

conduit à ce résultat. Il va paraître un extrait de mes recherches dans les *Ast. Nach.* J'aurais donc pu, Monsieur, me dispenser de Vous en écrire, si je n'avais eu à remplir le devoir de Vous remercier pour l'intéressant ouvrage que Vous m'avez adressé.

"Vous verrez, Monsieur, que je démontre qu'on ne peut satisfaire aux observations d'Uranus qu'en introduisant l'action d'une nouvelle Planète, jusqu'ici inconnue : et ce qui est remarquable, il n'y a dans l'écliptique qu'une seule position qui puisse être attribuée à cette Planète perturbatrice. Voici les éléments de l'orbite que j'assigne à cet astre :

Demi-grand axe de l'orbite ... ..	...	...	...	36,154
Durée de la révolution sidérale ... ..	...	...	...	217 ans, 387
Excentricité ... ..	...	...	...	0,10761
Longitude du périhélie ... ..	...	...	...	284° 45'
Longitude moyenne : 1 ^{er} janvier 1847 ... ..	...	...	...	318° 47'
Masse ... ..	...	...	...	$\frac{1}{9300}$
Longitude héliocentrique vraie au 1 ^{er} janvier 1847	...	...	...	326° 32'
Distance au Soleil ... ..	...	...	...	33,06

"La position actuelle de cet astre montre que nous sommes actuellement, et que nous serons encore, pendant plusieurs mois, dans des conditions favorables pour le découvrir.

"D'ailleurs, la grandeur de sa masse permet de conclure que la grandeur de son diamètre apparent est de plus de 3" sexagésimales. Ce diamètre est tout-à-fait de nature à être distingué, dans les bonnes lunettes, du diamètre fictif que diverses aberrations donnent aux étoiles.

"Recevez, Monsieur, l'assurance de la haute considération de Votre dévoué serviteur

"U.-J. LE VERRIER.

"Veuillez faire agréer à Mr. Encke, bien que je n'aye pas l'honneur d'être connu de lui, l'hommage de mon profond respect.

"A Monsieur J. GALLE,
"Astronome à l'Observatoire Royal de
"Berlin, à Berlin."

THE NEW ZEALAND SURVEY.

IN a report which has recently been published, the Surveyor-General of New Zealand describes the work of his department during the year 1909-10. A large area of country has been surveyed, but the urgency for pushing forward the topographical and settlement surveys, and the survey of native lands, leaves little opportunity for dealing with the major triangulation of the country. It is satisfactory, however, to see that besides some 320 square miles of minor triangulation, a commencement of a secondary triangulation has been made, and a base-line some eight miles in length has been measured. There is said to be a pressing need for this form of control, which may "bring into harmony different groups of practically uncontrolled minor work with their different standards of length, &c." The experience of many other regions goes to show that not only is such control indispensable, but adequate expenditure on it is the best economy, and very soon repays itself.

As the report is arranged by districts, it is difficult to appreciate fully the character of work done; but the demand for land surveys on large scales is very large, and the want of ample and accurate triangulation of second- as well as the present third-order series is no doubt a real one.

The measurement of a base of the secondary triangulation at Wairarapa was carried out with two five-chain invar tapes; a third of greater width, a quarter of an inch instead of an eighth, was also used for the first two sections only. The tension was determined by a Salter spring balance, and not by weights, as is now the more usual method. The tapes were supported at intervals of fifty links by special stands. Four measurements were made of all sections, two with each tape, and of the first four two additional measurements were made; the probable error of the final value adopted for the base is given as 1 part in 2,962,000. The standard of length for

controlling the invar tapes was a steel 100-link tape, of which the true length was known at 62° F. and under a tension of 15 lb., but not its coefficient of expansion and modulus of elasticity. A second base is now in hand, and with the increase of this important high-grade work greater facilities for comparison and verification of base apparatus will doubtless be introduced. The work of the department also includes the harmonic analysis of the tidal observations of the Dominion for the New Zealand Nautical Almanac, and arrangements have been made to furnish advance proofs to the Admiralty.

The work of the magnetic observatory has provided an unbroken series of magnetograms from the Adie instruments, and also a large number of seismograms from the Milne seismographs.

THE JAPAN MAGAZINE.¹

THE great development of Western education in Japan has naturally led to the extensive publication of newspapers and magazines of a very varied kind, and many of them are of a high literary, scientific, or philosophical quality. *The Japan Magazine* is one of the most recent additions, and although its editor seems to be a European, almost all the writers are Japanese. The issue for October, which has just come to hand, is a very good combination of readable matter, which at the same time is of great interest to all who know Japan.

The first article is on "Torii," the characteristic and picturesque gateways to be found at the entrance to every Shinto shrine. It is one of the best which we have seen, and is illustrated by some of the most striking examples in the country. Mr. Seiichi Tejima, the director of the Higher Technological School in Tokyo, gives an interesting description of the organisation and work of his school which will be read with advantage by those engaged in similar work in this country. In addition to the technical part of the curriculum, the importance which is given to the training of character should be specially noted. Mr. Tejima points out that a person engaged in any occupation may be tempted to bargain his honour for venal purposes if the basis of his morals is not sound, and thereby lose the credit of an expert, and it is therefore the school's principal line of policy in education to give moral training on one hand and engineering practice on the other. Mr. Tejima was recently in London in connection with the Japan-British Exhibition, and no doubt some of our readers made his acquaintance and admired the exhibit shown by his school and other educational institutions in Japan. Viscount Taneko, the well-known statesman and writer, gives some readable reminiscences of American statesmen which throw interesting sidelights on some of the problems arising between America and the Far East.

The chief city engineer of Tokyo, Mr. Benjiro Kusakabe, has a descriptive article on "The New Tokyo," which gives a good idea of the transformation which has taken place and almost made the city unrecognisable by those who knew it in former times. Of course this magic transformation is, after all, not so marvellous as it appears, for the reconstruction of a city of wood cannot be regarded as so colossal a task as would be the rebuilding of a stone city like London or Berlin. But the story of the modernisation of Tokyo is none the less interesting as an indication of the tact, skill, and expedition with which the Japanese attempt and achieve great things, and Mr. Kusakabe thinks that when all the new buildings now either in course of construction or contemplated in the near future are completed, and the city's plan of public improvements carried out, Tokyo will be, both in appearance and reality, one of the finest capitals in the world.

Mr. Yaichi Haga tells "How Western Civilisation came to Japan," and Mr. Yoso Kubo, of the Investigation Bureau, has an important article on "The Remaking of Manchuria," which explains Japanese policy and methods in that part of the world. There are very good articles on "The Art of Judo," or of physical training, with special relation to its ethical aspects, on the "Silk Indus-

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