[NATURE.]

HUNDREDTH ANNIVERSARY OF THE LINNEAN SOCIETY, LONDON.

THE hundredth anniversary meeting of this society was held on May 24 at Burlington House, in the library, the usual meeting room being inadequate for the reception of the large number of members present on this occasion. The president, Mr. Wm. Carruthers, F.R.S., took the chair, at three o'clock, and was supported by the two former presidents, who are happily still with us—Prof. Allman and Sir John Lubbock—the council of the society, and many distinguished fellows, among whom we noted Sir Richard Owen, Sir Joseph Hooker, Dr. Gunther, Sir Walter Buller, Prof. Duncan, Mr. Romanes, Colonel Grant, and among the visitors Dr. Henry Woodward, F.R.S., and Mr. Studley Martin, a nephew of the founder.

After preliminary business, H. M. the King of Sweden was elected an honorary member. The treasurer, Mr. Frank Crisp, laid the last year's accounts before the meeting, and briefly referred to the financial history of the society during the century now closed. The senior secretary, Mr. B. Daydon Jackson, presented an account of the Linnean collections from their formation, their purchase by the founder of the society, and their possession by the Linnean Society. This was succeeded by the president's annual address, which was largely devoted to a review of the society's past career. He spoke of the original quarto Transactions, then of octavo Proceedings, finally of the Journal, of which forty-three volumes are extant. During the past year seven parts of the Transactions and twenty of the Journal have been issued, an amount equal to that published during fifteen years in the early part of the century.

A novel feature was then introduced, one of those intended to mark the centenary of the society. Prof. Thore Fries, the present occupant of Linnæus' botanical chair at Upsala, had been invited to pronounce a eulogium on his illustrious predecessor. As he was detained by his professorial duties in his university, his essay was read by the president. In it he spoke of the profound sleep of natural science during the middle ages, and the hard struggle which had to be fought before men of science could liberate themselves from a narrow orthodoxy or the fetters they had themselves forged by attaching infallibility to Aristotle and classic authors. Linnæus bore an honorable part in placing the study of natural science on a logical basis by his clear definitions and admirable nomenclature, and by the enthusiasm he was able to rouse in his disciples for the same methods. England, unluckily for Sweden, became his heir; many consequently are the ties which unite the memory of Linnæus with this country, the strongest perhaps being the Linnean spirit, the genuine spirit of freshness and enterprise in which scientific research is carried on in England.

Sir Joseph Hooker then pronounced a eulogy on Robert Brown, the greatest botanist of the present century. He specially dwelt on the evidence afforded by the "Prodromus" of his untiring industry, accuracy of observation and exposition, together with sagacity, caution, and soundness of judgment, in which he has not been surpassed. Where others have advanced beyond the goal he reached, it has been by working on the foundations he laid, aided by modern appliances of optics and physics. His memory was wonderful, he seemed never to forget a plant he had examined; and the same with his books—he could turn to descriptions for a statement or a figure without needing a reference. The noble title conferred upon him by Humboldt has been confirmed by acclamation by botanists of every country. "Botanicorum facile princeps."

Prof. Flower, C.B., F.R.S., delivered an address on Charles Darwin, who, he said, had special claims on their consideration, inasmuch as a large and very important portion of his work was communicated to the world by papers read before the society and published in the Journal. His life was one long battle against our ignorance of the mysteries of living nature, and he sought to penetrate the shroud which conceals the causes of all the variety and wonders round us. His main victory was the destruction of the conception of species as being fixed and unchangeable beyond certain narrow limits, a view which prevailed universally before his time. That other factors had operated besides natural selection in bringing about the present condition of the organic world was admitted even by Darwin himself. His work, and the discussions which had sprung from it, had marvelously stimulated research, and he had shown by his life and labors the true methods by which alone the secrets of nature may be won.

Prof. W. T. Thiselton Dyer spoke on George Bentham, who presided over the society from 1863 to 1874. A nephew of Jermy Bentham, and trained to some extent under him, he was early imbued with a taste for method and analysis, and through his mother's fondness for plants he was led to study them, with marvelous results. The records of his life work are astonishing. While president he delivered a series of masterly addresses, and the latter part of his career witnessed the preparation of the "Flora Australiensis" and a full share of the "Genera Plantarum." He stood in the footsteps of Linnæus, and although the descent was oblique, he inherited the mantle of the master whose memory was that day commemorated.

The president stated that the council had decided to establish a Linnean gold medal, to be presented to a botanist and a zoologist in alternate years, but on this occasion it would be awarded in duplicate. The medal bore on the obverse a profile of Linnæus, modeled from the bust in the library; on the reverse, the arms of the society and the name of the recipient. The president made the first presentation to Sir Richard Owen, recounting the chief services he had rendered to zoology. Sir Richard, with some emotion, expressed his high sense of the honor conferred, and thanked the fellows for their cordial reception of him. The president then presented a similar medal to Sir Joseph Hooker, with a like recapitulation of the splendid services he had bestowed on botany. Sir Joseph suitably replied, returning his cordial thanks for the distinction.

The remaining formal business included the announcement of the newly elected councilors and the reelection of the officers—Mr. Wm. Carruthers, president; Mr. Frank Crisp, treasurer; and Messrs. B. Daydon Jackson and W. Percy Sladen, secretaries.

The annual dinner was held at the Hotel Victoria,

Northumberland Avenue, at seven o'clock. The president took the chair, about sixty of the fellows being present. In addition to the usual toasts, that of "The Medalists" was given, and replied to by Sir Joseph Hooker, who alluded to the fact that he had personally known eight of the presidents of the society, and that the founder himself induced his father, Sir William Hooker, to take up the study of botany. As a proof of his close connection with the Linnean Society, he added that his father, grandfather, father-in-law, and uncle had all been fellows.

The final portion of the centenary celebration took place the following evening, when the president and officers held a reception at Burlington House. A special feature was made of the Linnean manuscripts and memorials, which were displayed in glass cases with descriptions, a catalogue of them being also distributed. Memorials of other distinguished naturalists were also shown, conspicuously those of Robert Brown and George Bentham, lent by Sir Joseph Hooker and M. Alphonse de Candolle, of Geneva, a foreign member of the society.

A SIMPLE FORM OF APPARATUS FOR GENERATING GASES.

By G. STILLINGFLEET JOHNSON.

THE apparatus most in vogue at present for generating such gases as CO_2 , H_2 , and H_2S is that of Kipp. The form of apparatus described below possesses certain advantages over Kipp's, notably on the score of economy.*

The construction of the apparatus will be best understood by reference to the accompanying diagram.

The bulb, B, is blown on a tube, C, and a small aperture is made at O. The solid substance is introduced into this bulb in small lumps (e. g., marble, zinc, or ferrous sulphide) through the tube, C. The hole in the cork should be large enough to allow the tube, C, to slide easily in it on the application of a slight degree of

Cylinder A—Height, 6 inches; internal diameter, 1 inch.
Bulb B—Diameter, $\frac{3}{4}$ inch.
Tube C—Diameter, $\frac{1}{2}$ inch; length, 8 inches.

force. The liquid by whose action the gas is to be produced lies in the cylinder, A. Now, if the tube, C, be pushed down until the bulb is immersed in the liquid, the latter enters the bulb through O, and generates gas by acting upon the solid in B. The gas escapes through C, and may be led by a delivery tube, joined by rubber tubing to C, into any vessel designed to receive it.

Many advantages which the apparatus possesses will be perceived on using it, but two may be pointed out here. The first is that, when a sufficient supply of gas has been obtained, the tube, C, may be raised till the bulb is out of the acid, when the action ceases.

The second is that the acid may be agitated at any time without disconnecting the delivery tube, thus avoiding cessation of action from spent acid adhering to the solid matter, which is one of the great disadvantages of Kipp's apparatus.—*Chem. News.*

DETERMINATION OF TOTAL SOLIDS AND FAT IN MILK AND BUTTER BY MEANS OF WOODY FIBER.

By F. GANTER.

THE author, instead of the paper proposed by Dr. M. A. Adams, uses, for absorbing the milk, "wood-stuff," as obtained by the wood sulphite process for the paper manufacture. It requires merely to be dried and extracted with petroleum ether in order to remove all traces of resinous matter. Two grms. of wood-stuff are placed in the capsule intended for the evaporation of the milk, along with a small glass rod, dried at 105° until the weight becomes constant, and weighed along with the capsule. During weighing the capsule should be closed with a well-fitting cover.

Of the sample of milk, which has been previously placed in a small phial, weighed and stoppered, 5 to 6 grms. are poured as evenly as possible upon the wood-stuff in the capsule, and the exact quantity taken is ascertained by reweighing the phial. The capsule is then placed upon the water bath, and care is taken, by stirring and pressure, that the wood-stuff sucks up all the milk, leaving the sides of the capsule scarcely moist. During the evaporation the whole is stirred occasionally so that no particles of the wood are left adhering to the metal. If at the beginning of the process small quantities of milk not absorbed are seen on the sides and the bottom, they are pressed and rubbed with the wood by means of the glass rod until the spot appears perfectly clean and bright. In an hour the contents of the capsule are dried up so far that the operation may be completed in the drying closet, which takes an hour and a half longer. The total solid matter is shown by the in-

* F. E. Becker & Co., of Maiden Lane, Covent Garden, supply the apparatus of the dimensions mentioned in the figure for the sum of 1s.

creased weight of the capsule. The dry matter thus obtained is inclosed in paper in the ordinary manner and placed in Soxhlet's apparatus.

STELLAR PHOTOGRAPHY.

By EDWARD S. HOLDEN, Director of the Lick Observatory.

ON the 16th of April, 1887, there was held at Paris an International Congress of Astronomers, at the invitation of the Paris Academy of Sciences.

More than fifty physicists and astronomers met for the purpose of considering a scheme of international co-operation in the work of making a complete photographic map of the whole heavens, from the north to the south pole.

This, at least, was the main object of the conference. A plan was perfected by which a number of co-operating observatories, working by similar methods and by instruments exactly alike, can in a comparatively short time obtain a series of photographic negatives which, taken together, will constitute a picture of the whole sky. We can thus hand down to our successors a perfectly accurate and complete record of the positions and magnitudes (brightness) of every star shown on the maps, and do our part toward solving many extremely important stellar problems. The ancients believed the starry universe to be "incorruptible" and unchanged.

We know, while the changes are relatively few and take place often with great slowness, that it is only by means of such changes that any new light is obtained on the extremely difficult problem of stellar constitution.

First we have to show that there are changes, next how these changes occur, and lastly why they occur. The maps are designed to show the circumstances of the changes, and it is left to the mathematical and experimental skill of the astronomer to explain the wherefore. But it is really the wherefore that concerns us. Our sun is a star; and upon the constancy of his light and heat all life on the earth depends.

What Stellar Maps we now Possess.—Thanks to the unremitting labors of Bessel, Argelander, Schoenfeld, Chacornac, Henry, and Palisa in Europe, and to those of Gould and Peters in America, we have star maps of the whole sky, which show the position and brightness of every star visible to the naked eye; of all the stars down to the 10th magnitude from the north pole to 23 degrees south of the equator; and down to the 12th magnitude over nearly all of a belt of sky 30 degrees wide and parallel to the ecliptic.

An idea of a 10th magnitude star may be had when it is said that a powerful marine spyglass will just about show stars of the 10th magnitude in the blackest nights.

History of Astronomical Photography.—For a complete history of astronomical photography, I must refer any one who is interested to some one of the sketches of this subject which have lately appeared. Perhaps one written by myself in the *Overland Monthly* for November, 1886, will be most readily accessible.

It is there related how the first daguerreotype of the moon was taken by Professor J. W. Draper, of New York, in 1840; the first of the sun by Foucault, of Paris, in 1845; the first of stars by Professor Bond, of Harvard College, in 1850; the first of a solar eclipse by Doctor Busch, of Königsburg, in 1851, and by Professor Bartlett, of West Point, New York, in 1854; the first photographs of the spectrum of the eclipsed sun by Professor Schuster and Mr. Lockyer, of England, in 1862; the first of a nebula by Doctor Henry Draper, of New York, in 1861; the first of the spectrum of a star by Doctor Huggins, of London, and by Doctor Draper, of New York.

It is interesting to note how large a share Americans have had in this progress.

Since the first successes, there has been an enormous advance in every way. The greatly increased sensitiveness of the modern dry plates has been a powerful aid.

The International Congress.—It has therefore been obvious for some time that photography was destined to play a considerable part as the servant or handmaid of astronomy, and the International Congress was called, in order to devise the best methods for co-operative work among astronomers all over the world.

The conference was attended by about fifty astronomers, and these gentlemen represented sixteen different countries, so that its conclusions may be taken as truly international, as well as authoritative.

The chief object of their deliberations was the determination of the means of making a complete survey of the whole heavens, by means of photography; and they also discussed the best methods of securing photographs of nebulae, comets, star clusters, binary stars, planets, etc.

Their conclusions were formulated in resolutions, one of which reads thus: "To make a photographic chart of the sky for the present epoch, and to obtain the data for determining the position and magnitude of all the stars to the 14th magnitude."

The plates containing the stars to the 14th magnitude are to be taken in duplicate to guard against error. They must be made by means of special telescopes of thirteen inches aperture, and the exposure of the plates will be about fifteen minutes. The plates contain about four square degrees; and thus for every four square degrees in the sky, thirty minutes must be employed in the actual photographic exposures. Counting the necessary preparations and the time required to make duplicate plates to replace failures, we may reckon that for every plate of four square degrees photographed, the astronomer's time will be required for at least an hour, either in the observatory or in the laboratory. There are 41,000 square degrees in the whole sky, and therefore we must count on 10,250 hours devoted to this purpose alone, as the plates contain 4 degrees each.

With nights 10 hours long, there are 3,650 hours in a year. Everywhere but in California, Italy, and Algeria, about half of these will be cloudy; half of 3,650 is 1,825. Half of the clear nights will be unfit to work on such delicate photography, owing to the presence of the moon; half of 1,825 is 913 hours.

Leaving out of account every other possible source of disturbance, such as winds too strong to allow the steady pointing of the telescope, failure of the delicate mechanism by which the telescope is kept pointed at