vicinity of these furnaces being relatively sterile, the microbes being doubtless unable to exist at such a high temperature. Influenza appears to have but little regard for either sex or age, for it attacked indiscriminately men, women, and children between the ages of fifteen and sixty. Its taste was proved to be equally catholic as regards climate and situation, neither meteorological nor geographical conditions appearing to exercise any sort of control on its genesis and distribution.

The effect of the scourge on the death rate from other diseases has also been carefully investigated, and, as far as the statistics go, it would appear to have materially increased the deaths ascribed to pulmonary consumption.

Innumerable tables are appended to the report, but, perhaps from a popular point of view, the following statement, compiled from official data, showing the time occupied by the epidemic in travelling from east to west, is of most general interest.

Influenza was present as an epidemic in June 1889 in Turkestan, it only reached East Russia (Wjatka) after a lapse of four months, in the middle of October. On October 28 it appeared in West Siberia, and after an interval of three months, travelling eastwards, it reached Japan in January 1890, and Hong Kong in February. On its westward course it moved more rapidly, for it appeared in epidemic form at the commencement of November 1889 in Moscow, and about a fortnight later in St. Petersburg. The capitals of Sweden, Denmark, Germany, Austria, France, and England were all attacked towards the end of November and beginning of December, whilst in Budapest, Brussels, and Madrid it appeared in the middle of December. In New York it was first heard of on December 19, whilst by the end of the month Milan, Rome, Naples, Constantinople, numerous districts in the United States, Canada, and Morocco were all in the hands of the scourge. The commencement and middle of January found it in Turin, Algiers, and Egypt, and by the end of the month it had made its appearance in Central America and in South Africa; owing to the small amount of communication existing between Europe and East Africa, it did not appear in these parts until the end of March. At the end of February it arrived in Bombay. Thus whilst in the absence of definite channels of communication it only made slow progress, requiring upwards of four months to emerge from the heart of Turkestan to European Russia, on once reaching Moscow and St. Petersburg it spread with lightning rapidity over western and southern Europe, crossing the oceans to all parts of the world.

The report manipulates in a masterly manner an immense mass of facts; but valuable as the statistics here collected must be for purposes of reference from an historical point of view, the conclusions indicate only too plainly how far we yet are from an accurate knowledge of the factors which control the genesis and distribution of this terrible disease, convenient hypotheses being continually upset by the conflicting evidence collected as to its course and conduct.

SCIENTIFIC SERIALS.

Bulletin of the New York Mathematical Society, vol. iii. No. 6. (New York: Macmillan. March, 1894). — Prof. Harkness (pp. 135–141) gives a careful and appreciative abstract of the Cours d'Analyse de l'École Polytechnique, by Camille Jordan, a work commended by Prof. Klein in "The Evanston Colloquium," and which, in its second edition, is "entièrement refondue." Three interesting, though short, notes on Permutations (pp. 142–148) are furnished by Prof. F. Morley. They are headed a plea for the chess-board in teaching determinants, a special rule of signs, and the enumeration of positions. There are numerous references to the authorities on the subject. Notes and new publications are full as usual.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, January 18.—"An Estimate of the Degree of Legitimate Natality, as shown in the Table of Natality compiled by the Author from Observations made at Budapest." By Joseph Körösi, Member of the Hungarian Academy of Sciences, Director of Municipal Statistics.

The author has tabulated the age of the 71,800 married couples given in the Census of 1891, conforming to the single year-combinations. The virtual number of these combinations—as 45 productive years of the male have to be combined with each of the 40 productive years of the female—is about 2000. Knowing thus the number of all age-combinations, he observed for four years (two before and two after the Census) the 46,931 births amongst couples of those ages. By dividing the figures obtained by four, he got the yearly probability of birth for each age-combination.

As the legitimate natality is to be regarded as a resultant between two distinct forces, the instinct of nature which urges towards multiplication and the forethought which causes moral restraint, it was also desirable to get an insight into the march of the physiological fertility alone.

Two degrees of fertility for each age were therefore obtained. The difference between the degree of physiological and that of the actual fertility shows, a few cases of procreative exhaustion being excepted, the influence of the moral factor. In the somewhat advanced ages this moral restraint exercises an influence exceeding all expectation. With the mothers of 30 to 35 it reduces the fertility to 78 per cent. (instead of 100 per cent.), with those of 43 to 2 per cent., *i.e.* 98/100 of the physiological faculty is suppressed. With men the influence is also very great, though weaker than with women.

Out of a large number of data here follow some figures to characterise the results:

	For the mother.		For the father.	
The fertility is	Actual. per cent.	Physiological. per cent.	Actual. per cent.	Physiological. per cent.
at 25 to 29 years	29·2	30·9	35 8	28·0 (?)
,, 30 ,, 34 ,,	20·6	32·9	27·1	27·0
,, 40 ,, 44 ,,	5·9	20·4	13·8	21·1

"Results derived from the Natality Table of Körösi by employing the Method of Contours or Isogens." By Francis Galton, F.R.S.

There are three variables in the statistics of natality. The age of the father is one, that of the mother is another, and the percental offspring of parents of those ages is the third. These three variables may be co-ordinated in the same way as that which is daily followed at meteorological offices in dealing with (1) the longitudes of the various stations; (2) their latitudes; and (3) the barometric height at each. After these data have been entered on a chart in their proper places, contours, known by the name of isobars, are drawn to show the lines of equal barometric pressure. In natality tables, the ages of the father and the mother take the place of the longitudes and latitudes in weather charts, and lines of similar birth rates, or as I would call them, "isogens," take the place of isobars. A chart constructed on this principle is shown in Fig. 1. The broken line A B corresponds to the instances in which both parents are of the same age. The chart is practically limited to marriages in which the wife is less than five years older, and less than seventeen years younger, than her husband.

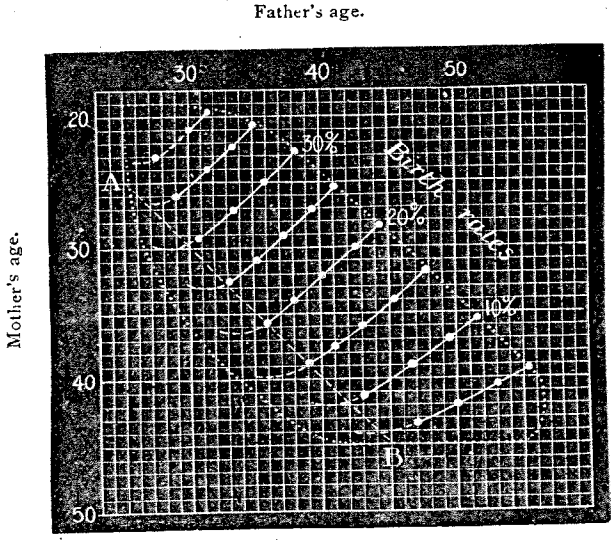

Fig. 1.

It will be noticed that the isogens run in nearly straight, diagonal, and equidistant lines across the greater par. of

the chart. As a consequence of this straightness, the *sums of the ages* of the parents to which each point in the straight portion of the same isogen refers is *constant*. The difference between their ages is of no account whatever in eight or nine tenths of the total number of marriages; it is only when the wife is older than the husband, or when she approaches the limit of the child-bearing age, that this curious law ceases to hold true.

Again, through a coincidence between the increasing age of either parent and the decrease of fertility, it happens that the sum of the three elements of (1) father's age, (2) mother's age, (3) percental birth rate in a year has a value that is itself appropriately constant.

From this follows the curious law that if we wish to calculate the percental birth rate per annum for a married couple within the limits of the chart where the isogens run straight and parallel, we have only to add the ages of the father and mother and subtract the total from 93 or 94, in order to obtain it with considerable precision. The approximate limits within which this law obtains are: (1) the wife is not to be older than her husband; (2) she is not to be less than twenty-three years of age, nor (3) more than forty.

Example.—In any large number of husbands and wives living under like conditions to the inhabitants of Budapest, whose respective ages at their nearest birthdays, to 21st June, 1892, were: that of the father, thirty-five, that of the mother, twenty-seven; then the number of children born to them during the year 1892 would be at the rate of $93-(35+27)$ per cent. $=31$ per cent; the isogen makes it about 32 per cent.

Entomological Society, March 28.—Captain H. J. Elwes, President, in the chair.—Mr. McLachlan, F.R.S., announced the sudden death, on the 23rd inst., of Mr. J. Jenner-Weir, who joined the Society in 1845, and had been one of its most regular attendants. He also commented on the scientific attainments of the deceased, and his social qualities and virtues. Mr. Goss and Mr. Merrifield also spoke of their long friendship with the deceased, and of the respect and esteem which they entertained for him.—Mr. W. Borrer, jun., exhibited a wasp's nest which had been built in such a way as to conceal the entrance thereto and to protect the whole nest from observation. He believed the nest to be that of *Vespa vulgaris*. Mr. McLachlan and Mr. Blandford made some remarks on the subject.—Mr. G. F. Hampson exhibited a specimen of *Gaudaritis flavata*, Moore, from the Khári Hills, and called attention to the existence in the males of this species, in the closely allied British species *Cidaria dotata*, Linn., and also in two Japanese species, of an organ on the under-side of the fore wing, which he suggested might be for stridulation; this organ consisting of a small scar of hyaline membranes situated just below the middle of vein 2, which is much curved; this scar is fringed with long hair, and has running down its middle a row of sharp spines situated on the aborted remains of vein 1, and which is curved up close to vein 2; the spines would naturally rub against part of the costa of the hind wing, but no spines or unusual roughening seems to exist on that or on any of the veins on the upper side of hind wing against which they could strike; below the scar is situated a large shallow fovea or pit in the membrane, slightly developed in *C. dotata* and *C. flavata*, but much more prominently in the two Japanese species, and, should the organ prove to be for stridulation, would probably act as a sounding board. Mr. Hampson said that in the Japanese species closely allied to *flavata*, the males have no trace of this curious organ. Prof. E. B. Poulton, F.R.S., Lord Walsingham, F.R.S., and Mr. Hampson took part in the discussion which ensued.—The Rev. T. A. Marshall communicated a paper entitled "A Monograph of the British Braconidæ, part v."—Mons. Louis Péringuey communicated a paper entitled "Descriptions of new Cicindelidæ from Mashunaland."—Prof. Poulton gave an account of his recent tour in the United States, and commented on the entomological and other collections contained in the American museums. Lord Walsingham, Mr. Hampson, and the President also made some remarks on the subject.

EDINBURGH.

Royal Society, March 5.—Prof. Sir W. Turner, Vice-President, in the chair.—Prof. Crum Brown read the first part of a paper on the division of a parallelepiped into tetrahedra. The subject of the paper was the question suggested by Lord Kelvin: In how many ways can a parallelepiped be cut into tetrahedra without introducing new corners? In the first part the author discusses the division of the cube into tetrahedra, all the corners of the tetrahedra coinciding with the corners of the cube. Noting the corners of the cube A, B, C, D, $\bar{A}$, $\bar{B}$, $\bar{C}$, $\bar{D}$, so that A $\bar{A}$, &c. are body diagonals of the cube, and A B, A C, A D, &c. face diagonals, and therefore A $\bar{B}$, &c. edges, we have the following five forms of tetrahedra: A B C D, A $\bar{B}$ $\bar{C}$ $\bar{D}$, A $\bar{A}$ B C, A $\bar{A}$ B $\bar{C}$, and A $\bar{A}$ C $\bar{B}$, and no more, for A B $\bar{C}$ $\bar{D}$ and A $\bar{A}$ B $\bar{B}$ have all four corners in one plane. These tetrahedra may be designated O, Δ, I, L, Γ, respectively. O has a volume one-third of the cube, has no part of the surface of the cube, and can occur in two positions in the cube, A B C D and $\bar{A}$ $\bar{B}$ $\bar{C}$ $\bar{D}$. Δ has a volume one-sixth of the cube, has three faces coinciding each with half of a face of the cube, and can occur in eight positions. I has a volume one-sixth of that of the cube, has one face coinciding with half a face of the cube, and can occur in twenty-four positions. L and Γ are enantiomorph, each has a volume one-sixth of the cube, and each can occur in twelve positions. These give fifty-eight positions in all, which, with the twelve groupings of four corners all four in one plane, make up the seventy groups of four corners. The author then goes on to discuss the number of ways in which these tetrahedra can be built together to form a cube. These are shown to be the following:—

1 O and 4 Δ's,
3 Δ's and 3 Γ's,
*2 Δ's, 2 I's, and 2 L's,
*2 Δ's, 2 I's, 1 L, and 1 Γ,
*2 Δ's, 2 I's, and 2 Γ's,
1 Δ, 1 I, 3 L's, and 1 Γ,
1 Δ, 1 I, 2 L's, and 2 Γ's,
1 Δ, 1 I, 1 L, and 3 Γ's,
4 L's and 2 Γ's,
3 L's and 3 Γ's,
2 L's, and 4 Γ's.

Of these the three marked * correspond to two different arrangements each, in one of which the plane separating an I from a Δ are parallel, in the other inclined to one another. There are therefore fourteen distinct ways in which a cube can be cut into tetrahedra without making new corners.—Prof. Cossar Ewart read a paper on the second and fourth digits of the horse, their development and subsequent degeneration. He referred to cases in which two or even three digits had been recorded. In some cases the presence of such digits is due to subdivision of the normal middle digit, in others it is due to the restoration of those digits which are always found in the fossil horse. Prof. Ewart argues that the terminal "buttons" or tubercles of the splint bones of the horse are vestiges of the lost second or fourth digits. He gives a description of the condition of the digits in embryos of different ages. In embryos under 1 inch in length no evidence was found of the phalanges of the second or fourth digits, but in a slightly larger embryo a rudiment of the second finger, connected by a complete joint to the second metacarpal, could be made out. The second and fourth phalanges attained their greatest development in embryos about 14 inches in length. The second finger then showed a terminal phalanx and an indistinct second phalanx connected to a large first phalanx which was joined by a very complete joint to its metacarpal. The apex of the terminal phalanx was surrounded by a cap corresponding possibly to one of the deeper layers of the normal hoof. In older embryos the joints were never so complete, the second and third joints rapidly disappearing, so that the second and fourth toes of all the limbs consisted of an elongated piece of cartilage connected by more or less distinct joints to the metacarpals. In still older embryos the fused phalanges are ossified and are firmly connected to the splints so as to form the well-known "buttons."

March 19.—Prof. Geikie, Vice-President, in the chair.—Prof. Crum Brown communicated the second part of his paper on the division of a parallelepiped into tetrahedra. He showed that there are 180 distinct ways in which this may be done without introducing a new corner.—A paper, by Mr. Gregg Wilson, on the reproduction of the edible crab, was communicated.—Mr. C. A. Stevenson read a paper on telegraphic communication by induction by means of coils. Such communication has been found possible when two circular coils of 200 yards diameter were placed horizontally at a distance of one quarter of a mile apart.