have made themselves and the council ridiculous, and would have prejudiced their case as regards the fellowship.

This issue—namely, the position of women chemists in regard to a society which professes to have no other aims than the promotion of chemistry—is one which is bound to be settled in favour of the women. Men have no prerogatives as regards the study and cultivation of natural knowledge. It is open to women, as human beings, to follow its pursuit if they are so minded, and they have the same moral rights as men to benefit by membership of an organisation which has been created to further its interests. We admit women to our colleges and universities; they work in our chemical laboratories; they engage themselves in the business of original chemical inquiry; we publish their scientific communications in our journals; and we confer upon them our degrees in science. Why, then, should the Chemical Society of London be singular in refusing to admit them as fellows? That it is singular is shown by the fact that even a purely professional society—the Institute of Chemistry—admits them. The Society of Chemical Industry places no obstacle in their way, and they are admitted to Continental and American chemical societies.

The small group of London chemists who have set themselves to oppose the wishes of the main body of the society have thereby raised an issue which is even broader than that which they have sought to evade. It is whether, in an essentially democratic institution like that of the Chemical Society, the will of the majority is to prevail, or whether it is to be thwarted by the machinations of a self-constituted oligarchy which abuses its trust and makes use of its opportunities to gratify its personal prejudices. Perhaps the general body of the fellows will have something to say on this matter at the forthcoming general meeting of the society.

PERIODICITY IN THE SUN AND THE RED VARIABLE STARS.[1]

THE mechanisms of the periodicities of the sun and stars are matters still of great obscurity. The cyclic change of the sun's spotted area has long been known, indeed can be traced in the early Chinese observations. In probable association with this are periodicities of facular and floccular areas, and of prominence activity. Coronal forms have been shown to change in type from point to point of this solar cycle, while recent observations of the so-called "solar constant" have shown its intrinsic variability. This last also is likely to be periodic. Such intimate first-hand knowledge is impossible in the case of the stars. Their integrated light changes alone can be examined. For variable stars about or below the solar level, according to the classifications of Secchi, Lockyer, or Pickering, some idea of the details of their variation may be obtained by analogy with the sun. In dealing with the red variable stars this method has been followed in the publication under review. This is an "Essai d'une Explication du Mécanisme de la Périodicité dans le Soleil et les Étoiles rouges variables," by A. Brester, Jz, Docteur ès Sciences, published by the Academy of Science, Amsterdam, 1908. The first accounts of the theory have been already reviewed in NATURE (vol. xxxix., p. 492, and vol. xlvii., pp. 433, 434). Its main features remain unchanged. The present statement gives it in the light of more recent knowledge, amends it in detail, and extends its application, more especially, to the case of red variable stars.

A short preliminary re-statement of the theory is perhaps desirable. In the case of the sun there is postulated a hot fluid globe made up of concentric layers of different substances arranged, more or less, according to their densities, and having angular velocities increasing with the depth in the sun. For the stability of such a stratification a relatively tranquil sun is demanded; such disturbances as are admitted are considered as being of the order of feebleness of terrestrial winds.

Radiation from the outermost solar layers provokes condensation, retarded by exothermic chemical action, which, falling as a torrential rain, forms the photospheric clouds. If the loss of heat above exceeds the gain of heat below the clouds increase in thickness and gradually reach lower and lower levels. In their descent they leave behind the finer condensed material, which serves to explain the loss of solar light at the limbs and the "yellow veil." The extreme brilliance of the photospheric clouds is likened to that of an incandescent mantle, the brightness of which seems to be associated with some subtle chemical activity. The breaks in the photosphere through which the re-vaporised clouds ascend constitute the spots, the vapours of which, though at least equal in temperature to the photospheric clouds, have smaller emissive powers. An upthrusting of faculæ would usually precede a spot, which seems to correspond to the latest observations, while the facular lag and equatorial acceleration of spots would follow from the assumed distribution of angular velocity.

The periodicity of the thickening and sinking of this photospheric cloud and its re-conversion into uprising vapour, which again condenses at a high level, grows in thickness and slowly reaches lower levels once more, is obviously too indefinite for mathematical treatment, so that the eleven-year cycle and the minor periodicities are still only facts of observation. An intensification of this clouding up of radiation and an increased periodic spottiness represent the extension of the theory to the red variable stars.

The tranquility and absence of eruptive phenomena, which the author regards as essential to his theory, are fearlessly imposed. Since the delicately poised strata must not be disturbed, the directly observed velocities, both on the photosphere, as spot and floccular changes, and at the limb, as prominence activities, are discredited as movements of matter. A transference of luminescence serves to explain them. The displacements of some solar lines indicate, on the principle of Döppler, velocities in the line of sight which the author holds as "impossible and absurd." Since line displacements are now known to be produced by other agencies, as well as by line-of-sight velocities, Döppler's principle is held to be untrustworthy. The invariability of the general Fraunhoferic spectrum is adduced as evidence of this photospheric calm, while the outermost different angular velocities of some of the solar layers, as indicated in the recent work of Prof. Hale, show, according to the author, that the "supposed solar eruptions cannot exist."

The above is a very brief sketch of the theory which in the essay is treated in great detail. A wealth of pertinent quotations and references is brought to its support, the collection of which must indeed have been a labour of love.

The parts which exothermic and endothermic chemical actions play in the theory are interesting. Dissociation, a distinctive solar theory of Sir Norman Lockyer, is used in this connection, though the relative temperature and the direction of motion in the umbræ of spots are the opposite of those given in

[1] "Essai d'une Explication du Mécanisme de la Périodicité dans le Soleil et les Étoiles rouges variables." By A. Brester, Jz. Eerste Sectie. Deel ix., No. 6. Pp. 137. (Amsterdam: J. Muller, 1908.)

the sun-spot theory suggested by him. This latter theory recent solar work would seem to support.

While a transference of luminescence might be held as sufficient to account for the direct observations of apparently high velocities in prominences, it would not adequately account for the actual line displacements observed, which are so consistently dealt with by Döppler's principle. It is difficult to see why even a velocity of 300 miles per second in the outer regions of the solar atmosphere is held to be impossible. At the lower levels of the photosphere and reversing layer such enormous velocities are hardly to be expected, though even here the invariability of the spectrum is more apparent than real. Larger solar images and greater dispersion show local movements of the solar lines unobserved under less favourable conditions.

The independent rotation of some of the outermost solar layers is not vital to any theory, and indeed the outermost considered has the *highest* velocity apart from the lack of polar retardation. The existence of extensive magnetic fields in the sun due to the rotation of ions indicates velocities in excess of that which the author's theory would allow. The theory, however, seems a flexible one, and may provide even for these observations. The essay should be found both interesting and suggestive, though it can hardly carry conviction.

For his painstaking compilation of evidence, for his careful discussion of it, and for his daring unorthodoxy and consistency, the author deserves full credit. In the region of solar theory, during this age of subatomic physics, many of the grosser explanations and less subtle analogies, hitherto sufficient, may have to pass. The necessity for an alert and open mind is especially great.

THE INTERNATIONAL CONGRESS OF CHEMISTRY.

THE seventh International Congress of Chemistry will be held in London at the end of May. The congress meets every third year, the last meeting having been in Rome, and the one previous in Berlin. This is the first time that the congress, which is under the patronage of the King and the Prince of Wales, has been held in this country. Some two years ago an organising committee was formed of delegates from twenty societies which have interests in connection with chemistry, and also from the Chambers of Commerce of London and Manchester.

There are very few of the important industries which are not directly or indirectly indebted to technical chemistry for their development and success. Continental nations have long recognised this, and the congresses which have been held in the various cities of Europe have been well attended. It has been felt, also, that the holding of the congresses has materially contributed to the progress of the various countries by bringing the heads of the firms into personal contact with scientific men from all parts of the world.

The congress covers the whole domain of chemistry, and is divided up into eleven sections:—(1) analytical chemistry, (2) inorganic chemistry and allied industries, (3) metallurgy and mining, (4) organic products, (4*a*) colouring substances and their uses, (5) industry and chemistry of sugar, (6) starch industry, (6*a*) fermentation, (7) agricultural chemistry, (8) medical chemistry, (8*a*) pharmaceutical chemistry, (8*b*) bromatology, (9) photochemistry, (10) electrochemistry and physical chemistry, (11) law, political economics, and legislation with reference to chemical industries.

British delegates who have attended these congresses have always been well received and entertained in a most hospitable manner. It is hoped and expected that we in this country will not be behindhand in the welcome which will be extended to our foreign *confrères*.

The congress will be opened at the Albert Hall, and the business part of the proceedings will be held in the buildings of the University of London the Imperial Institute, and the Imperial College of Science and Technology at South Kensington. The chief aim of the congress is the advancement of scientific knowledge, but beside this, arrangements are being made for various gatherings of a social nature, such as a banquet at the Crystal Palace, a conversazione at the Natural History Museum, and a visit to Windsor Castle by special permission of the King.

In view of the fact that more than 3000 visitors are expected to attend the congress, and that it will last a whole week, the expenses will necessarily be heavy. Substantial sums have already been received, but in order that we may in no way be behind other nations in our hospitality, the committee has appealed for further help.

THE HUTTON MEMORIAL MEDAL AND RESEARCH FUND.

SHORTLY after the death of the late Captain F. W. Hutton in 1905, steps were taken by the Philosophical Institute of Canterbury to establish a research fund as a memorial of his many services to New Zealand science. The New Zealand Government recognised the value of Captain Hutton's work by

subsidising the fund to the amount of 300*l.*, and a total sum of about 660*l.* was ultimately handed over to the New Zealand Institute.

Of this amount, 100*l.* was set aside for the expenses of striking a bronze medal to be known as the Hutton memorial medal. This medal, a photograph of which is here reproduced, has been designed by Prof. Lanteri, and bears an excellent portrait of the late Captain Hutton, and on the obverse a design emblematical of the fauna and flora of New Zealand, viz. a tuatara (*Splenodon punctatus*, Gray), prominent in the foreground; a kiwi (Apteryx); a cabbage tree (*Cordyline australis*); New Zealand flax bush (*Phormium tenax*), and other New Zealand plants,