shown that there is a falling off of illuminating value when very high yields of gas are obtained. While the best general results may be obtained from carbonising at a fairly high temperature, it is essential that the gaseous products should be enabled to pass freely away and without encountering in the ascension-pipe any absorbent of hydrocarbons such as thick tar. Mr. Hunt has also tested the lime and air process for eliminating sulphur compounds from gas. Daily tests were made of the amount of oxygen in the gas from certain gas-works, and it was almost invariably found that when the oxygen went up the sulphur compounds followed. From this experience it was concluded (1) that oxygen, so far from assisting in the removal of sulphur compounds, was actually prejudicial, at all events, when present in any appreciable quantity; (2) that it was of use mainly for oxidation of the sulphuretted hydrogen by which economy of lime was effected, and the spent lime, being chiefly in the form of carbonate, with a large percentage of free sulphur, was rendered practically inodorous; (3) that the quantity of oxygen, either pure or as atmospheric air, which might be safely employed, having regard to reduction of sulphur compounds, varied with the CO_2 present, *i.e.* the less CO_2 the more oxygen. It further appeared that unless air could be almost completely excluded, the lime and air process was less suitable for the removal of sulphur compounds than one in which each impurity was separately attacked.

THE final results of an elaborate investigation of the atomic weight of barium are communicated by Prof. Richards, of Harvard, to the current issue of the *Zeitschrift für Anorganische Chemie*. The care which has been bestowed upon the perfection of the analytical processes involved, and upon the preparation of absolutely pure materials, together with the really remarkable agreement between the large number of individual values obtained, will doubtless cause this stœchiometrical contribution of the Harvard laboratory to take high rank among the more exact atomic weight determinations. A short time ago, Prof. Richards gave an account in the same publication of a series of determinations based upon the analysis of barium bromide, from which the value 137·43 for the atomic weight of barium was derived. This number is considerably higher than the usually accepted value, 136·8, derived from the determinations of former observers. In order to confirm his work, Prof. Richards has since carried out a similar investigation of the chloride of barium, an undertaking much more complicated than that of the bromide, on account of the slight solubility of silver chloride in water. Eleven series of experiments, including altogether forty-nine individual atomic weight estimations, have now been carried out, having for their object the determination of the ratio of barium chloride to silver chloride, of barium chloride to metallic silver, of barium bromide to silver bromide, and of barium bromide to silver. The atomic weight finally arrived at, if oxygen is valued at 16, is 137·43; the actual number obtained by use of the chloride was 137·439, and that derived from the bromide 137·430. Moreover, the highest and lowest individual values obtained among the whole fifty separate estimations were 137·42 and 137·45, an amount of accordance which affords evidence of the extreme precautions taken, and of the high degree of accuracy attained. If the Stas value for oxygen, 15·96, is assumed, the atomic weight of barium is 137·10, and if the new value, 15·88, is taken as comparative standard, that of barium becomes 136·41. It is interesting that the experiments with barium chloride afford a means of independently ascertaining the atomic weight of chlorine, and the number thus obtained is 35·457, identical with the value ascribed to it by Stas.

THE additions to the Zoological Society's Gardens during the past week include a Brown Capuchin (*Cebus fatuellus*) from Guiana, presented by Mrs. Walter Palmer; two Leopards (*Felis pardus*, ♂ ♀) from south-east Africa, presented by Mr. J. Gardiner Muir; a Vulpine Phalanger (*Phalangista vulpina*, ♂) from Australia, presented by Mr. Raymond W. Cooper; a Crab-eating Opossum (*Didelphys cancrivora*, ♂) from St. Vincent, presented by Mr. G. Stephen; a Tawny Owl (*Syrnium aluco*) British, presented by Mr. G. L. Hunt; a Greek Tortoise (*Testudo græca*) European, presented by Miss Leigh; a —— Elaps (*Elaps*, sp. inc.), a Pointed Tree Snake (*Dryiophis acuminata*), a Clouded Snake (*Leptognathus nebulosis*) from Trinidad, W.I., presented by Mr. R. R. Mole; a Tarantula Spider (*Mygale*, sp. inc.) from Trinidad, W.I., presented by the Rev. S. D. Wright; a Malabar Parrakeet (*Palæornis columboides*) from India, deposited; four Bahama ducks (*Dafila bahamensis*, ♂ ♂, ♀ ♀) from South America, two Mandarin Ducks (*Œx galericulata*, ♀ ♀) from China, a Spotted-billed Duck (*Anas pœcilorhyncha*, ♀) from India, a Ruddy Sheldrake (*Tadorna casarca*, ♀) European, four White-backed Pigeons (*Columba leuconota*) from India, purchased; a Burrhel Wild Sheep (*Ovis burrhel*, ♂) from the Himalayas, received in exchange.

OUR ASTRONOMICAL COLUMN.

DENNING'S COMET.—*Astronomische Nachrichten* (No. 3222) contains the following elements, computed by M. Schulhof, for the comet discovered by Mr. Denning on March 26:—

T = 1894 February 13·20392 Paris Mean Time.

$x = 132^\circ\ 14'\ 31''\cdot6$
$\Omega = 75\ 51\ 46\cdot1$ } Mean Eq. 1894.
$i = 6\ 31\ 14\cdot0$

$\log q = 0\cdot084720$

These elements resemble those of comets seen in 1231 and 1746.

Ephemeris for Berlin Midnight.

1894.	R.A. h. m. s.	Decl. ° ′
April 12 ...	10 47 37 ...	+23 14·6
13 ...	50 7 ...	22 45·5
14 ...	52 33 ...	22 16·9
15 ...	54 57 ...	21 48·6
16 ...	57 18 ...	21 20·7
17 ...	10 59 36 ...	20 53·3
18 ...	11 1 51 ...	20 26·3

THE NATAL OBSERVATORY.—The superintendent of the Natal Observatory has issued his report for the fiscal year 1892-93. The principal series of observations made during this period was the comparison of the declinations deduced from observations made at the observatories in the northern and southern hemispheres, by a comparison by Talcott's method, of the zenith distances of northern stars and southern circumpolar stars. The opposition of Mars in 1892 threw a deal of extra work upon the observatory. Thirty-eight sets of meridian observations of the planet were obtained, and sixty-two sets of observations taken on opposite sides of the meridian towards the eastern or western horizon. The whole series of these observations have been completely reduced and tabulated, ready for the final discussion for obtaining the value of the solar parallax and distance of the sun as soon as the meridian observations of the planet, made in the northern hemisphere, have been received. The observations made at the Cape observatory supplement those obtained at Natal, and the two sets combine to form a complete set extending over the whole period of opposition. This year will bring another favourable opportunity for determining the solar distance from observations for the opposition of Mars, and the observatory will be far better equipped for observing this opposition than was the case during the last one, and if the weather be favourable a very satisfactory series of observations should be obtained during this, the last, opportunity until the year 1911.

A NEW COMET.—The following announcement has been sent out by the Astronomer Royal:—"Bright comet Holmes, April 9. Right Ascension, 17h. 58m.; North Declination, 71° 30′."