

store, 1'3; bakery, 0'8; barber, 1'2; cigar, 1'4; clothing 1'5; confectionery, 1'0; delicatessen, 1'1; drug, 1'2; dry goods, 1'0; florist 1'1; grocery, 1'0; haberdashery, 1'7; jewellery, 1'6; meat, 0'9; millinery, 1'3; music, 1'1; restaurant, 1'1; shoe, 1'0; stationery, 1'0; wine 1'0 watt per square foot of floor.

THE October issue of *Science Progress* contains a full account, by Mr. W. A. Davis, of the experiments on the chemical effects of light, to which so much attention has been directed in recent years. The changes produced may be of some half-dozen types. The most important of these is probably a reciprocal oxidation and reduction, but isomeric and polymeric change, synthesis and hydrolysis are also effected in many cases. These changes are somewhat irregular in their occurrence; thus the nitrobenzaldoximes undergo isomeric change on exposure to light, whilst the parent substance remains stable; again, maleic acid is converted into fumaric acid by light in presence of bromine, but the other halogens do not produce this effect. One of the most striking changes is that of *allo*-cinnamylidene acetic acid,



which, when dissolved in benzene with 3 per cent. of its weight of iodine, actually sets within three minutes on exposure to light, owing to the conversion of 80 per cent. of the acid into a less soluble isomeride; in the dark no change occurs in six days.

WE have received from the Carnegie Institution of Washington a monograph on the conductivity, &c., of aqueous solutions of salts and organic acids, by Prof. H. C. Jones. As this summarises the data that have been published in a series of American papers, it will be of considerable value to those who have to refer to the figures now collected. In the original papers the data for the range 0° to 35° C. were all issued separately from those from 35° to 65° C.; in such cases the advantages of publishing in bulk rather than in successive portions cannot be emphasised too strongly. The present publication is therefore doubly welcome.

MESSRS. T. C. AND E. C. JACK have added another dozen volumes to their "People's Books," which are published in cloth binding at 6d. net. The additions include a volume by Dr. T. G. Bonney, F.R.S., entitled "The Structure of the Earth," in which he gives a very brief statement of the problems and methods of geology, and a popular account of the disintegrating forces at work modifying the earth's crust, of volcanoes, land movements, and the life-history of the earth. In "Hypnotism and Self-Education," Dr. A. M. Hutchison writes on the present-day position of medicine as regards diseases which demand healing other than that which can be given by drugs. A volume by Mr. William Hall, R.N., on "Navigation," is intended to initiate the reader "as a sort of honorary member in the great company of seafarers," and expounds simply such subjects as dead reckoning and astronomical navigation. Mr. R. G. K. Lempfert, superintendent of the Forecast Division of the Meteorological Office, describes in his volume "Weather Science" how meteorological observations

are made and their relation to the changes going on in the atmosphere, and explains what can be learnt by combining the results of observations taken at a number of stations. Two other of the books—"Marriage and Motherhood," by Mr. H. S. Davidson, and "The Baby: A Mother's Book," by a Mother, provide in simple words the information with which every wife and mother should be familiar.

IN view of the increasing importance of the study of public hygiene, the syndics of the Cambridge University Press have decided to publish a series of volumes dealing with the various subjects connected with public health. The provisional lists of subjects, all of which will be treated by experts, include:—The causation of tuberculosis, house-flies and disease, bacteriology of foods, tropical hygiene, sewage disposal, water purification, school hygiene, sound and unsound foods, domestic sanitation, chemical analyses of foods, &c. It is intended that the whole series shall appeal not only to medical men but also to those engaged in the study or administration of public health at home or abroad. The series will be under the general editorship of Dr. G. S. Graham-Smith and Mr. J. E. Purvis.

MESSRS. KEGAN PAUL, TRENCH, TRÜBNER AND CO., LTD., are about to publish a work on the "Theory of Evolution," by the Rev. K. Frank, S.J., with a chapter on ant guests and termite guests, from the pen of Father E. Wasmann, S.J. The work has been translated from the German by Mr. C. T. Druery, and will be illustrated.

#### OUR ASTRONOMICAL COLUMN.

**RADIUM IN THE CHROMOSPHERE.**—In No. 454 of *The Observatory*, Dr. Dyson replies to the views expressed by Mr. Evershed and Mr. Mitchell concerning his suggestion that there is some evidence for the existence of radium among the elements spectroscopically disclosed in the solar chromosphere.

His contention is that the chromospheric spectrum is an enhanced-line spectrum, and that before accepting any coincidence of Fraunhoferic and chromospheric lines as evidence of identity of source, the behaviour of any line in question in the spark should be taken into account. On these grounds he questions Mr. Mitchell's identifications of the lines  $\lambda 4699\cdot 52$  and  $\lambda 4533\cdot 34$  with lines given by Rowland. Other cases are against the radium identifications, however, and Dr. Dyson expresses the hope that the question will receive attention at future eclipses, and that the radium line at  $\lambda 5813\cdot 9$ , referred to by Mr. Evershed, will be looked for.

**OBSERVATIONS OF JUPITER.**—Despite the unfavourable conditions of altitude and weather some interesting observations of Jupiter were made during May-July at the observatory of the French Astronomical Society, and the results, with drawings, are now published in the November number of *L'Astronomie*.

The north polar region was much darker than the neighbouring region during May, but later it cleared until its hue was similar to the north temperate zone. Great changes of form and relative movement were observed in the great southern perturbation, and about the middle of July the displacement was at the rate of about 1000 kms. per day; these changes are illustrated by curves and drawings. Later observa-

tions, September 13 and October 9-10, showed that the north equatorial band, so inconspicuous for the past four years, had suddenly become one of the darkest and most conspicuous details on the planet, and it suggested that, at the next opposition, the aspect of Jupiter may be found to be considerably transformed.

THE DISCOVERY OF GALE'S COMET, 1912*a*.—In No. 1, vol. xxiii., of the Journal of the British Astronomical Association Mr. Gale, of Waratah (N.S.W.), tells the story of the discovery of his second comet, 1912*a*. Having to travel considerably, he finds but little time for telescopic work, but carries with him a field-glass of 2-in. aperture and a  $\times 3$  magnification. Examining the northern part of Centaurus on September 8, he saw a strange object of obviously cometary character, and on the next evening, having arrived at Mr. Beattie's observatory at Sydney, he was able to confirm the discovery and get a position. At the time of discovery the comet's magnitude was about 6, and the discovery emphasises the fact that a keen observer under a clear sky may do important work without possessing any considerable instrumental equipment.

A STAR CALENDAR.—We have received a copy of the "Star Calendar," by Mrs. H. Periam Hawkins, for 1913, and can strongly recommend it to all amateur astronomers. With its revolving disc it enables one to find the position in the sky of any constellation, or the time of rising and setting in these latitudes, for any hour in the year; the price is 1*s.* net. Mrs. Hawkins has also prepared, as in previous years, a "Star Almanac," which contains a great deal of useful information frequently needed. In addition to star charts for the four seasons, various useful tables and notes, the almanac contains a reproduction of Dr. Wolf's photograph of the "Butterfly" nebula of the Pleiades, and quotes Sir Norman Lockyer on the employment of the stars as guides to travellers; the price is 6*d.* net, and both calendar and almanac are published by Messrs. Simpkin, Marshall, Hamilton, Kent and Co.

THE SPECTROSCOPIC BINARY  $\beta$  SCORPIONIS.—In 1908 Dr. Slipher found that the calcium lines in the spectrum of  $\beta$  Scorpionis did not appear to partake of the oscillations of velocity shown by the other lines, and, also, that they were sharply defined instead of being broad and diffuse, as are the other lines.

The inquiry as to this peculiar behaviour has been taken a step further by Mr. J. C. Duncan, who, in No. 54 of the Lowell Observatory Bulletins, discusses a large number of new measures of the spectrum carried out by him. The elements which best represent the orbit give a period of 6'8284 days, an eccentricity of 0'27, and a projected semi-major axis of 10,990,000 km. for the brighter, and 14,450,000 for the fainter, component; the semi-amplitude of the velocity curve for the brighter star of the system is 126 km. per sec., and for the fainter star 166 km. per sec.

While the velocity of the centre of mass of the system is  $-8\cdot 0$  km. per sec., that given by the calcium radiation, K, is  $-16\cdot 6$  km. per sec., thus showing a difference of more than 8 km. per sec., which seems too great to be attributed to errors of measurement. This seems to support Hartmann's suggested explanation for a similar phenomenon in the case of  $\delta$  Orionis, viz. that the calcium absorption is produced by a mass of calcium vapour, independent of the star, moving with a constant velocity between the earth and the star. Observations of other stars in the Scorpio, Orion, and Perseus regions, made by Dr. Slipher, suggest the presence of such calcium clouds in all those regions. On the other hand, a suspected shortening of the period of  $\beta$  Scorpionis would sug-

gest that the calcium cloud envelops the binary system, and produces the effect of a resisting medium on the revolution of the components, but the suspicion needs much more confirmation than is at present forthcoming.

#### MEDICAL RESEARCH AND PUBLIC HEALTH.

ON November 28, at a meeting of the General Medical Council, Sir Clifford Allbutt raised the question, how the grant for research provided by the National Insurance Act could be used to the best advantage. He looked forward, not to a crusade against tuberculosis alone, but to a crusade against many other endemic diseases, a "general movement all along the line against all these plagues." He pointed out, very truly, that research, diagnosis, and treatment go hand in hand; that the business of pathological and clinical laboratories, in great cities, is to be in touch with men in practice, and to educate them in the methods of science, and in the results of science. He was opposed to the founding of one large institute in London: he was afraid that it would "harden into a bureau"; he desired to see more use made of the many institutions already founded in diverse parts of the country, in our great cities, and in our university cities. Medical research and medical education are inseparable; the doctor must not regard bacteriological institutes as places where he can put a specimen in the slot and get a diagnosis; he must take an intelligent part in the work of the institute. This view was approved by the General Medical Council.

On November 30, at a meeting of the Metropolitan Asylums Board, a recommendation was made by the Hospitals Committee, "that in view of the continued incidence and fatality of zymotic disease, approval be given to the appointment, at a salary of 500*l.* per annum, of a research bacteriologist." Since 1870, the board's hospitals have received more than 500,000 cases of infectious disease, with nearly 40,000 deaths. For one example of the national loss from these diseases, we have the fact that measles alone, in five years, in London, accounts for 10,199 deaths. We want to know more about measles. Probably it would pay the country to appoint more than one bacteriologist, at more than 500*l.* per annum, to study measles alone. We have looked at measles for ages, but have not found the cause of it. The discovery of the cause of diphtheria led to the discovery of diphtheria antitoxin. It is not improbable that some equally valuable discovery is waiting to be made in measles. Dr. Bousfield, at this meeting of the Metropolitan Asylums Board, put the matter in very plain words:—

"We have simply been warehousing infectious disease for years. We have been treating the symptoms and knew nothing about the disease itself. We have spent in forty years 15,000,000*l.*, and we now ask that machinery may be set up by which the lives of patients will be saved and the period of their stay in hospital considerably shortened, with a consequent saving of expense to the ratepayers."

This recommendation, of course, was agreed to; and, so far, so good. For in all London there is no authority wiser or more beneficent than the Metropolitan Asylums Board. But what is the good of one bacteriologist? We hope that he will be only the thin end of a wedge of bacteriologists. We are tired of babies dying of measles, tired of our ignorance of the cause of measles. It may be nature's way of killing off the undesirables, but she kills off likewise many desirables, and we want the bacteriologists to take nature in hand.