Our Astronomical Column.

ASTRONOMICAL ANNOUNCEMENTS BY WIRELESS TELEGRAPHY.—Prof. Kobold, editor of *Astr. Nachrichten*, and director of the Centralstelle, delegated the latter work to Prof. Strömgren, Copenhagen, during the war, but has now resumed it, and announces in *Astr. Nach.*, 5044, that arrangements have been made for the distribution of astronomical information by wireless telegraphy from the Nauen station. Such messages will bear the signature "Obs.," and it is suggested that institutions that wish to receive them should make arrangements with the wireless station nearest to them that receives Nauen messages. It is hoped that they will make a contribution to the cost of the service. The idea of using wireless in this manner is certainly a good one, and might be of great service in the case of such unexpected phenomena as the outburst of novæ, where early observations are of special value.

THE ASTROGRAPHIC CATALOGUE.—This great undertaking, begun a third of a century ago, is still far from completion, many of the observatories that undertook to collaborate having dropped out, from financial or other reasons. Their zones were afterwards allotted elsewhere, and one of the new observatories (Hyderabad) may be mentioned in particular for its praiseworthy energy. The late director, Mr. R. J. Pocock, unhappily died without seeing the work completed; but thanks to the Nizam's generosity the work is continuing under his successor, Mr. T. P. Bhaskaran, who has just published vol. iii., containing measures of rectangular co-ordinates of 58,743 star-images on plates with centres in decl. $-19°$. The form of publication is similar to that in the Greenwich and Oxford catalogues.

TIDAL FRICTION AND THE LUNAR AND SOLAR ACCELERATIONS.—Dr. H. Jeffreys has a paper on this subject in the Monthly Notices for January, in which he quotes Major G. I. Taylor's result in Phil. Trans., A, ccxx., that tidal friction in the Irish Sea accounts for 1/56th of the required dissipation of energy, assuming that the moon's secular acceleration is $10{\cdot}5''$ per century, which is $4{\cdot}4''$ above the amount calculated from planetary action on the earth's orbit. The accelerations are here measured, as is customary, by the space gained at the end of a century. Dr. Jeffreys uses the more strictly logical system of the velocity gained, and, consequently, doubles the value of the acceleration. He gives a list of the seas that seem likely to contribute to the tidal effect, and concludes that they are capable of producing the whole of it. The tidal acceleration of the moon is the difference of two terms: (1) the apparent acceleration due to the slackening of the earth's rotation, and (2) the actual retardation due to increase of distance. In the case of the sun only (1) is present, though there may be further acceleration if the earth is travelling in a resisting medium. Dr. Jeffreys finds for the solar acceleration $1{\cdot}56''$ on his system—that is, $0{\cdot}78''$ on the usual system.

Dr. Fotheringham has rediscussed the accelerations from all available ancient observations. He finds $10\frac{1}{2}''$ for the moon, and $1''$, or somewhat more, for the sun. The corresponding period for the large empirical lunar term is 260 years. Prof. Turner finds that this period agrees well with the periods deduced from Chinese earthquake records and from those of Nile floods. He also confirms it by statistics of tree-growth, derived from a study of their annual rings. He suggests that the earth is pulsating in this period with consequent alteration in its rotation, which produces an apparent fluctuation in the moon's motion, and smaller ones in that of the sun and planets.

The Iron and Steel Institute.

THE annual meeting of the Iron and Steel Institute, held in London on May 6-7, was rendered noteworthy by the fact that the incoming president was Dr. J. E. Stead. It is somewhat remarkable that Dr. Stead has not been elected to this office before. He has been engaged in metallurgical work for fifty years, has reached the age of seventy, and no metallurgist in this country holds a higher international reputation. He has carried out a considerable number of researches of first-rate importance which are remarkable for their suggestiveness and technique, and he possesses in a striking degree the confidence and respect of those engaged in the industry. The explanation, however, is forthcoming in the opening sentences of his address, from which it is clear that he was invited to fill this office some years ago, but refused as he did not consider he was qualified, to use his own words, "to accept such an exalted position." It is quite safe to say that this misgiving has never been shared by anyone else. Dr. Stead finally yielded to the strong representations of his fellow-members on the council, and his acceptance of the office of president has been received with widespread gratification by the institute.

His presidential address is an attempt to pass in review the progress made in the ferrous industries during the past fifty years. This proved to be a gigantic piece of work, and it is not surprising to learn that Dr. Stead found more trouble in condensing than in collecting the voluminous data so as to bring them within the limits of an address. Even so, it turned out that he was not able to read more than one-third of it. The address is divided into a series of sections which deal successively with the blast-furnace, the puddling process, science in the foundry, the basic Bessemer and basic open-hearth processes, electric furnaces, the production of sound ingots, the recognition of science, the advent and progress of metallography, the application of science to the ferrous industries, the encouragement of science, and technical education. Within the limits of this article it is only possible to touch briefly on the subject-matter of three of these sections.

(1) *Blast-furnace Practice.*—It appears from the accumulated experience of this branch of the industry that no object is gained by increasing the capacity of the furnace above 30,000 cubic feet, and that its working is best controlled by having a separate blowing engine for each furnace. Increased output per furnace can be achieved by widening the diameter of the hearth and increasing the volume of the air blown in. The gases issuing from the furnace-top should be conserved by the adoption of the double bell or some similar system. The maximum proportion of their calorific value should be used by freeing them from dust, controlling the proportion of air for their combustion, and maintaining a low exit temperature. Coke-ovens should be close to furnaces and the coke handled as little as possible after it leaves them so as to avoid the production of "fines," and should be sufficiently hard to resist crushing. Fine coke disorganises the regular working of the furnace and reduces the output of pig-iron. It should, therefore, be sieved off and either used for other purposes or briquetted, if the process be not too costly, and then charged into the furnace. Dr. Stead concludes that there is sufficient evidence to show that given efficient gas-engines it is advisable to use them in preference to steam-engines. One of the still unsolved problems is the utilisation of the heat carried out of the furnaces in the slag. Inasmuch as the gas and the heat obtained from the

blast-furnaces and coke-ovens exceed the requirements of the blast-furnaces, he regards it as probable that in cases where coke-ovens, blast-furnaces, and steelworks are grouped together sufficient gas will be available to do all the heating at the steelworks without using any raw coal.

(2) *Electric Furnaces.*—The electro-thermal steel furnace, which up to 1914 had produced only a very small proportion even of the higher grades of steel, was developed with great rapidity in this country during the war. Germany led in this branch of the industry, and most of the German electric steel was made by refining basic Bessemer steel. Furnaces of 30 tons capacity were used for this purpose. The U.S.A., Italy, and France were all ahead of England in production. To-day the U.S.A. leads, followed by Germany and England. It is stated, however, that the actual number of furnaces and the amount of power used are greater in England than in Germany. By the end of 1918 no fewer than about 140 furnaces of all types were in use in this country, with a production of 150,000 tons per annum. During the war the output in these furnaces was principally used for making steel for bullet-proof plates, aeroplanes, motor-cars, armour-piercing shells, and steel helmets. Stainless steel is being made in increasing quantities, as are also nickel-chromium and other alloy steels. The significant statement is made that on the Tyne electro-thermal steel is being manufactured at a price which can compete with the acid open-hearth steel, since cheap power is available from coke-oven gas. A great advance is foreshadowed in Dr. Stead's reference to the melting of steel *in vacuo*. Mr. Albert Hiorth, of Christiania, has designed an induction furnace of this type in which the steel is melted and then cooled. Afterwards it is removed and cut up into sections for forgings. It is stated that in this way steel free from honeycomb and gases is obtained. While it is probable that this process is likely to be, for the present, applied only to the highest qualities of steel, experience may indicate the desirability of its extension to other varieties later on.

(3) *Technical Education.*—Dr. Stead finally puts in a powerful plea for the better education of the technical staffs and workmen engaged in the industry. He mentions that many years ago he discussed and formulated a scheme with the late Mr. Andrew Carnegie whereby there was to be established in every industrial centre an institute which could be used as the headquarters of local technical societies, consisting of metallurgists, engineers, electricians, chemists, and others. At this centre proceedings of technical societies and all technical publications were to be assembled. Indexes of subject-matter would be prepared by a competent staff, and supplied to the general managers of the various industries. After many years' discussion a step in this direction has been taken in the Middlesbrough district. Suitable premises have been obtained, which are being reconstructed to meet local requirements. The sum of about 10,000*l.* has been subscribed, and there are promises of annual subscriptions. This, however, is only a beginning, and Dr. Stead, who has nothing if not vision, contemplates an annual contribution from the iron and steel industry for the purpose of making the scheme adequate. He suggests a contribution of 0·1 per cent. on the capital invested, or 1 per cent. on the actual dividends. Taking the former at, roughly, about 250,000,000*l.*, the annual charge would be 250,000*l.* A fund of this magnitude should be sufficient in his opinion to enable technical institutes to be established and maintained in the eight principal iron- and steel-making districts and in London, and to carry on their work with a "fair degree of efficiency." It is to be hoped that this suggestion of Dr. Stead's will be vigorously taken up by his council, and a serious attempt made to bring it to fruition. H. C. H. CARPENTER.

The University of London.

GOVERNMENT OFFER OF A SITE.

AT a meeting of the Senate of the University of London, held on May 18, the Vice-Chancellor, Dr. Russell Wells, reported that the Chancellor, the Earl of Rosebery, had received from the President of the Board of Education, Mr. H. A. L. Fisher, a communication in the following terms, dated April 7:—

"The Government have watched with sympathetic interest the efforts which the universities have been making to fit themselves for the task that the period of reconstruction imposes on them, and to take advantage of the opportunities for extending their usefulness which are offered by the steadily growing public recognition of the national importance of a good system of university education. Nowhere are the opportunities more favourable than in London; for as the capital city of the Empire, with the unmatched facilities for many branches of study and research which its great national collections, hospitals, and public institutions provide, London has always attracted a large number of students, not only from all parts of the United Kingdom, but also from overseas. The war has deepened the general sense of Imperial and international solidarity and has spread more widely an understanding of the mutual benefits which the different peoples derive from drawing closer the relations between their educational systems; and it is accordingly to be anticipated that in the near future many more university students will be coming to London from our Dominions and Colonies and from foreign countries. This will inevitably place a very serious strain upon the teaching resources of the University of London and will add considerably to the already grave difficulties of organisation by which the University has long been confronted. The Government have, during the past year, sanctioned large increases in the grant to the teaching institutions included in the University of London, as in the grants to the other universities and colleges throughout the country, and no doubt these additional grants should go some way towards enabling the University to meet its increased responsibilities. The mere increase of the grants to individual colleges will not, however, by itself dispose of the special problem which London University has to solve, and the Government are accordingly prepared to take a further step which they consider likely to prove of very material assistance to the University at this critical stage of its development.

"It has seemed to the Government that this is a suitable time at which to make an offer which they have long had under consideration and which they think should help to remove a good many of the administrative difficulties involved in the housing of the University headquarters in the Imperial Institute at South Kensington. The Government are now in a position to acquire a site of about 11½ acres behind the British Museum, and they offer to devote it gratis and in perpetuity to the provision of a site for new headquarters of the University and for colleges and institutions connected with it, including King's College, whose premises in the Strand are now