

and on the latent heat of vaporisation of the liquid. The heat in each case is supplied electrically, and the change of temperature measured by means of a platinum resistance thermometer. Under saturation conditions the specific heat of the liquid varies from 1.06 calories per gram at  $-40^{\circ}$  C. to 1.10 at  $0^{\circ}$  C. and to 1.16 at  $40^{\circ}$  C. The heat measured in joules per gram, which must be abstracted from the liquid, when the pressure is increased by a kilogram per sq. cm. in order to keep the temperature constant varies from 0.06 at  $-40^{\circ}$  C. to 0.09 at  $0^{\circ}$  C. and to 0.15 at  $40^{\circ}$  C. The latent heat of vaporisation in calories per gram varies from 332 at  $-40^{\circ}$  C. to 302 at  $0^{\circ}$  C. and to 263 at  $40^{\circ}$  C. It is to be hoped that these results will soon be made available to refrigeration engineers in the form of a total heat-entropy chart.

A SIMPLE chart for the conversion of temperatures from the Fahrenheit to the Centigrade scale, or *vice versa*, has recently been issued by the Cambridge Scientific Instrument Co., Ltd. The device consists of the two scales side by side in the form of a spiral, and is printed on a card about 1 ft. square. The effective length of the scales is thus about 6 ft., thereby permitting the divisions, which correspond with  $2^{\circ}$  each, to be satisfactorily open without at the same time restricting the range. This covers from the absolute zero,  $-273^{\circ}$  C., to  $2000^{\circ}$  C. Both the Fahrenheit and Centigrade scales are divided to  $2^{\circ}$  to prevent confusion, and each interval of  $10^{\circ}$ ,  $50^{\circ}$ , and  $100^{\circ}$  is clearly marked to facilitate easy reading. The chart should prove of service to all users of pyrometers or other temperature-measuring instruments, as both scales are so generally employed that conversion from one to the other cannot in practice be avoided. In addition to the conversion chart, tables of useful thermometric data are given. The Cambridge Scientific Instrument Co. states that it will be pleased to forward a copy of this chart free of charge to anyone interested on receipt of six penny stamps to cover the cost of postage.

THE report of the National Union of Scientific Workers for the quarter ending March 25 last outlines the progress which has been made with the work of organisation of the society. Eight branches of the union have been definitely formed in various parts of the country, the prospective membership of which appears to be between 300 and 400. An organising sub-committee is being set up to deal with the London area, which, the report says, presents special difficulties. Among the aims of the union specified in the report is the maintenance of the freedom and independence of research. All inquiries respecting the work of the union should be addressed to the secretary, Mr. Norman Campbell, North Lodge, Queen's Road, Teddington.

A NEW series of books on industrial chemistry, edited by Dr. S. Rideal, is announced by Messrs. Baillière, Tindall, and Cox. It is intended to give in it a comprehensive survey of the chemical industries. Two volumes have just been issued. "Industrial Electrometallurgy," by Dr. E. K. Rideal, and "The Application of the Coal Tar Dyestuffs," by C. M. Whittaker, are in the press. Further volumes will deal with "The Industrial Gases," "Silica and the Silicates," "The Rare Earths and Metals," "The Iron Industry," "The Steel Industry," "Gas-works Products," "Animal Proteids," "Organic Medicinal Chemicals," "The Petroleum Industry," "Fats, Waxes, and Essential Oils," "Synthetic Dyes," "Wood and Cellulose," "The Carbohydrates," and "Rubber, Resins, Paints, and Varnishes."

NO. 2532, VOL. 101]

THE April issue (No. 64) of Mr. C. Baker's Classified List of Second-hand Scientific Instruments has just reached us. In consequence of the increasing difficulty in obtaining new apparatus, it should be of especial interest and service to scientific workers. Copies can be had upon written application to 244 High Holborn, W.C.1.

MESSRS. DULAU AND Co., LTD., 37 Soho Square, W.1, have just issued a Catalogue (No. 72) of 764 books—some scarce—on botany and horticulture, anthropology, ethnology, archaeology, scientific travel, etc. The list will doubtless be interesting to many readers of NATURE.

### OUR ASTRONOMICAL COLUMN.

PHOTOGRAPHS OF THE SPECTRUM OF VENUS.—In a recent report to the Royal Astronomical Society (Monthly Notices, vol. lxxviii., p. 278) Mr. J. Evershed gives a preliminary account of some photographs of the spectrum of Venus which have been obtained with the large grating spectrograph at Kodaikanal. The primary purpose of the investigation was to ascertain whether the general shift of the lines towards the red at all points on the visible disc of the sun affects also a hemisphere turned  $90^{\circ}$  or more from the earth. If the wave-lengths in the light from Venus, after correction for the motion of the planet as a whole, are found to be identical with those from ordinary sunlight, the solar displacements cannot be attributed solely to motion of the absorbing gases; but if the Venus spectra show a smaller wave-length, a general motion of the solar vapours away from the earth may reasonably be inferred. Five good photographs, with iron arc comparisons, were obtained in October, 1917, which agree with a previous series of plates taken during February, 1917, in showing a distinctly smaller wave-length for iron lines in the spectrum of Venus as compared with the corresponding lines in the control spectrum of daylight. The results thus favour the motion interpretation of the solar shifts, involving an earth effect; but as the February plates were possibly not entirely free from pole effects in the arc, confirmatory evidence will be sought during June and July next. The trustworthiness of the plates for the purpose in view is indicated by the fact that the combined results from the east and west elongations yield a value for the solar parallax which differs only very slightly from that adopted in the Nautical Almanac. Only one plate was obtained when the planet was at half phase or less, but this is of special interest as showing a discrepant velocity, which is difficult to account for except by supposing that Venus rotates in the same direction as the earth and with the same order of velocity. It is further expected that the Venus plates will eventually decide whether the sun's gravitational field is concerned in the solar line-shifts or not.

RADIAL VELOCITIES BY OBJECTIVE PRISM.—The great advantages offered by the objective prism in the photography of stellar spectra have led to numerous attempts to utilise this instrument for the determination of radial velocities. The spectra of stars down to the tenth and eleventh magnitudes can be photographed in this way, and since a great number of spectra appear on a single plate, even an approximate method of deriving radial velocities would clearly be of great value in connection with the problems of stellar motions. One of the most promising methods appears to be that suggested by Prof. R. W. Wood, in which the light from the stars is passed through a filter of

neodymium chloride. In this way each of the stellar spectra is made to show a narrow artificial absorption line at  $\lambda$  4272, which serves the purpose of a comparison spectrum from a source at rest. An exhaustive test of the accuracy attainable by this method has recently been made by Mr. T. S. H. Graham, making use of a photograph taken at the Harvard College Observatory (Journal R.A.S., Canada, vol. xii., p. 129). Twenty spectra were included in the measures, and four independent sets of measures and reductions were made. The different results obtained from the four series indicate a somewhat greater probable error than the 10 km. per sec. previously estimated by Kapteyn and Campbell. Full and interesting details of the procedure are given in the paper, and attention is directed to the various sources of error, of which even the partial elimination would lead to results of great value.

#### RECENT MARINE BIOLOGY.

THE December issue of the Journal of the Marine Biological Association contains several papers of exceptional interest. One of these, by Dr. Allen and Mr. Sexton, gives a detailed account of experiments with reference to the inheritance of eye-colour in Amphipods, and in a further paper Dr. Allen presents the general results in a very attractive manner. *Gammarus chevreuxi* had been maintained in the laboratory aquaria for several years, and, quite suddenly, in the third generation of a family of these animals, a striking mutation occurred. Normally the eye possesses black pigment, beneath which is chalk-white matter, but in some individuals of this family the black was replaced by red. A pure black-eyed stock which bred true for three years was mated with a red-eyed stock, which again bred true for five generations. Black behaved as dominant, and red as recessive, and the results of further breeding were in very close correspondence with Mendelian theory. Thus black hybrids carrying red were mated together, giving 4393 offspring, and 3327 of these were black and 1066 red. (The expected results are 3294 and 1098). In the course of the experiments a second mutant appeared in which there was neither black nor red pigment in the eye, but only the deeper-lying chalk-white matter. This albino condition was also transmitted in very close correspondence with expected Mendelian results. Yet a third mutant was observed, a condition in which the chalk-white pigment was absent, and this "no-white" variety behaved as a recessive to dominant white and also closely followed Mendelian laws of numbers. Thus there was a gradual loss of factors, and accompanying the process of albinism there was degeneration of the ommatidia of the eye, a tendency towards the production of such a condition as that exhibited by the various blind species of subterranean Amphipods.

In another paper Dr. Allen gives a general account of experiments with reference to the cultivation of diatoms, describing the methods employed by himself and Mr. Nelson in order to obtain pure cultures. In some of these experiments a normal artificial sea-water was employed, as similar in composition as possible to natural sea-water, and made from pure chemicals. The silica necessary for the growth of the diatom frustules was found to be obtainable from the glass in which the cultures were kept. Sometimes this culture fluid succeeded and sometimes it failed, and it was found that it always succeeded if it was inoculated with from 1 to 4 per cent. of natural sea-water. Some growth stimulant was, therefore, present in sea-water, and it was found that this substance could be replaced

by a very small amount of an infusion of the green seaweed *Ulva*. The infusion could be evaporated to dryness and ignited to 200° C. without losing its activity, but if the ash were heated to low red-heat it became inactive. The growth stimulant is therefore some relatively stable, organic substance, and it is compared with those materials known as auxetics or vitamins. Besides these matters of special interest, Dr. Allen's paper deals also, in a very interesting manner, with the general conditions of productivity of food substances in the sea, and is a good summary of our knowledge with regard to this important series of problems.

J. J.

#### SCIENCE AND TECHNOLOGY IN NEW ZEALAND.

THE quickening of interest in pure and technical science brought about by the war in our Colonies as well as in this country is shown by the action of the New Zealand Government in publishing a journal entitled the *New Zealand Journal of Science and Technology*, to appear quarterly under the general editorship of a group of representative scientific men of New Zealand. This is intended to include a number of the shorter and more popular articles on scientific subjects which are likely to interest the general public, and is supplementary to the more detailed and extended reports of the various scientific departments of the Government. In this way it is hoped to interest and instruct the public in scientific questions, and to cause the growth of a healthy public opinion on the need for the organisation and extension of industrial research in the community.

The first number of the new journal, containing sixty-five pages, covers a very wide range of topics of general interest, including short articles on various biological and geological subjects and several papers dealing with mining matters, while an interesting account is given by E. Best on the Maori system of measurement. Special articles are contributed on the history and geology of the Wakamarina valley and goldfield and of the geology of the Waikato valley. Of particular interest is the account by L. Birks of the utilisation of the waters of Lake Coleridge as a source of electric power for the city of Christchurch, sixty-three miles distant. This is the first comparatively large-scale attempt to utilise the important sources of water power in the New Zealand lakes and rivers. The hydro-electric installation at Lake Coleridge was formally opened in November, 1914, shortly after the outbreak of war, and has run continuously since March 1, 1915. In the first year of its operation about 2000 kilowatts of power were utilised, and this increased to 4000 in the course of the second year. Six thousand kilowatts are now provided, and to meet further extension another installation of 3000 kilowatts is in course of erection, but has been much delayed owing to the war. This enterprise has proved such a success that it is likely to stimulate the public to make further use in the near future of their great natural resources in water power for general industrial purposes. In another article E. Parry discusses the economics of electric-power distribution, and emphasises the importance and economy of a centralised plant for the distribution of electric power for the larger towns.

Altogether the new journal has made an excellent beginning, and is likely to prove a useful asset in interesting and educating the public in the importance of the application of scientific methods to the needs of a young community.