumination of the atmosphere in the neighbourhood of the cloud, and that is exactly the condition which I artificially made by a suitable dark glass, which stopped the glare. It is the dilution of the tints with white light which makes them faint or invisible. Of course it may be said that the dark glass will weaken the tints as well as the general light, but as a fact the tints do show better through a proper one, and reduction of glare does make colour more marked.

Nor do I think that the square or rhomboidal form is important, for I think that is only the result of the air-currents which cause the light cloud.

These colours will be oftener seen in projections from banks near the horizon, if my view be correct of the height at which they are formed, because it is only when the bank or mass of thick cloud hiding the sun is low that we see well above it. Mr. Backhouse gives enormous heights at which water could only visibly exist as minute ice-crystals, such as cause halos.

J. F. TENNANT

37, Hamilton Road, Ealing, W., March 27

The Distribution of Appendicularia

IN regard to Prof. Herdman's query concerning the distribution of *Appendicularia* it may be mentioned that this form was

frequently met with near the surface of the sea during the observations for H.M. Trawling Commissioners along the east coast of Scotland. From previous observations it would seem to be prevalent, especially in summer and autumn, all round our shores, as well as to stretch far into the neighbouring seas.

W. C. MCINTOSH

St. Andrew's Marine Laboratory, March 23

THE TECHNICAL INSTITUTE

IN considering the sixth Annual Report of the Council of the City and Guilds of London Institute to the Governors, we cannot but be impressed with the substantial advance made in each of the several branches of the Institute's work.

The past year has seen the completion of the great Central Institution in Exhibition Road, the University of the system of technical education, and London may be congratulated on at last possessing an institution which is, as pointed out in the Report, comparable with, and in some respects superior to, a German Polytechnic School. Considering the thorough manner in which the workshops and laboratories in the several departments have been equipped, we think the Institute is justified in claiming that parents will be enabled to secure in England for their sons technical instruction of the same high class as has been for so long provided in the great technical colleges abroad, and moreover better adapted to the special circumstances of home industry. The Report further expresses a patriotic hope that students trained in the Central Institution will gradually occupy the places in manufacturing works, and especially in chemical works, both in Great Britain and the colonies, which have of late been almost monopolised by the Germans and Swiss.

Besides the regular courses of instruction, special series of lectures are given by the Professors of the Institution at 5 o'clock, and we have reason to know that such courses as Prof. Henrici's on the Differential and Integral Calculus for engineering students, and those by Prof. Armstrong on Carbon Compounds, and by Prof. Ayrton on Industrial Applications of Electricity, now being given, fulfil a distinctly-felt want. The same may also be said of the special courses, including that on Iron-Girder Bridge Construction, by Prof. Unwin, to be given in July.

At the Finsbury Technical College the year has been marked by the appointment of Dr. Silvanus Thompson to the office of Principal, a post the duties of which have hitherto been discharged by Mr. Philip Magnus, the Director and Secretary of the Institute, but which the enormous increase in all the branches of the Institute's work has compelled him to relinquish. It is satisfactory to note that the great success already achieved by this College, both with respect to its Day and Evening Departments, has continued, and the Institute has determined to considerably increase the accommodation at a cost of 17,500*l.* In the Evening Department greater prominence has been given to courses of instruction for persons engaged in the various branches of the building trade, laboratories for instruction in plumbing, in gas-fitting, and in metal-plate work having been arranged, as also a class for builders' quantities. There are now between 600 and 700 persons attending the courses in the Evening Department.

The branch of its work by which the Institute is most widely known, the system of technological examinations, develops rapidly. According to Mr. Magnus's present Report, 3968 candidates presented themselves for examination in May last, of whom 2168, or nearly 55 per cent., were successful in passing. Examinations were held in forty-two subjects. In four subjects included in the programme, viz. salt manufacture, oils and fats, silk manufacture, and mechanical preparation of ores, the number of candidates was below the minimum for

which an examination is held. In regard to silk manufacture, Mr. Magnus, in deploring the want of attention given in this country to technical instruction in connection with this important industry, points out the great improvement which has taken place in the silk trade of Crefeld as a result of the establishment of the Weaving and Dyeing School at that place.

Examinations were held for the first time, in 1885, in boot and shoe manufacture and in framework knitting, at which a number of students from the new Technical School at Leicester presented themselves.

It is satisfactory to observe that great attention continues to be paid to making the examinations of such a character as to prevent students possessed only of mere book-knowledge from passing. Practical examinations were held in weaving and pattern designing, in metal-plate work, in mine surveying, and, for the first time, in carpentry and joinery. In all these subjects (except mine surveying), candidates have to send in specimens of work duly certified as having been executed by themselves.

The examinations were held in 167 towns in Great Britain and Ireland, Manchester heading the list of provincial towns so far as regards the number of its successful candidates. The Polytechnic Institution, London, was equally successful, and next in order came Bradford, Leeds, Bolton, and Huddersfield.

With regard to the prospects of the examinations in May of this year, it appears from returns furnished in November last that 6396 persons were receiving instruction in the registered classes of the Institute, as against 5874 in the previous year; and it may therefore be expected that a considerably increased number will present themselves this year.

It must be gratifying to the Institute to have received an application, recently noticed in these columns, from the Board of Technical Education in New South Wales, to extend the examinations to that colony, and we are glad to observe that the Council of the Institute, believing that whatever tends to unite more closely the colonies with the mother country is calculated to improve their mutual trade and commerce, recommend that the application should be acceded to.

The annual meeting of the Governors was held yesterday, under the presidency of Lord Selborne, who delivered an address on the work of the Institute during the past year.

EXHIBITION OF BAROMETERS

THE Royal Meteorological Society held its seventh annual Exhibition of Instruments on March 16 and 17, in the Library of the Institution of Civil Engineers, 25, Great George Street, Westminster. The Exhibition was devoted entirely to barometers, with the exception of a few new instruments which have been brought out during the past year. A very valuable collection of different forms of barometer was brought together, and in those cases where it was not possible to obtain a specimen of the instrument a photograph or illustration of it was shown. The Exhibition therefore practically included almost every known form of barometer.

The instruments were classified under the following headings:—Mercurial Barometers: Adjustable Cistern, Closed Cistern, Siphons; Barographs; Aneroids; Metallic and other forms of Barometer. There were altogether 78 barometers, 9 new instruments, and 33 drawings, photographs, &c., making 120 exhibits.

Some very fine specimens of standard barometer of the Fortin principle were exhibited—Mr. P. Adie showing one with a glass plunger to raise the mercury in the cistern, Mr. Casella showing another with the scale figured to tenths of an inch, and Messrs. Negretti and Zambra showing a third with cistern and tubular casing square in section. By the side of these were placed a port-

able barometer, with ivory float, about 100 years old, and a standard barometer, by Barrow, the pattern used by the members of the British Meteorological Society about 1850-60. Messrs. Negretti and Zambra exhibited a self-compensating barometer with a double rack moved by one pinion, so that, when adjusting the vernier in one position, the second rack moves in the opposite direction, carrying along with it a plunger, which is the exact size of the internal diameter of the tube. This firm also showed a standard barometer with electrical adjustment, and a new standard barometer with overflow cistern adjustment. Some interesting specimens of mountain barometers were exhibited, including one originally used by the North American Boundary Commission in 1857, which since its return has been employed by the Kew Committee on the inter-comparison of the various standard barometers of this country.

Among the closed cistern barometers was the large cistern one made for the Meteorological Society of London in 1837 by Mr. R. C. Woods. The proportion of the calibre of the tube to that of the cistern is as 1 : 50, a proportion which was considered sufficient to obviate the necessity for applying capacity corrections. The tube and cistern originally held 70 lbs. of mercury! The next instrument to this was the Kew barometer, first designed in 1853, in which the cistern is closed and the scale contracted so as to obviate the necessity of correction for capacity. Specimens were exhibited of the marine barometer, as supplied to Her Majesty's ships previous to 1854; the Kew marine barometer, as adopted by the Admiralty; the gun barometer, with the glass tube packed with india-rubber to check the vibration caused by firing; and the coast barometer. The Meteorological Office showed patterns of barometers as used in France, Holland, and Russia. Two specimens of long-range barometer were exhibited, viz. Morland's diagonal, by Messrs. Negretti and Zambra, in which the top part of the tube is inclined more or less from the perpendicular to give an enlarged scale-reading; and Hicks's spiral tube, which gives a range of 8 inches for 1 inch variation of atmospheric pressure.

Among the siphon barometers were two very old forms, viz. Hooke's double barometer and a Dutch barometer, by Reballio, combining siphon and long-range barometer, thermometer, and hygrometer. An interesting relic was the mounting of the travelling-barometer formerly belonging to, and used by, De Luc. The siphons included Gay Lussac's, Buntzen's, Jones's, Adie's, Dollond's, Bogen's, and Wild's forms of barometer; also a siphon designed by Capt. J. B. Basevi, R.E., and used by him in the high table-lands of Tibet, in connection with the operations of the Great Indian Trigonometrical Survey; Stanley's barometer, with "rising and falling" index; and Guthrie's sensitive barometer, which has a flat horizontal spiral in which is a bubble of air for indicating the variations of atmospheric pressure, the motion of the bubble being four and a half times that of the true barometric variation.

A specimen of Milne's barograph was shown by the Meteorological Office, while Messrs. Negretti and Zambra exhibited their improved form of the same instrument in which the paper is carried on a cylinder. M.M. Redier, of Paris, sent two forms (large and small) of their barograph, which works so satisfactorily; and M.M. Richard Frères, of Paris, in addition to sending a self-recording mercurial barometer, exhibited several specimens of their self-recording aneroid, which is becoming so popular in this country. This instrument consists of a series of eight vacuum-boxes, by which the effects of the atmospheric pressure are increased and transmitted by a system of levers to an arm carrying a pen. The pen, of a special form, contains an ink mixed with glycerine, and marks the curve of atmospheric pressure on the paper round the cylinder, which revolves once in seven days. This firm also showed