(*Canis vulgaris*) from Savoy, presented by M. Leon Montaigne; a White-crested Tiger-Bittern (*Tigriosoma leucolophum*) from West Africa, presented by Mrs. F. M. Hand; nine Pheasant-tailed Jacanas (*Hydrophasianus chirurgus*) from India, presented by Mr. Frank Finn; a Horned Capuchin (*Cebus apella*) from South America, a Feline Douroucouli (*Nyctipithecus vociferans*) from South Brazil, four Crowned Partridges (*Rollulus cristatus*) from Malacca, deposited; a White-tailed Gnu (*Connochaetus gnu*, ♀), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

DIAMETER OF JUPITER.—In continuation of his series of determinations of planetary diameters with the 26-inch refractor at Washington, Prof. T. J. J. See gives the reduced measures of Jupiter in *Astronomische Nachrichten*, Bd. 157, No. 3757. The observations were made during daylight, using the colour screen over the eye-piece for eliminating the secondary fringes, &c. For the final evaluation of the diameter sixty-eight measures are employed, extending over the period 1901 September 6-October 1; from these he gives:—

$$\text{Equatorial diameter of Jupiter} = 37''\cdot646 \pm 0''\cdot014$$
$$= 141,950 \pm 53 \text{ km.}$$

Prof. See thinks this very closely approximates to the absolute value of the diameter, and by comparing it with the value obtained at night, when the planet is seen as a very brilliant object on a dark background, he obtains a measure of the irradiation. The night value is 38''·40, which gives for the irradiation:—

$$I = 0''\cdot755 \pm 0''\cdot040$$
$$= 2847 \pm 150 \text{ km.}$$

As these values are so different, the suggestion is made of the advisability of adopting two sets of planetary diameters, one representing the apparent size of the planet as seen at night, to be used in physical observations and ephemerides, work on satellites, &c., the other representing the true dimensions of the spheroid independent of its illumination by the sun, to be employed in the theory of the planet's figure, constitution, &c.

The resulting absolute dimensions of the Jovian spheroid referred to the distance 5·20 are:—

Equatorial diameter	= 37''·646	= 141,950 km.
Polar diameter ...	= 35·222	= 132,810 km.
Oblateness	= 1:15·53.	
Assumed mass ...	= 1:1047·35 (Newcomb).	
Density	= 1·35 (water = 1).	

"THE HEAVENS AT A GLANCE," 1902.—This handy little publication for the present year is issued in a slightly modified form. The author has repeatedly had inquiries respecting the inclusion of one or more star maps, and the present edition is furnished with two, one showing the northern stars, the other the southern objects visible from Great Britain. Another additional feature is the small map of the moon, showing the principal lunar formations.

All the more important phenomena are given for the year, and a series of summaries of the particulars relating to variable and coloured stars, nebulæ, &c.

VARIABLE STAR CATALOGUE.—In the *Astronomical Journal*, vol. xxii. No. 514, the committee appointed by the Council of the Astronomische Gesellschaft publish a further catalogue giving the elements of stars which have been certainly recognised as variable since the publication of Chandler's third catalogue (*Astronomical Journal*, vol. xvi., pp. 145–172). The present list gives the definitive designations for 191 variables, and also for the three Novæ in Perseus, Sagittarius and Aquila.

CATALOGUE OF 100 NEW DOUBLE STARS.—*Bulletin* No. 12 from the Lick Observatory comprises the fourth catalogue of new double stars having distances under 5'', discovered by W. J. Hussey with the 36-inch telescope at Mount Hamilton. (The first three catalogues appeared in the *Astronomical Journal*, Nos. 480, 485, 494.)

The search is being conducted in a systematic manner, and it is hoped that the work when more advanced will afford data for an investigation into the distribution of close double stars in various parts of the sky, and of their numbers with respect to magnitude.

THE TEACHING OF MATHEMATICS IN PUBLIC SCHOOLS.

THE following letter has been sent to the Committee appointed by the British Association to report upon the teaching of elementary mathematics.

GENTLEMEN,—At the invitation of one of your own body, we venture to address to you some remarks on the problems with which you are dealing, from the point of view of teachers in public schools.

As regards geometry, we are of opinion that the most practical direction for reform is towards a wide extension of accurate drawing and measuring in the geometry lesson. This work is found to be easy and to interest boys; while many teachers believe that it leads to a logical habit of mind more gently and naturally than does the sudden introduction of a rigid deductive system.

It is clear that room must be found for this work by some unloading elsewhere. It may be felt convenient to retain Euclid; but perhaps the amount to be memorised might be curtailed by omitting all propositions except such as may serve for landmarks. We can well dispense with many propositions in the first book. The second book, or whatever part of it we may think essential, should be postponed till it is needed for III, 35. The third book is easy and interesting; but Euclid proves several propositions whose truth is obvious to all but the most stupid and the most intellectual. These propositions should be passed over. The fourth book is a collection of pleasant problems for geometrical drawing; and, in many cases, the proofs are tedious and uninstructive. No one teaches Book V. A serious question to be settled is—how are we to introduce proportion? Euclid's treatment is perhaps perfect. But it is clear that a simple arithmetical or algebraical explanation covers everything but the case of incommensurables. Now this case of incommensurables, though in truth the general case, is tacitly passed over in every other field of elementary work. Much of the theory of similar figures is clear to intuition. The subject provides a multitude of easy exercises in arithmetic and geometrical drawing; we run the risk of making it difficult of access by guarding the approaches with this formidable theory of proportion. We wish to suggest that Euclid's theory of proportion is properly part of higher mathematics, and that it shall not in future form part of a course of elementary geometry. To sum up our position with regard to the teaching of geometry, we are of opinion—

(1) That the subject should be made arithmetical and practical by the constant use of instruments for drawing and measuring.

(2) That a substantial course of such experimental work should precede any attack upon Euclid's text.

(3) That a considerable number of Euclid's propositions should be omitted; and in particular

(4) That the second book ought to be treated slightly, and postponed till III, 35, is reached.

(5) That Euclid's treatment of proportion is unsuitable for elementary work.

Arithmetic might well be simplified by the abolition of a good many rules which are given in text-books. Elaborate exercises in vulgar fractions are dull and of doubtful utility; the same amount of time given to the use of decimals would be better spent. The contracted methods of multiplying and dividing with decimals are probably taught in most schools; when these rules are understood, there is little left to do but to apply them. Four-figure logarithms should be explained and used as soon as possible; a surprising amount of practice is needed before the pupil uses tables with confidence.

It is generally admitted that we have a duty to perform towards the metric system; this is best discharged by providing all boys with a centimetre scale and giving them exercise in verifying geometrical propositions by measurement. Perhaps we may look forward to a time when an elementary mathematical course will include at least a term's work of such easy experiments in weighing and measuring as are now carried on in many schools under the name of physics.

Probably it is right to teach square root as an arithmetical rule. It is unsatisfactory to deal with surds unless they can be evaluated, and the process of working out a square root to five places provides a telling introduction to a discourse on incommensurables; furthermore, it is very convenient to be able to assume a knowledge of square root in teaching graphs. The