

dye is increased by the introduction of heavier radicals, and they are able to draw other inferences that may prove useful guides in seeking for new sensitizers. Of these twenty derivatives, which include ethyl red and pinachrome, it appears that none is so generally advantageous as sensitol green. The second communication treats of the "carbocyanines," and describes the preparation and action of eighteen different derivatives. One of the diethylcarbocyanine iodides is pinacyanol or sensitol red, and it is found that the sensitising power for gelatino-silver bromide is far less in the dimethyl derivative, and that it sinks gradually on passing to the dipropyl and dibutyl compounds. In the isocyanines the two quinoline residues are linked by the group $\text{:CH}\cdot$, while the joining group in the carbocyanines becomes $\text{:CH}\cdot\text{CH}\cdot\text{CH}\cdot$. The lengthening of this linking chain is accompanied by an extension of the extra sensitisation far into the red region of the spectrum, and the authors suggest that if methods were available for still further lengthening this chain it would be possible to produce compounds that would sensitise still further into the infra-red. Inferences are also drawn with regard to

the effects of the positions of the substituting radicals and other matters.

THE Research Defence Society has lately published four pamphlets of general interest, namely: (1) Vaccination, by Dr. Mary Scharlieb; (2) The Prevention of Tetanus during the Great War by the Use of Antitetanic Serum, by Sir David Bruce; (3) The Work of the Medical Research Committee, by Sir Walter Fletcher; and (4) The Value of Experiments on Animals: Notes of Personal Experience, by Sir Leonard Rogers. The set, price 2s., may be obtained from the society's Secretary, 11 Chandos Street, Cavendish Square, London, W.1.

It is eight years since the first edition of Prof. F. Soddy's volume, "The Interpretation of Radium," was published, and during that momentous period the necessity for enlarging and revising the original version has been proved. Mr. Murray announces that the author has been at work, and, with due compressions and the right additions, particularly those that bear upon the problem of the constitution of the atom, has brought the volume as closely up to date as is possible with a large and rapidly extending subject.

Our Astronomical Column.

LONGITUDE BY WIRELESS.—The scheme for linking up the observatories of the world by utilising wireless time-signals was referred to in NATURE for May 20 last (vol. cv., p. 370). It must be understood that no appreciable increase of accuracy over the older method by cable signalling is claimed; indeed, where the observers are not interchanged the precision is less. But the gain in convenience, expense, and wide distribution of signals is considerable, and it is known that where the travelling-wire method of observing transits is adopted, personality is greatly reduced; what remains is of the same order as the small local deflections of gravity, which can be eliminated only by extensive geodetical operations.

Mr. Dodwell, the director of Adelaide Observatory, has communicated the longitude which he deduces by the reception of the Lyons and Annapolis signals at Adelaide and Greenwich. It is 9h. 14m. 19.95s. using Lyons signals, and 19.78s. using Annapolis ones. The Nautical Almanac value is 20.30s. Allowance has been made for time of transmission, assuming a speed equal to that of light.

Many of the Australian boundaries are defined as meridians east of Greenwich by a specified number of degrees. They were determined by lunar observations and are known to be in error by some miles. It is not, however, expected that any change will now be made in them.

AN APPARENT EARTH-EFFECT ON THE DISTRIBUTION OF SOLAR FACULÆ.—The Monthly Notices for June contains a paper on this subject by Mr. E. W. Maunder, who acknowledges important help from several others in discussing the material, which consists of the Greenwich photographs from 1878 to 1916. The research was undertaken to test the result announced by Mrs. Maunder in 1907 that there was a preponderance of spots on the eastern half of the visible disc. Suggestions were made that this might arise from the spots sloping backwards or from the surface being heaped up behind the spot, thus avoiding the necessity of invoking an "earth-effect." The

faculæ, however, since they are evidently above the surrounding surface, could scarcely be affected in either of these ways, so that an eastern preponderance seems very hard to interpret otherwise than as an earth-effect. Such a preponderance is, in fact, shown for the greater part of the period under discussion. The average excess for thirty years is about 3 per cent.—a quantity of the same order as that found by Mrs. Maunder for spots, and later for prominences. The northern and southern hemispheres of the sun are plotted, and show a general accordance, with differences of detail. There is fairly clear evidence that the eastern excess varies with the progress of the sun-spot cycle, being least marked during the increase of solar activity and most marked during its decline. In other words, regarding the earth-effect as a damping influence on the spot activity, then the solar resistance to this damping is greatest at the time of increasing activity.

THE DENSITIES OF BINARY STARS.—In a paper in *Mem. della Soc. degli Spett. Ital.* (vol. viii., Ott., Nov., Dic., 1919) Dr. G. Abetti discusses the densities of several binaries of which the relative masses and parallaxes are known. The diameters are inferred from the absolute magnitude, and surface brightness is inferred from the spectrum. The extreme values of density are 0.002 for ϵ Hydræ A and 1.87 for ϵ Hydræ B. On plotting the mean densities as functions of spectral type, there is a slow but steady decline from 0.60 for A5 and 0.55 for F5 to 0.45 for G0 and 0.2 for K0. This agrees with Prof. H. N. Russell's hypothesis on the assumption that the stars in question are in the giant stage, passing from an early diffused condition (type K0) to one more condensed through the types G, F, and A. Plotting mass as a function of absolute magnitude, all masses above 1.5 have about the same absolute magnitude, while all the fainter absolute magnitudes have about the same mass, the mean for these being about 0.3. The number of stars discussed is too small to lay great stress on the results.