

is found necessary to produce and to maintain them. In heat-harmonicons the action is less simple, the alternations of pressure as well as the oscillations of the air determining the admission of the entering puffs. To judge from the position in which a singing-flame sounds best in a chemical harmonicon, a certain "lead" like that used in admitting steam to the cylinder of a steam-engine is necessary for the flames to exert their expansive force, the gas perhaps not instantly igniting on its emergence from the jet; and this "lead" the mere oscillations of the surrounding air are unable to supply; but in the position which the jet occupies in the tube, the air-pressures, which return at periods answering to a half stroke of the flame before the oscillations, precipitate its development and enable it to exert its pressures at the proper times. The proportion of lead given to the flame increases as it approaches the middle of the tube, where only the variations of pressure act upon it, while at the lower end of the tube it is commanded entirely, like the air-blast of an organ-pipe, by the oscillations of the air. It is perhaps thus that a wire-gauze flame burning at the foot of a lamp-glass sounds so vociferously, because stationary alternations of pressure in the lower part of the tube cannot affect the transmission of gas through the gauze, while the extensive oscillations there produced have perfectly free action in extinguishing and replenishing the flame. By using a piece of thin glass connecting-tube about 4 ft. long, held vertically over an unlighted Bunsen jet, on lighting the gas escaping at the top, and carefully raising the tube so as to allow the flame to descend very slowly, it may be made to pause in its descent at the successive ventral points corresponding to the harmonic divisions of the tube, sounding the note of the section of the tube above it as it comes to each point of rest. On lowering the tube it ascends, stopping and singing at some higher point of rest, depending apparently upon the less instantaneous inflammability of the gas. With some difficulty, and by shielding the lower end of the tube as much as possible from draughts, the flame was sometimes made to drop quickly within a few inches of the bottom of the tube, stopping always at the same place and sounding there for a moment the lowest note of the tube, when by the strength of its vibrations it was either rapidly extinguished, or elightened the Bunsen lamp below. The notes sounded by these means were, however, not nearly so loud and effective as those obtained when the gas-flame was held at its stationary points by making it come to rest upon wire-gauze.

I am indebted for almost all of the foregoing experiments to Mr. Haigh, who was very skilful in suggesting and devising modifications of them, leading to the immediate conclusions regarding the mode of their production to which they appear most distinctly to conduct. Other occupations have hitherto prevented me from attempting to extend and to examine them as thoroughly as they seem to deserve; but the field of research presented by the study of harmonic flames does not yet appear to be nearly exhausted, and the repetition of the above experiments by others will perhaps throw more light upon the doubtful questions with which they are still to some extent surrounded, enabling, it may be, the many significant and easily-recognised features of singing flames to be produced with even more than their present ease and certainty. A. S. HERSHEL.

SCIENTIFIC SERIALS

The Geological Magazine, July.—In this number Mr. J. Croll commences an article On the physical cause of the submergence and emergence of land during the glacial epoch, which is to be continued. As far as it goes it is concerned with the conceptions we have of the thickness of continental ice. An attempt is made to estimate the thickness of the great antarctic ice-cap, about which "observation and experience to a great extent may be said to be a perfect blank." The condition of the interior of the antarctic continent is inferred from the little that we know of Greenland. The diameter of the ice-cap being taken at 2,800, the thickness at the centre is given at the lowest at 6 miles, reckoning a quarter of a degree only as the slope of the upper surface. Mr. Hopkins has recorded that he found one degree the least slope on which ice will move. An ice-cap of only 6 miles in thickness is to many an unfamiliar idea, and "few things," Mr. Croll writes, "have tended more to mislead geologists in the interpretation of glacial phenomena than inadequate conceptions regarding the magnitude of continental ice."—The other original articles are On the dawn and development of life on the

earth, by H. Woodward, F.R.S.—Notes on carboniferous monomyaria, by R. Etheridge, jun.—The geology of the Nottingham district, by Rev. A. Irving.—There are two letters on the glaciation of the south-west of England, by Dr. Mackintosh and H. B. Woodward.—Mr. Mallet writes that he does not see how he can be charged with "misapprehending" Mr. Scrope in the discussion on the nature of volcanic heat, and asks that as he has reduced his own views to clear definition (Phil. Trans., vol. i. 1873) Mr. Scrope will do the same.

Bulletin de l'Academie Royale des Sciences, &c., de Belgique, No. 5.—M. Van Beneden contributes the first part (65 pp. in length) of a paper entitled "On the original distinction between the testicle and the ovary; the sexual character of the two primordial layers of the embryo; the morphological hermaphroditism of an entire 'individual'; an essay on the theory of fecundation." The "essay" opens with an introduction in which reference is made to Huxley's first pointing out that the organism of *Zoophytes*, *Medusidæ*, *Polyps*, *Siphonophora* and *Hydroidæ* consists essentially of two layers, endoderm and ectoderm, and also to other writers who have studied the relationships of endoderm and ectoderm in various aspects. The second part contains the history and bibliography of the subject, and the third (50 pp. long) describes the author's researches on *Hydractinia echinata*, made during a lengthened visit to Ostend. He first describes the characters which the male and female reproductive zooids have in common, and carefully details his methods of preparation. The microscopic description of the female and then of the male zooids or gonosomes is given in much detail, illustrated by plates. He arrives at the following conclusions:—The ovaries are developed entirely from the epithelial layer of the endoderm. Up to the time of maturity they remain entirely surrounded by the elements of the endoderm. The testicle and spermatozoa are developed from the ectoderm. The female sporosacs contain rudimentary testicular organs, and male sporosacs a rudimentary ovary. From a sexual point of view the ectoderm and endoderm have an opposite signification. If it is true that special organs have resulted from specialisation of function following division of labour, then we must believe that originally the whole ectoderm performed the male sexual function and the endoderm the female. The ectoderm is the animal and male layer, the endoderm the vegetation and female. Fecundation consists in the union of an egg, the product of the endoderm, with the product of the ectoderm, which brings chemical compounds of "opposite polarity" into union. The new individual is formed at the instant the elements of "opposite polarity" unite just as a molecule of water is formed by the union of atoms of hydrogen and an atom of oxygen.—M. Henry contributes papers on chloral and chlor-ethyl ethers, &c.—M. F. Plateau has sent in a communication on the digestion of insects, which is to be published in the memoirs.

Bulletin de la Société d'Anthropologie de Paris, t. vii.—In the seventh volume of this journal M. Hamy gives us the results of his examination of M. Janneau's officially conducted investigations into the anthropology of Cambodia. He begins by endeavouring to define the meaning attached to the three words, "Moi," "Kha," and "Penang," which have hitherto been used in Annamite, Laolian, and Kmer almost indiscriminately to indicate the wild tribes of the hills. By the first of these we must understand the negro tribes occupying the oriental chain of the Cambodian range; in the second a people not unlike the yellow races of Laos; and in the third the tribes in whom the flat-faced non-Caucasian type is strongly marked. The Cambodians themselves distinguish between races, known as *Kuôï*, who, they say, are the primitive people of the land but not savages, and the *Rodé*, the former being employed in the extraction of the ores of Kompong Svai, and the latter in the breeding and care of horses, while both are exempt from the yoke of slavery which presses heavily upon nearly all the other tribes. In the Cambodian language M. Janneau thinks he can trace evidence of identity with many of the primitive forms of the roots of the mother-tongue of the Indo-European languages. The Aryan name "Rama" appears among the ancient regal titles of Cambodia, and while the Sanscrit "Ramayana" includes the Cambodians amongst the offspring of the immaculate cow, *Cabala*, the people themselves have from the most remote antiquity made the cow the object of special adoration.—The question of the depopulation of certain districts, more especially in the Polynesian and other Australasian insular groups, has lately attracted especial attention among the members of the Anthropological Society of Paris. The Gambier Islands, which in

1838 had 2,000 inhabitants, had in 1872 only 650. M. Leborgne shows, however, that although alcoholism does not exist in these islands, where fevers and smallpox are unknown, rheumatic, neuralgic and nephritic affections are not uncommon, whilst phthisis and scrofulous degeneration are attended by a frightful mortality, which seems to point to the injurious results of consanguineous unions. M. Broca is disposed to attribute the gradual diminution of the Polynesian and other analogous peoples to the moral action of certain depressing influences to which savages are exposed when they find themselves brought suddenly in contact with civilised men. The very contact of civilisation seems to exert in and for itself a destructive action on their physical nature. M. de Quatrefages considers, in a separate paper, the same question in reference to the general diffusion amongst the Polynesian races of tuberculosis, which was not observed by the early discoverers, but has now attained such dimensions that its presence could scarcely escape the notice of the least observant travellers. In the universality of its destructive action on all the Australasian islands, M. de Quatrefages sees another and most incontrovertible evidence of the unity of the entire race.

Zeitschrift der Oesterreichischen Gesellschaft für Meteorologie, June 15.—In this number is commenced a review by Herr Fritsch of M. Poëy's "New Classification of Clouds," published in the *Annales Hydrographiques*. After insisting on the importance to sailors, farmers, gardeners, and others, of a knowledge of clouds with a view to prediction, M. Poëy has remarked how few observers have recorded the kind of cloud, the shape, rate of movement, course, and change of direction or shift, which differs with the height at which it floats. The ideas of men who have busied themselves with clouds, from Aristotle to Maury, are commented upon and criticised. Lamarck was the first to divide clouds into classes, and Howard's system, which followed independently a year later, differed but slightly in the main from that of the French naturalist. The stratus of Howard he regards as nothing but a fog, and the cumulo-stratus as a cumulus. His own fracto-cumulus resembles Lamarck's "atroupés," and his pallio-cirrus and pallio-cumulus, determined by observation in the Antilles, replace the nimbus of Howard. The sub-divisions of Admiral Fitzroy, based merely upon quantity, lead to error. As to the stratus, the first mistake arose from its being described as a mist by Howard himself, and the next from his followers raising the thin streak of fog to the dignity of a cloud. For Kämtz says of the cirro-stratus, that when seen at the zenith it appears to be made up of a number of cloudlets, but near the horizon like a long and very narrow streak. This cloud might therefore be confused with the stratus as represented, especially as both are common at sunrise and sunset. This error, namely, making the stratus anything but a fog, has been followed in all publications since 1815, including one of Kämtz in 1840, and the plates of Schübler, of the Smithsonian Institution, of Maury, and of the French Ministry of Marine (see NATURE, vol. ix. p. 163).

Reale Istituto Lombardo. Rendiconti: t. vii. fasc. vi., March.—The following papers are contained in this number:—In hydraulics there is a paper by M.E. Lombardini, On floods and on the inundation of the Po in 1872.—In experimental physics, Prof. Rinaldo Ferrin contributes a paper On the reversal of the current in Holtz's electric machine.—Prof. Alfonso Corradi contributes a paper to the history of medicine on certain unpublished writings of Morgagni.—Tome vii. fasc. vi., April, contains the following papers:—In the section of mathematical and natural science there is an anthropological paper by Prof. Cesare Lombroso, On tattooing amongst criminals in Italy.—In chemistry there is a note by Prof. Egidio Pollacci, On the action of sulphur on earthy carbonates, particularly on calcium carbonate as relating to geology and agriculture.—In mechanics, Prof. Giuseppe Bardelli contributes a mathematical note entitled "Researches on the moment of inertia."

Fünfteste Jahresbericht der Schlesischen Gesellschaft für Vaterländische Cultur (1872).—This Society has its head-quarters at Breslau, and, according to the present report, numbers 443 acting, 32 honorary, and 198 corresponding members. It is at present under the presidency of Dr. Göppert. The account of proceedings, now before us, attests considerable vigour and industry during the year. In the department of natural science, perhaps the most important paper is that of Prof. Cohn, giving the results of his observations on Bacteria, and their relation to putrefaction and contagion.—Dr. Roemer reports on some bone-remains of rhinoceros found in the Tra-

chenberg; and Dr. Göppert traces the history of the elk in Silesia.—The family of the Cirratulides is described by Prof. Grube; and we also find accounts of a collection of Javan birds, and Transcaucasian insects in the Society's museum, and of plant-eating Cetacea.—Dr. Poleck discusses the experimental bases of the so-called modern chemistry.—Prof. Cohn's report in the botanical section is of considerable length. We may note in it Dr. Stenzel's paper, On the Riesengebirge as a limit of vegetation. He finds that about thirteen species of phanerogam and cryptogam vascular plants belong only to the Silesian side, and about as many only to the Bohemian side of the range. The entire number of plant species in that highland region is estimated at about 200, so that about an eighth finds its limit at the watershed of the range.—There is also an instructive paper by Prof. Göppert, On the relation of the plant-world to weather.—Dr. Schröter communicates a list of the fungi he has met with at Rastatt during a four years' residence; and Dr. Göppert reports on the fungus collection in the museum of the Botanical Garden in Breslau.—Descriptions of flora of the Grünberg and other localities in Silesia are furnished by various observers.—The Society has a section specially devoted to horticulture, and the report on this, presented by M. Müller, contains a good deal that will be found of value by the practical gardener.

SOCIETIES AND ACADEMIES

LONDON

Geological Society, June 24.—John Evans, F.R.S., president, in the chair.—The following communications were read:—New Carboniferous Polyzoa, by Prof. John Young, and Mr. John Young, Hunterian Museum, Glasgow University (see NATURE, vol. ix., p. 456).—On *Palaeocoryne* and other polyzoal appendages, by Prof. John Young and Mr. John Young, Hunterian Museum, Glasgow University.—The steppes of Siberia, by Thomas Belt. The author described the portion of the Siberian steppes traversed by him as consisting of sand and loam. The best section seen by him was at Pavlodar, where he found 1 ft. of surface-soil, 20 ft. of stratified reddish-brown sand, with lines of small gravel, 8 ft. of light-coloured sandy silt, 15 ft. of coarse sand, with lines of small pebbles and one line of large ones, and 6 ft. of clayey unlaminated silt, with fragments of the bed-rock in its lower half, the bed-rock being magnesian limestone much crushed at the top. The generally accepted marine origin of the great plain was said to be negated by the absence of sea shells in its deposits, whilst *Cyrena fluminalis* occurs in them. The author regards them as deposits from a great expanse of fresh water kept back by a barrier of polar ice descending far towards the south. In its greatest extension this ice-barrier would produce the crushing of the bed-rock; and as it retreated, the water coming down from the higher ground in the south would cover a continually increasing surface.—On the microscopic structure and composition of British Carboniferous dolerites, by S. Allport.—Additional remarks on boulders, with a particular reference to a group of very large and far-travelled erratics in Llanarmon parish, Denbighshire, by D. Mackintosh.—Note on the Binger diamond-fields, by Archibald Liversidge.—Remarks on the working of the molar teeth of the *Diprotodon*, by Gerard Krefft, F.L.S.; communicated by the president. In this paper the author criticised a figure of the lower molars of *Diprotodon*, published by Prof. Owen, on the ground that the teeth are represented in it in an unabrased state, and stated that when the last tooth breaks through the gum the first of the series is always worn flat. He also remarked on the peculiar modification of the premolar in the genus *Diprotodon*.—Descriptions of species of *Chatetes* from the lower Silurian rocks of North America, by Prof. H. Alleyne Nicholson, F.R.S.E. In this paper the author accepted the union of *Chatetes* and *Stenopora* made by Milne-Edwards and Haime, and stated that *Monticulipora* D'Orb. and *Nebulipora* McCoy, also seemed to him to belong to the same generic group, for which he proposed to employ the name *Chatetes*.—On the composition and structure of the bony palate of *Ctenodus*, by L. C. Miall; communicated by Prof. P. Martin Duncan, F.R.S.—Notes on a railway section of the Lower Lias and Rhætics between Stratford-on-Avon and Fenny Compton, and on the occurrence of the Rhætics near Kineton and the Insect-beds near Knowle in Warwickshire, and on the recent discovery of the Rhætics near Leicester, by the Rev. P. B. Brodie.—The resemblances of ichthyosaurian bones