

heated in a tube closed at one end explodes with violence and production of flame. The powder behaves very curiously if touched in one place with a heated rod; the particles are set in rapid whirling motion by the escaping oxygen, and the rise of temperature is so great as frequently to terminate in local combustion. This unusual phenomenon gradually extends throughout the whole mass, oxygen being copiously and continuously evolved in an almost perfectly dry state. When much more strongly heated the substance melts and then evolves water vapour, the residue consisting of ordinary sodium hydrate. Analyses indicate that the substance possesses the composition HNaO_2 . Its production from sodium peroxide and alcohol in all probability occurs in accordance with the following equation, sodium ethylate being the secondary product:



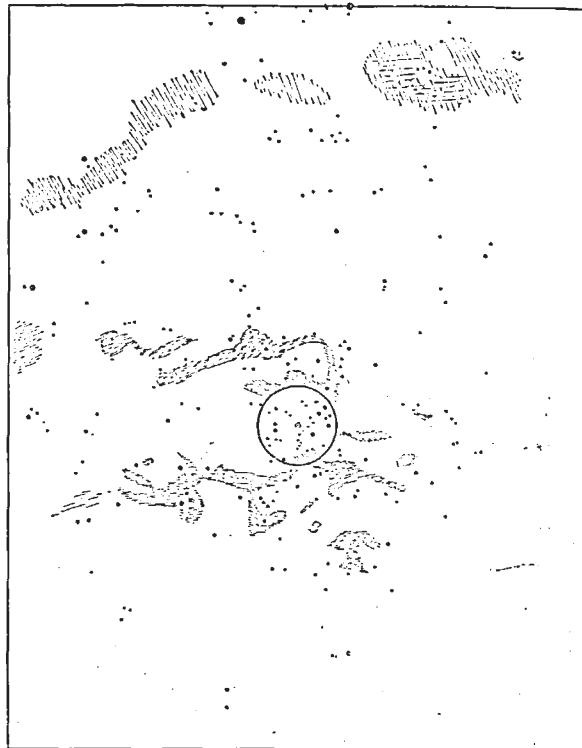
The probable existence of this new sodium compound was pointed out by Prof. Tafel in a previous communication concerning the action of alcoholic mineral acids upon sodium peroxide, and he has now been able to isolate it. He considers it to be the hydrate of a trioxide of sodium Na_2O_3 . It dissolves in ice-cold water without decomposition, but at temperatures very little higher the solution slowly evolves oxygen. If alcohol is added to this solution the evolution of gas is considerably augmented and the solution deposits after some hours crystals of Mr. Vernon Harcourt's hydrate of sodium peroxide, $\text{Na}_2\text{O}_2 \cdot 8\text{H}_2\text{O}$. Hydrochloric acid converts it into sodium chloride, hydrogen peroxide, and gaseous oxygen. In order to prepare the new compound, twelve grams of sodium peroxide and two hundred cubic centimetres of ice-cold absolute alcohol are convenient quantities to take; they should be well shaken together in a closed flask, the liquid and the fine white sandy product separated from any undecomposed lumps of peroxide, rapidly filtered, the white sand-like substance washed with cold alcohol and ether, and stored in a desiccator.

THE additions to the Zoological Society's Gardens during the past week include a Diana Monkey (*Cercopithecus diana*, ♀) from West Africa, presented by Mrs. Collett; a Mozambique Monkey (*Cercopithecus pygerythrus*, ♀) from East Africa, presented by Mr. H. J. Clowes; a Macaque Monkey (*Macacus cynomolgus*, ♂) from India, presented by Mrs. Morris; a Leopard (*Felis pardus*) from East Africa, presented by Mr. Thomas E. Remington; a Two-spotted Paradoxure (*Nandinia binotata*) from West Africa, presented by Dr. Sydney W. Thompstone; a Moose (*Alces machlis*, ♂) from Sweden, presented by Mr. Guy Nickalls; a Bennett's Wallaby (*Halmaurus bennettii*, ♂) from Tasmania, presented by Captain G. W. Brook; two Horned Screamers (*Palmadeda cornuta*) from Para, presented by Mr. H. A. Astlett; a Banded Parrakeet (*Palcornis fasciatus*, ♀) from India, presented by Mr. Thomas Hodgson; a Green Turtle (*Chelone viridis*); a Hawks-billed Turtle (*Chelone imbricata*) from the East Indies, deposited; a Mexican Guan (*Penelope furpurascens*) from Central America, two American Wigeon (*Mareca americana*) from Brazil, a Short-tailed Parrot (*Pachyrus brachyurus*) from the Upper Amazon, purchased; two Raccoons (*Procyon lotor*); a Persian Gazelle (*Gazella subgutterosa*, ♂), born in the Gardens, three Bar-tailed Pheasants (*Phasianus Reevesii*), an Amherst Pheasant (*Thaumaia amherstia*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

NEBULOSITIES NEAR THE PLEIADES.—For many years, says Prof. E. E. Barnard in the *Astronomische Nachrichten*, No. 3253, he has known of a vast and extensive nebulosity north of the Pleiades. This is not to be confounded with the nebulosities round the cluster revealed by photography during the last ten years, and all of which are included within the circle on the

accompanying illustration. The wisps and patches of nebulous matter outside the circle are shown upon a photograph taken by Prof. Barnard with the Willard lens which he has rendered famous, the plate being exposed for ten hours, fifteen minutes.



The curved and streaky streams of celestial mist in the illustration are apparently connected with the Pleiades, though some of them extend irregularly for several degrees each side of the cluster. Prof. Barnard hopes to obtain still clearer pictures of the nebulosities by extending the time of exposure.

SCIENCE IN THE MAGAZINES.

EAST and west, as everyone knows, are merely relative terms. Elisée Reclus, in the *Contemporary*, traces the normal line of separation between the two halves of the ancient world which best deserve these names, considering the matter from an historical point of view. The true and natural partition between east and west of the ancient world is a transverse zone running from north to south between the Arctic Sea and the Gulf of Oram. This almost uninhabited zone begins just west of the plains of the Lower Indus, in the desert tracts of Lower Beluchistan, and ends in the barren reaches between the Obi and the Yenisei. Such a zone divides the world into two halves having continental masses of nearly equal size. The evolution of humanity was worked out differently on the two sides of this line, and the two developments are traced in the article referred to.

A very exhaustive article is contributed by Mr. John Rae to the same review, under the title "The Work of the Beer Money." The author describes what the County Councils have done for technical education since the passing of the Local Taxation (Customs and Excise Act) of 1890, when funds for the purpose of furthering such instruction became available. To those who expected great things, the survey will be disappointing; for it shows that in many cases the moneys have been expended almost uselessly. Better results, however, could hardly be expected, for it must be remembered that the County Councils had to create the machinery with which to carry on the work. On this account many mistakes have been made, "but," says Mr. Rae, "they [the Councils] have gone about matters in a practical way, and when they have made mistakes they have shown themselves quick to repair them. Much of the

work was necessarily tentative, and that indeed is part of its value. Each local authority has started the work in its own way, according to its own circumstances, industries, and resources; so that the country has for two years been one great experimental station, with some hundreds of separate plots of educational varieties." The sums spent upon the erection of important technical schools during the last six or seven years will astonish many people. To quote Mr. Rae: "Bolton has built a technical school at a cost of £15,000; Bury, at a cost of £16,000; Blackburn, of £40,000. Oldham and Rochdale are now spending £12,000 each in building one; Halifax and Derby are spending £20,000 each; Bath, £21,000; Worcester and West Ham, £40,000; Birmingham, £48,000; and Manchester, on a site worth £100,000, is erecting a technical school estimated to cost £150,000 more, the most elaborate and magnificent product of the whole movement." So far as we can gather from the article, the work which has been done shows good promise of practical fruit. It is pointed out that the grant should be secured permanently for education by statute, and this should be done as soon as possible. Mr. Rae thinks that the worst deficiencies which the experience of the past three years has revealed are (1) the startling illiteracy of the men and the lads who have passed the standards of elementary schools, and (2) the general want of the means of good secondary education. These are the deficiencies which must prevent the effectual diffusion of technical instruction. Mr. Rae's article should certainly be read by everyone interested in the progress of technical instruction.

Another article in the *Contemporary* is entitled "Joseph Priestley in Domestic Life," by Madame Belloc. The mother of the authoress was taught to read by Priestley, and she gave her daughter a very clear idea of his personality. The article thus contains a description of the investigator as he really was according to the last echo of oral tradition. And though it deals chiefly with Priestley's private life, students of the history of chemical science will find parts of it interesting. The *Contemporary* also contains an article by Mr. Herbert Spencer, whose theme is "Weismannism Once More." Mr. Spencer harks back to the original points of discussion between Prof. Weismann and himself, in order to show (1) that certain leading propositions having been passed by unnoticed, remain outstanding; and (2) that when leading propositions have been dealt with, the replies given are invalid.

In the *National Review*, Mr. F. W. H. Myers writes on "The Drift of Psychological Research." Wonderful things are told of telepathy and kindred powers, and the author is very sanguine as to future developments. He recognises that men of science fight shy of the "glum researches," and are ever ready to put their fingers upon the weak points in psychological reasoning and investigation. This dislike is accounted for by the rude approximate character of the work carried on by its votaries; but, on the other hand, Mr. Myers holds that psychology is a new science, and has, therefore, to grope its way up to the exactness of older branches of knowledge. He inclines to the opinion that the methods of science cannot at present be extended to the realm in which he is an explorer. After Mr. Myers' article, and as an antidote to it, one contributed by Mr. Ernest Hart to the *Century* should be read. Mr. Hart's paper should convince every even-minded person of the imposture widely practised under the names of hypnotism, spiritualism, telepathy, "spookism" in its various manifestations, Mahatmism, Matteism, and other phenomena of an occult character. The same magazine contains the conclusion of the series of articles, "Across Asia on a Bicycle," contributed by Messrs. T. G. Allen and W. L. Sachtleten; and Mrs. C. L. Franklin gives a short biography of Sophie Germain, whose mathematical works and philosophical writings gained for her such a high reputation at the beginning of this century.

Sir Robert Ball continues his articles on "The Great Astronomers," in *Good Words*, the subject this month being Galileo. He handles the matter of Galileo's trial for heresy very carefully, and does not give vent to the feelings which every astronomer must experience when describing the events which led up to the abjuration which the founder of physical astronomy was forced to pronounce. Mr. T. Munro combines imagination with science in an article, "Sun-rise or the Morn," in *Cassell's Family Magazine*. The Mammoth Cave of Kentucky is the subject of an article, by Prof. W. G. Blaikie, in the same magazine. Under the alliterative title, "Seeds of Science," Mr. Munro shows, in the *Leisure Hour*, how poets and story-

tellers have anticipated some of the discoveries of science. It would have been strange if, in all the vague speculations which have been given to the world, some coincidences of the kind referred to had not been found. Salt, and sleeplessness are the subjects of two other articles in the *Leisure Hour*.

An extremely interesting account of "Tarahumari Dances and Plant Worship" is given by Dr. Carl Lumholtz in *Scribner*, with illustrations from photographs by the author. Another article of ethnographical importance is "Customs connected with Burial among the Sihanaka," by the Rev. J. Pearce, in the *Sunday Magazine*, which also contains a paper entitled "A Thousand Miles up the Irrawaddy," by the Rev. W. R. Winston. *Chambers's Journal* contains, as usual, a number of short and popular articles on more or less scientific subjects. Among those we note a description of some remarkable artesian wells, and a paper on the utilisation of waste products. Mr. Grant Allen writes pleasantly on "The Night Jar," in the *English Illustrated*, and Colonel Howard Vincent describes the scientific measurement and identification of criminals.

In addition to the magazines mentioned in the foregoing, we have received the *Fortnightly*, *Longman's*, and the *Humanitarian*, neither of which, however, contain articles that call for comment here. The first number of the *Phonographic Quarterly Review* has also been sent to us. The *Review* is edited by Mr. T. Allen Reed, and it bids fair to take a permanent stand among phonographic literature. Some of the articles have been furnished by phonographers, and others by well-known writers, the writings of the latter having been transcribed. The editor evidently recognises the importance of a knowledge of science to the shorthand writer of the present day, for among the articles we note "The Native Tribes of East Africa," by Dr. J. W. Gregory; "Experiences of a Naturalist," by Dr. A. S. Murray; "The Myths of the Unicorn and the Griffin," by Sir Henry Howorth; and "The Formation of Flints," by Canon Bonney. The publication of articles of this kind will help on the time when scientific lectures will be reported without being caricatured.

MEASUREMENTS OF PRECISION.¹

MORE than two thousand years ago there lived in the far East a philosopher who established his claim to the possession of a good measure of both wisdom and wit, when he wrote: "Avoid even the appearance of evil: do not stop to tie your shoe in the melon patch of an enemy."

Suppressing the humour but not the sentiment of the Oriental teacher, it is easy to see that Confucius meant to impress upon his followers the importance of taking care that, even in the performance of trivial acts, the time and place should be such as would give rise to no suspicions as to motive or design.

I am honoured by being permitted the freedom of your academic groves to-day. I realise that the opportunity of defending a theme under such circumstances is not to be lightly esteemed, and I wish, in the beginning, to make terms with everybody, by declaring that in bringing before you a proposition so simple as to need no argument, I am innocent of ulterior motive or deep design.

My desire to give formal expression to this proposition grows out of the frequency with which it has presented itself in the course of official duties during the past few years.

I wish to consider "Precise Measurement" as one of the agencies through which man has advanced from a condition of savagery to his present state; and the metrology of any age as an exponent of the civilisation of that age.

The brief time during which I can venture to ask your attention to this subject fortunately releases me from all obligations to consider literary excellence or rhetorical ornamentation, and compels me even to deviate in some degree from the logical order of presentation. It is safe, however, to take liberties with an audience so largely composed of those who are not only familiar with the facts to be presented, but who are accustomed to arrange, digest, and put in orderly sequence materials which are found in a more or less chaotic condition.

The first form of measurement to which primitive man resorted was undoubtedly simple enumeration. In narration or barter the number of units in a group was alone considered, regardless of differences among individuals. The recognition

¹ An address delivered at the Johns Hopkins University, Baltimore, by Prof. T. C. Mendenhall.