The Journal of the College of Science, Imperial University, Japan, quoted in the *Chemical News* for April 9th, gives the full description of the atomic weight determination of tellurium by Masumi Chikashige, already noticed in Science. Previous determinations have been made from tellurium associated with heavy metals, and the figure found, 127.6, is higher than that of iodin, below which it should be, according to the periodic law. It has been thought that some impurity of higher atomic weight might account for the anomaly. Chikashige worked with a tellurium of a wholly different (Japanese) origin, occurring associated with sulfur and selenium. He also reaches the same result, 127.6. It may, however, be noted that if the supposed contamination in the American and European tellurium be due to a higher element of the sulfur group, it would not be unnatural to suppose the same element present in the Japanese mineral, which contains 99.75 per cent. sulfur, 0.06 per cent. selenium, and 0.17 per cent. tellurium.

J. L. H.

ASTROPHYSICAL NOTES.

In *Circular No. 12* of the Harvard College Observatory, dated November 2, 1896, Professor Pickering published the discovery on the Draper Memorial photographs of a remarkable stellar spectrum, that of Zeta *Puppis* (Mag., 2.5; R. A., 8^h 0.1^m; Dec., $-39°$ 43′).

In addition to dark hydrogen lines and *K*, there were two broad bright lines at λ 4633 and 4688, and a peculiar series of dark lines whose wave-lengths were rhythmically related. These were λ 4544, 4201, 4027, 3925, 3859, 3816 and 3783. It was at first thought that they represented some new element not yet found on the earth or in the stars. *Circular No. 16*, of date January 12, 1897, announced, however, the important discovery that these lines are very probably due to hydrogen, being produced under conditions of luminosity not hitherto known. Professor Pickering finds that by writing Balmer's formula, connecting the wave-lengths of the hydrogen lines, in the form

$$\lambda = 3646.1 \frac{n^2}{n^2 - 16}$$

the ordinary lines will be given when for n the even integers 6, 8, 10, etc., are substituted, and the new lines when the odd integers from 9 to 21 are successively assigned to n. It appears that the lines for n = 7 (λ 5412), 9 (λ 4544), 11 (λ 4201) and 13 (λ 4027) have been hitherto recorded in certain spectra of type IIb. Professor Pickering has since reported that three other southern stars are somewhat similar to Zeta *Puppis* in having part of the lines of the new series.

Meanwhile Professor H. Kayser, of Bonn —whose work in conjunction with Professor Runge on the harmonic relations of spectral lines is so favorably known—also investigated the origin of the new lines, and publishes his conclusions in two articles in the *Astrophysical Journal* for February and April. Hydrogen had been the only element having harmonically related lines which had possessed only a single series of such lines. Now Kayser and Runge have found that two of the series of lines for an element end at nearly the same place. Hence on examining the frequencies of the new lines, Kayser concluded that they have this characteristic and represent a new hydrogen series, a conclusion confirmed in his second article written after seeing *Circular No. 16*. Thus the spectral relations of hydrogen lines become normal.

It is a matter of much interest to know if the lines of the new series can be produced in laboratory experiments. If so, important information as to stellar temperatures and pressures is likely to be o btained

THE Lick Observatory has just sent out Plates 2 to 5 of its *Observatory Atlas of the Moon*, finely reproduced in photogravure, on a scale of 38 inches to the lunar diameter, from the negatives obtained with the great refractor. The publication of this valuable series of photographs was made possible by the generosity of a citizen of New York, Mr. W. H. Law.

IN the *Monthly Notices* of the Royal Astronomical Society for January Mr. W. F. Denning contributes a catalogue of the real paths of 107 meteors, observed by himself and others in England during the last ten years. The averages are:

Height at first appearance	73.6 miles	(106 meteors)
Height at disappearance	45.3 "	(107 meteors)
Length of path	62.1 "	(105 meteors)
Velocity per second	26.9 "	(58 meteors)

The greatest height of any well-observed meteor was 126 miles. In the above averages no distinction was made between fireballs and shooting-stars.

IN the same number of the *Notices* Professor G. von Neissl, of Brünn, contributes a list of the real paths of 100 large meteors which have been authentically observed, chiefly in the last two decades. For these the average height when first seen was 91 miles. No. 77 of the list was visible from Servia to France, traveling in a real path of 1770 miles, from the hardly credible elevation of 483 miles to that of 115 miles. From a comparison of the catalogues of von Neissl and himself, Denning shows several instances of the recurrence of large meteors from the same radiant, indicating that they belonged to the same swarm.

E. B. F.

SCIENTIFIC NOTES AND NEWS.

MISS ALICE BACHE GOULD has given $20,000 to the National Academy of Sciences as a memorial to her father, the great astronomer, B. A. Gould. It will be known as the Gould fund and the income will be used to promote researches in mathematics and astronomy.

SIR HENRY THOMPSON has presented the Royal Observatory at Greenwich with a telescope said to be the most powerful instrument at present existing for the prosecution of astronomical research by means of photography. The photographic refractor has an object glass 26 inches in diameter. The photographs it will take will be on twice the scale of 2 mm. to one minute of arc, and its short focal length gives it great light-gathering power. The instrument now mounted at Greenwich has been in course of construction by Sir Howard Grubb, of Dublin, during the last three years.

THE Royal Observatory at Bonn has received from the state a preliminary appropriation of 30,000 Marks, which will ultimately be increased to 90,000 Marks, for the construction and mounting of a refracting telescope of medium size.

SIR WILLIAM FLOWER'S term o office as Director of the Natural History Departments of the British Museum has been extended for three years from the expiration of his retirement date under the age regulation of the Civil Service.

THE American Philosophical Society, Philadelphia, will hold a conversazione in honor of Sir Archibald Geikie on the evening of May 7th. Sir Archibald Geikie will make a communication on recent geological work in the Hebrides and Faroe Isles.

THE Council of the British Medical Association has conferred the gold medal of the Association on Mr. C. G. Wheelhouse and Sir Walter Foster.

THE Cothenius medal, *Leopold Carolinische Akademie der Naturforscher*, has this year been awarded to Dr. G. Quincke, professor of physics at Heidelberg.

DR. P. GRÉHANT, professor of physiology in the Paris Museum of Natural History, has been awarded 4,000 francs by the French government to promote his researches on the applications of physiology to hygiene.

MR. J. H. PRATT, instructor of mineralogy in the Sheffield Scientific School of Yale University, has accepted the post of mineralogist in the North Carolina Geological Survey.

M. PICOU was elected president and M.