Bose's figure. We have made the necessary additions, and find a biquadratic, as was anticipated. But a more unfortunate circumstance is that the author makes the variations in the components of the tension of the kite string depend on the velocity components of the kite instead of on the angular displacements. It is to be mentioned, however, that the investigation is independent of the assumption that the surface of the kite is a narrow plane gliding at a small angle of attack, an assumption sometimes justifiable in the case of an aeroplane, but inapplicable to the old-fashioned quadrilateral kite.

THE *Psychological Bulletin* for June 15 contains several summaries of recent work in the different departments of sense perception. One of them deals with the factors which influence the estimation by an observer using one or both ears of the position of the source of a regular sound such as a musical note. For a person using one ear only Arps and Klemm have confirmed the belief that some factor besides the intensity of the sound heard plays a part in the estimation of the distance of the source. Myers has shown that the timbre of a note is one of the factors which affects the estimation of distance of a source in the hearer's median plane, but not in any other direction. Another summary deals with optical illusions, amongst others with that of two or more parallel lines, one of which when crossed obliquely by short lines no longer seems parallel to the others —Zöllner's lines. Giese has shown that if one line only of a pair of parallel lines is crossed by oblique lines, the extent of the illusion is half that when both lines are crossed when one eye only is used, but that when both eyes are used the illusion is the same in each case. If the figures are presented in succession instead of simultaneously, the extent of the illusion is diminished. Practice also decreases the illusion.

OUR ASTRONOMICAL COLUMN.

AUGUST METEORS.—Mr. Denning writes:—"Very unsettled weather, with thunderstorms unusually prevalent, has interfered with observation of the Perseids this year, but a fair number of them were recorded. The display appears to have been one of average character.

"On August 10 the sky was only partly clear at some places. There were about 20 meteors per hour (14 Perseids) for one observer watching uninterruptedly.

"On August 11 clouds were more abundant, and not much could be seen of the shower.

"On August 12 the sky was very favourable in the west of England, but somewhat clouded in the east. At Bristol 80 meteors (68 Perseids) were seen up to 12.30 p.m., but many others were missed, and the horary rate for a constant watch of the sky would have been about 40.

"On August 13 there were some passing clouds, but up to midnight these did not materially affect the progress of observation. At Bristol 45 meteors (29 Perseids) were counted. The number had evidently decreased since August 12.

"On August 14 several thunderstorms occurred during the night, and nothing could be seen.

"The radiant point of the meteors was as follows:—

July 15	15°+48°
August 10	40+55
August 12	47+58
August 13	49+58

Nearly all the meteors left streaks.

"The most brilliant object appeared on August 13 11h. 8m., shooting from $34\frac{1}{2}^\circ+50^\circ$ to $25\frac{1}{2}^\circ+45\frac{1}{2}^\circ$, where it left a streak for 30 seconds as seen from Bristol. It was seen at Bristol, and by Mrs. Wilson at Harrow. Its radiant point was at 54°+56°, and height 79 to 55 miles, path 48 miles, and velocity 40 miles per second. It moved from over Northampton to Oxford.

"A curious meteor was recorded on August 12 10h. 44m., shooting upwards from $30\frac{1}{2}^\circ+20^\circ$ to $13^\circ+51^\circ$. It moved slowly, and left a bright streak. Half-way along its course it appeared to stop, and then renewed its course.

"The radiant of the Perseid swarm was fully fou degrees in diameter.

"Large meteors were not very abundant, but several were noticed, and will be made the subject of further investigation. Several of them were recorded by two or more observers.

"Mrs. Fiammetta Wilson at Harrow-on-the-Hill, and Miss A. Grace Cook at Stowmarket, obtained a number of valuable observations, though the atmospheric conditions were seldom very good. It will be possible to compute the real paths of many large meteors (Perseids) and of several meteors directed from the minor radiants of this period. Mrs. Wilson, with her usual perseverance, has sent the writer a list of 110 meteor-paths observed from August 7 to 15.

"One of the most interesting objects that has appeared during the recent display was a brilliant one from Musca (40°+29°) on August 10 at 9h. 33m. The meteor had a long path of about 154 miles from over London to the English Channel east of Start Point, Devonshire. It fell from a height of 68 to 52 miles.

"A feature noticed in regard to the Perseids was that they exhibited a distinct difference of velocity. This was quite apart from such discordances as might be induced by differences in position and distance. Two meteors appearing in very nearly the same region gave in several instances an apparent speed essentially dissimilar, though presumably at same height, or very nearly so."

THE DETROIT OBSERVATORY.—We have received vol. i., pp. 73–206, of the Publications of the Astronomical Observatory of the University of Michigan, which forms an impressive testimony to the activity of the staff. Thus, in about four years, no fewer than 3200 spectrograms have been secured with the $37\frac{1}{2}$ in. reflector, and meanwhile the Director has found time to organise and direct the work of the La Plata Observatory, which has already made a mark in cometary discovery. The long-projected Lamont 24 in. refractor, it is to be regretted, is still delayed, awaiting the delivery of the flint glass disc from the Jena makers.

The astronomical researches described in the present volume include determinations of the geographical position of the observatory, the visual light curve of β Lyræ, a paper on the characteristics of Cepheid variables, and studies of the spectra of δ and ϵ Orionis, all the work of Prof. Ralph H. Curtiss; the spectra of ψ Persei and β Monocerotis, and radial velocity of Maia, treated by Dr. Paul Merrill; a study of the titanium spark as a comparison spectrum,

by Mr. Lewis L. Mellor; and observations of double stars discovered at the La Plata Observatory (13th Catalogue), by Prof. W. J. Hussey. Numerous observations of comets, including comet Daniel (1909*a*) and of some minor planets, are also published. The preceding part (pp. 1–72) of the volume was noticed in NATURE, vol. xci., p. 67, March, 1913.

OCCULTATION OF β SCORPII BY JUPITER (1876).—The Bulletin of the Astronomical Society of Barcelona (vol. iii., No. 6) contains an article by Senor Vicente Ventosa, of the Madrid Observatory, describing observations he had the good fortune to secure of an unpredicted *occultation* by Jupiter of the brighter component of β Scorpii on February 27, 1876. In the Nautical Almanac for 1876 this conjunction was given as a very close approach with the star, 0° 1′ N. Jupiter was obscured by clouds when the occultation commenced, and when observations were possible β_1 was invisible and emersion was witnessed. This conjunction was referred to in NATURE, vol. xiii., p. 188, and described by Mr. J. Birmingham in the same vol., p. 368. Senor Ventosa, by making use of Coniel's corrections to Bouvard's tables of Jupiter, has calculated the circumstances of the occultation, and from his observations of the variation of magnitude of the star as it left the limb obtains a probable height of 2500–3000 km. for the Jovian atmosphere. An extended account of the research is to be published in the Revista of the Royal Academy of Sciences of Madrid.

THE FIGURE OF THE EARTH.—Many books have been written on this subject, yet the current literature is so comparatively inaccessible to non-specialists, and such meagre statements are generally given in text-books, that there must be many persons ready to welcome the authoritative essay by Prof. W. de Sitter in the August number of *The Observatory*. In directing the attention of our readers to this article, we may add that Prof. de Sitter comes to the conclusion that to improve our knowledge of the figure of the earth we must observe minor planets, and that the opposition of Eros in 1931 will afford the earliest opportunity. It will no doubt be recalled that last year Prof. E. W. Brown, in his opening address to the sub-section of Cosmical Physics of the British Association, stated that direct observations of the moon's parallax are likely to furnish at least as accurate a value of the earth's shape as any other method.

METEOROLOGY OF THE MOON.—An extremely interesting article under this heading appears in *Popular Astronomy* (No. 3, 1915), contributed by Prof. William H. Pickering. It is largely the outcome of some two and a half years' observations, for which the Jamaican station of the Harvard Observatory has evidently proved highly satisfactory. Details are given of changes observed in selected types of lunar surface, elevations, depressions, and level areas. The changes are given as being typical of what is everywhere taking place. A series of drawings of the lunar mountain Pico is reproduced. All the recorded changes are held to fit in with the hypothesis of snow or ice formation, or the reverse. The article successfully makes obvious that our satellite still offers a most fruitful field to zealous and patient work.

R CORONÆ BOREALIS.—This irregular variable is apparently undergoing one of its more or less sudden failures of light. Prof. A. A. Nijland (*Ast. Nach.* 4809, 184) reports that whilst for 2½ years it has been constant at about 6·4m., on July 24, as estimated in opera-glass, its magnitude was 7·1, and on July 29 only 7·6. We find that Prof. Nijland observed secondary minima during the preceding light fluctuations on March 8 and May 13, 1912, the star then fading to 10·2m. and 8·2m. respectively.

THE PRETORIA MEETING OF THE SOUTH AFRICAN ASSOCIATION.

THE South African Association for the Advancement of Science held its thirteenth annual session during the first week of July, at Pretoria, under the presidency of Mr. R. T. A. Innes, Union Astronomer. Notwithstanding the war, festivities and excursions took place as usual, and not the least interesting and instructive of the latter were visits to the Government School of Agriculture at Potchefstroom, to the Bacteriological Research Laboratory at Onderstepoort—said to be the finest institution of its class in the world—and to the 2100 ft. level of the Crown Mines near Johannesburg, which has subterranean galleries extending over an aggregate of 100 miles. It so happened that, on the very day when the news of the surrender of German South-West Africa was received, Mrs. Botha had arranged to visit the association in session at the Transvaal University College; she was accorded a great ovation, after which the members sang the National Anthem.

The papers read numbered nearly eighty, and outlines of some of them, as well as of the four sectional presidential addresses, are given below.

The presidential address given before Section A by Mr. F. E. Kanthack, director of irrigation of the Union, was a historico-scientific account of the development of the internal-combustion engine, the development of which is probably the greatest engineering feat the world has ever seen. This factor in the war is entirely novel, and has had more far-reaching effects than anything else. It is scarcely possible to realise and appreciate the enormous amount of scientific work and inventive genius which has been expended on the motor-car, and especially on the engine. New metallurgical processes had to be invented to produce steels of great strength to survive the shocks and strains of hard-running, and the various machine tools and manufacturing processes connected with motor-car construction are no less wonderful than the finished article. What the steam engine was to the nineteenth century the internal-combustion engine is to the twentieth, and the effect of the latter on society is probably greater and more far-reaching than was the case with the steam engine.

The president of Section B, Mr. H. Kynaston, director of the Union Geological Survey, died during the week preceding the association's meeting, and his address was read by the sectional secretary after a vote of condolence had been adopted. Its theme was "Radio-activity in its Bearing on Geological Problems." The address referred to the significance of the results regarding the concentration of radio-active compounds, although the data are as yet scarcely sufficient for definite conclusions. The view was expressed that either radio-active elements are absent from the more central portion of the earth, or present to an inappreciable extent, or else some agency such as pressure is able to restrain radio-activity in depth, or altogether prevent atomic disintegration. As the latter alternative does not seem to conform to observation, it would appear that radio-active elements are confined to the crustal portion of the globe. The address then went on to discuss the bearing of meteorites on the idea of a radio-active crust, the conclusion being that the evidence certainly lends support to that theory.

Section C also had to meet without its president, Mr. C. P. Lounsbury, chief of the division of ento-