

This paper, which supplies some suggestive and not uninteresting matter, is based upon observations on the abnormal development in a full-grown axolotl of a fifth digit at the base of the fourth, and the gradual reparation, by multiplication of the parts, of various injuries to the other phalanges. Dr. Fauvelle considers at length the conditions on which the formation of supplementary parts in the adult may possibly depend, and whether we may not refer such abnormal manifestations of activity to a reversion in the cells of the connective-tissues to an embryonic condition, in which segmentation is possible. M. Avia, in confirming the views of Dr. Fauvelle as to the influence of heredity in the human species on the appearance of supernumerary organs, instanced the family of the Fodli, which for several centuries had exercised patriarchal supremacy over a tribe of the Arab Hyamites. In this family, whose members are not allowed to marry beyond the limits of their own kindred, polydactylism has become an established hereditary character, and is considered as an indispensable evidence of legitimacy, and right of succession. M. Avia has personally examined various Fodli, all of whom had twenty-four phalanges on their hands and feet.—On heredity, by Dr. Fauvelle. In this, as in the preceding paper, the author draws attention to the injury done to scientific inquiry by the constantly increasing recklessness with which physiological and anatomical conditions, whose causes we are ignorant of, are indiscriminately referred to so-called "atavism." It must be confessed, however, that the author himself in his exposition of the significance of the phenomena of heredity, as given in this paper, and in his more recent communication to the Society of his views regarding the real or assumed existence of atavism, exhibits the same want of accuracy and close definition which he condemns in others, and the vagueness of the opinions which he has enunciated with such dogmatic temerity excited a lively controversy, in which MM. Laborde and Sanson, and Mme. Cl. Royer, with other members, took part.—On primitive forms of numerations, by M. Letourneau. In this paper, and in the discussion which followed its reading, attention was drawn to the development, among some peoples, of a decimal system of numeration from the natural counting of the fingers, while according to Bachofen and others, the decimal method was preceded, in those earlier periods of civilisation in which the patriarchal principle was still in force, by the octomal system. Curious evidence of the prevalence of this practice of counting by 8 is afforded in Sanskrit, and in Greek and Latin, as well as in several modern European forms of speech, by the close affinity, if not identity, of the words signifying nine and new, as, e.g., the French "neuf," thus showing that the numeral following eight was of more recent acceptation than the final term of the octomal form of numeration.

Bulletin de l'Académie des Sciences de St. Pétersbourg, vol. xxi. No. 1.—List of the members of the Academy on March 1, 1886.—Diagnoses of new plants from Asia, by C. J. Maximowicz, part 6 (Latin), containing a good many new species.—Report on new linguistic materials contained in the "Codex Comanicus," by Prof. Radloff (German).

SOCIETIES AND ACADEMIES

LONDON

Royal Society, June 10.—"A Minute Analysis (experimental) of the various Movements produced by stimulating in the Monkey different Regions of the Cortical Centre for the Upper Limb, as defined by Prof. Ferrier." By Charles E. Beevor, M.D., M.R.C.P., and Prof. Victor Horsley, F.R.S., B.S., F.R.C.S.

The following investigation was undertaken as prefatory to a research into motor localisation of the spinal cord.

Anatomy.—(1) Attention is drawn to some minute details of the topographical anatomy of the upper limb centres as defined by Prof. Ferrier.

(2) Outlines of the shape and arrangement of the fissure of Rolando, the præcentral and intra-parietal sulci.

(3) Proof adduced in support of the authors' opinion that the small horizontal sulcus named X by Prof. Schäfer really corresponds to the superior frontal sulcus of man.

Previous Researches.—Ferrier's results are then given in full.

Method of Experimentation is explained in detail, as also the mode of subdivision of the part of the cortex investigated into centres of about 2 mm. square.

From the results of excitation are then deduced the two following axioms:—

Axiom I.—Viewing as a whole the motor area of the central cortex for the upper limb, as defined by Prof. Ferrier, we find that the regions for the action of the larger joints are situated at the upper part of the area, i.e. closer to the middle line, while those for the smaller and more differentiated movements lie peripherally at the lower part of the area.

Axiom II.—As a broad result, extension of the joints is the most characteristic movement of the upper part of Ferrier's arm centre; while flexion is equally characteristic of the movements obtained by stimulating the lower part. Finally, between these two regions there is a small portion where flexion and extension alternately predominate, a condition to which we have given the name of *confusion*. (Here both flexors and extensors are contracting at the same time, and consequently the joint is usually fixed in a neutral position, each group of muscles alternately drawing it in opposite directions.)

Priority of Movements is found to take place, and follows the "march" first indicated by Dr. Hughlings Jackson as existing in epileptic seizures.

This *march* is in accordance with Axiom I., since the shoulder commences the series of movements in the uppermost part of the area, the thumb at the lowest part, and the wrist in the intermediate part.

Summary.—(1) That X is the superior frontal sulcus of man.

(2) That the movements of the joints are progressively represented in the cortex from above down.

(3) Localisation of sequence of movements.

(4) Localisation of quality of movements.

(5) That there is no absolute line of demarcation between the different centres.

Mathematical Society, June 10.—J. W. L. Glaisher, F.R.S., President, in the chair.—At a special meeting the following resolution was unanimously carried:—"That the Council be empowered to take the necessary steps to obtain a charter of incorporation for the Society."—At the ordinary meeting Messrs. A. R. Forsyth, F.R.S., R. Lachlan, and the Rev. J. J. Milne were admitted into the Society.—The following communications were made:—Reciprocation in statics, by Prof. Genese.—On the theory of screws in elliptic space (third note), by A. Buchheim.—Some applications of Weierstrass's elliptic functions, by Prof. Greenhill.—Formula for the interchange of the independent and dependent variables with some applications to reciprocants, by C. Leudesdorf (second paper on reciprocants), by L. J. Rogers.—On the motion of a liquid ellipsoid under the influence of its own attraction, by A. B. Basset.—Electrical oscillations on cylindrical conductors, by Prof. J. J. Thomson, F.R.S.

Chemical Society, May 20.—Dr. Hugo Müller, F.R.S., President, in the chair.—The following papers were read:—Sources of error in the calorimetric study of salts, by Prof. W. A. Tilden, F.R.S.—On the action of aldehydes and ammonia on benzil, by Francis R. Japp, F.R.S., and W. Palmer Wynne, B.Sc.—On imabenzil, by the same.—On ammonia-derivatives of benzoïn, by Francis R. Japp, F.R.S., and W. H. Wilson, Ph.D.—On compounds from benzil and benzoïn and alcohols, by Francis R. Japp, F.R.S., and Julius Raschen.—On the action of phosphoric sulphide on benzophenone, by the same.—The separation and estimation of zirconium by means of hydrogen peroxide, by G. H. Bailey, D.Sc., Ph.D.—An apparatus for the determination of the temperature of decomposition of salts, by the same.—The retention of lead salts by filter-paper, by L. Trant O'Shea.

June 3.—Dr. Hugo Müller, F.R.S., President, in the chair.—The following papers were read:—Notes on Sir W. Fairbairn's experiments on re-melting cast iron, by Thomas Turner, Assoc. R.S.M.—Some ammonium compounds and other derivatives of α -1' hydroxyquinoline, by C. A. Kohn, B.Sc., Ph.D.— β -sulphophthalic acid, by Prof. C. Graebe and A. Réé, Ph.D.—Compounds obtained by the aid of β -sulphophthalic acid, by the same.—Derivatives of taurine (part 2), by J. William James.

Anthropological Institute, June 8.—Mr. Francis Galton, F.R.S., President, in the chair.—The election of Mr. Joseph J. Mooney was announced.—Mr. C. H. Read read a paper on the ethnological exhibits in the Colonial and Indian Exhibition, in which he reviewed briefly the collections to be seen in the various courts, and described in detail some of the objects. The author dwelt especially upon the meagreness of the collection sent from the Dominion of Canada, where there is such a vast

field for ethnological inquiry.—Miss Buckland read a paper on American shell-work and its affinities, in which it was pointed out that the resemblance in shell ornaments found in mounds in various States of North America to those existing in the Solod mon and Admiralty Islands renders it highly probable that a commerce was carried on between the islands of the Pacific and the American continent prior to the Spanish conquest.—A paper by Mr. C. W. Rosset, on the Maldivé Islands, was read. The group contains upwards of 12,000 islands, which lie in clusters called atolls, of which there are more than twenty. The king's or sultan's island is situated in Malé Atoll, and here Mr. Rosset spent seventy days, as the sultan would not allow him to visit the other atolls. The natives live almost entirely upon fish and rice; and as the islands are not capable of producing grain of any kind, the rice has to be imported from India, the nearest point of which is about 350 miles distant. The author gave an interesting description of the customs of the natives, and exhibited a large collection of photographs, dresses, and other objects of ethnological interest.

Royal Meteorological Society, June 16.—Mr. W. Ellis, F.R.A.S., President, in the chair.—The Rev. J. R. Boyle and Mr. H. B. de la Poer Wall, M.A., were elected Fellows of the Society.—The following papers were read:—Note on a sudden squall, January 13, 1886, by Mr. R. H. Scott, F.R.S. This is an account of a remarkably sudden squall of about ten minutes' duration, which passed over the south of England on the morning of January 13. It was first recorded at Falmouth at 8.20 a.m., and passed over London at 10.40 a.m.—The floods of May 1886, by Mr. F. Gaster, F.R.Met.Soc., and Mr. W. Marriott, F.R.Met.Soc. The month of May 1886 will long be remembered for the heavy rains that occurred between the 11th and 13th, and the floods they produced over the greater part of the west and midland counties of England. In fact, at Worcester the flood was higher than any that have occurred there since 1770. On the 11th and 12th heavy rain fell over the east of England, there being over 3 inches during these two days at several places in counties Down, Dublin, and Wexford; the greatest reported being 3.52 inches at Kilkeel, co. Down. Over the other parts of the United Kingdom the rainfall on the 11th was under 1 inch. Rain, however, commenced falling about noon on Tuesday over the midland counties, and continued with increasing intensity till Friday morning; the duration at most places being about sixty hours. The heaviest rainfall occurred in Shropshire, where over 6 inches fell at several stations; while at Barwarton as much as 7.09 inches was recorded, the amounts for each day being 0.60 inches on the 11th, 3.10 inches on the 12th, and 3.39 inches on the 13th. Very serious floods followed these heavy rains. At Shrewsbury the extreme height of the flood on the Severn was 16 feet, and at Worcester 17 feet 1 inch, above the average summer level. At Ross the flood on the Wye was 14 feet; at Nottingham the rise of the water in the Trent was 12½ feet; at Rotherham the flood was 8 feet 5 inches; and in North-East Yorkshire the Derwent rose to nearly 11 feet above summer level. These floods caused great damage to property and loss of life; bridges were washed away; railway traffic suspended; and thousands of workmen thrown idle. In several places the waterworks were flooded, and the towns' water-supply was consequently cut off. Mr. Gaster drew attention to the complex character of pressure-distribution during the time referred to, and showed how the region of maximum rainfall followed certain of the shallow depressions which appeared over the British Islands. He drew attention to the peculiarities of this type of depression, showing how in many, if not in most, cases the rainfall was heaviest in their rear, and was brought by the easterly, not by the westerly, wind. He also referred to some previous instances of heavy floods, in which similar atmospheric conditions prevailed, and explained how it was that, as the disturbance passed off, snow fell instead of rain, this in its turn being followed by severe cold and in some places frost.—On atmospheric pressure and its effect on the tidal wave, by Capt. W. N. Greenwood, F.R.Met.Soc. The object of this paper is to show how a little knowledge of weather-forecasting, with some practical knowledge of local weather changes and a good barometer, will go far towards forming a right correction for application to the predicted height of the tide, and also to determine what that correction should be in its relation to the fluctuations of the barometer and the prevailing gradient.—Meteorological results at Levuka and Suva, 1875-85, with notes on the climate of Fiji, by Mr. J. D. W. Vaughan, F.R.Met.Soc. The climate

of Fiji is remarkably healthy. Diseases such as fevers of an aggravated and malarious character, cholera, and liver complaints are unknown.

EDINBURGH

Royal Society, June 7.—The Hon. Lord Maclaren, Vice-President, in the chair.—Dr. H. R. Mill and Mr. J. T. Morrison, of the Scottish Marine Station, read a paper on tidal variations of salinity and temperature in the estuary of the Forth. They divide a river-system into four parts: (1) the *river proper* with its tributaries and feeding-lakes, in the whole of which the water is fresh; (2) the *estuary*, in which the river-water meets that of the firth or sea, and in which there is rapid change of salinity with position and great tidal differences; (3) the *firth* or sea-inlet, in which there is a very uniform and gradual increase of salinity from estuary to sea; (4) the *sea proper* adjacent to the mouth of the firth. It was shown that the temperature of the river in spring and summer being higher than that of the firth, and in consequence surface-water being warmer as well as fresher than bottom-water, the curves representing vertical distribution of salinity and of temperature were identical. Hence the interaction of river and firth waters can be studied as completely by the thermometer as by the hydrometer. In the estuary of the Forth translational motion of the whole mass of water is found to characterise both flood and ebb tide, but about the times of high and low water considerable shearing motion takes place. So long as no shearing occurs, the water is of nearly uniform salinity from surface to bottom at any given time.—Mr. J. J. Barlow communicated a paper on a new method and reagents for detecting chlorides, bromides, and iodides in the presence of each other, and also in the presence of nitrates and chlorates.—Mr. J. A. Thomson gave a paper on the anatomy of *Suberites domuncula*, and also, in conjunction with Mr. P. Geddes, a paper on the history and theory of spermatogenesis.—Dr. J. Waddell gave an account of experiments by which he has determined the atomic weight of tungsten. The methods he used are superior to those previously employed.—Mr. A. H. Auglin discussed certain theorems mainly connected with alternants.

PARIS

Academy of Sciences, June 15.—M. Jurien de la Gravière, President, in the chair.—On the earthquake which occurred in Brazil on May 9, extract from a letter of H.M. dom Pedro d'Alcantara. This disturbance, the first on record, took place in the Petropolis district on May 9 at 3.20 p.m. The vibration, which was of a mild character, lasted scarcely four seconds, and was also felt along the coast as far as Rio de Janeiro, and inland 266 kilometres from that point. It was accompanied by exceptional cold weather, the glass falling to -5° C. in some parts of the province of Minas Geraes, and -3° in other places.—On the absorption spectra of oxygen, by M. J. Janssen. In continuation of his studies on the absorption spectra of the gases, the author deals here with those of oxygen, which reveals some features of great interest for molecular mechanics.—Remarks on the decomposition of the sal ammoniacs by the bases and metallic oxides, by M. Berthelot.—On the ammonia present in the ground (third note), by M. Th. Schloësing, in reply to MM. Berthelot and André. The question is discussed whether the quantity of ammonia present in vegetable soil is, as a rule, comprised between 0 mg. and 20 mg., as determined by the author, M. Boussingault, and other analysts, or whether this quantity ranges from 78 mg. to 118 mg., as determined by MM. Berthelot and André. It is pointed out that the difference between the two views is a question of quantity; and as the quantity depends on the process of analysis by which it is determined, it ultimately resolves itself into a question of analytical processes.—Lavoisier and the Commission on Weights and Measures, by M. E. Grimau. Some unpublished documents are printed, showing the action taken by the Commission on behalf of Lavoisier, at that time under arrest as a farmer-general. From one of these documents it appears that, in consequence of said action, the illustrious names of Laplace, Delambre, Borda, and others, were themselves removed from the Commission on the 3rd Nivose of the second year of the Republic (December 26, 1793).—Observations on Fabry's comet, by M. L. Culs. The spectral analysis made at Rio de Janeiro during the month of May with a spectroscope of slight dispersive power showed distinctly the three bands characteristic of carbon compounds.—Comparative dimensions of the satellites of Jupiter, deduced from observations made during the year 1885, by Dom Lainey.

For the four satellites these observations yielded for the vertical diameters at mean distance the following angular dimensions :—

I.	1°176 ± 0°360
II.	1°281 ± 0°392
III.	1°725 ± 0°436
IV.	1°286 ± 0°447

—Note on the herpolodie (second communication), by M. Hess.—On the measurement of the specific volume of the saturated vapours, and on the value of the mechanical equivalent of heat, by M. A. Perot. Reversing the well-known process of Messrs. Fairbairn and Tait for determining the volume of a known mass of saturated vapour at a given temperature, the author finds the number expressing the mechanical equivalent of heat to be about 424.—Note on a registering hygrometer, by M. Alb. Nodon. This instrument, which is constructed on a principle analogous to that of Breguet's metallic thermometer, is contrived to work for ten consecutive days. Its indications are unaffected by a temperature ranging from 10° to 35° C.—Law determining the electric conductivity of saline solutions of mean concentration, by M. E. Bouty.—Relation between the coefficient of self-induction and the magnetic action of an electro-magnet, by M. Ledebor.—New magnetic maps of France, by M. Th. Moureaux. The observations, which have served as the groundwork of these charts, were mostly made during the years 1884 and 1885 under the direction of M. Mascart, at seventy-eight stations in every part of France, the results being all referred to January 1, 1885, by comparison with the curves of variation as determined with the magnetograph at the Observatory of the Parc Saint-Maur. From these observations the declination is shown to be least at Belfort (13° 59' 8"), greatest at Conquet (10° 25' 1"), varying in the north of France about 30' for a degree of longitude, and less in the south.—Summer isobars, winds, and cloudiness on the Atlantic, by M. L. Teisserenc de Bort. The maps embodying these data are based on the records of English and Dutch vessels, comprising 40,900 observations for each element, and on a report on the equatorial region published by the Meteorological Office.—Note on the earthquake in Brazil, by M. Cruls. Although traces of ancient volcanoes and more recent eruptive formations have been detected on the seaboard of Rio de Janeiro, the author considers that this seismic disturbance was not volcanic, but due to shrinking or some analogous movement of frequent occurrence in the crust of the earth.—Reply to some objections made to the memoir on microseismic observations, by M. T. Bertelli.—On the penta-sulphuret of phosphorus, by M. F. Isambert.—On the principle of equivalence in the phenomena of chemical equilibria, by M. H. Le Chatelier. The experimental law serving as the base of pure mechanics—two forces equal to a third are equal to each other, and reciprocally—is true also of chemical equilibria. But in order to eliminate the equivocal notion of *force*, the author substitutes for it another thus formulated: in every phenomenon of equilibrium two material systems equivalent in relation to a third will also remain equivalent in relation to any other system to which they may be opposed, and they are in mutual equilibrium when opposed to each other. This law is here verified in the case of vaporisation, dissociation, solubility, and under other conditions.—On monosodic orthophosphate and arseniate, by MM. A. Joly and H. Dufet.—On a combination of methylic alcohol and anhydrous baryta, by M. de Forcrand.—On the monochloracetate of butyl, by M. G. Gehring. In order to complete the series of monochloracetates, the author has prepared, and determined some of the physical properties of, this substance, adopting the same general method as that employed in the preparation of the monochloracetate of methyl.—On the development of the oesophagus, by M. P. de Meuron.—On the vascular system of *Dorocidaris papillata*, by M. H. Prouho.—On the crystals of gypsum in the pseudopotters' clays of the Paris district, by M. Stan. Meunier.—Preliminary note on the geological structure of the Lure range, Lower Alps, by M. W. Kilian. This range, which runs for 50 kilometres from the neighbourhood of Vilhosco to Monbrun (Vaucluse), appears to be intermediate between the Alpine and Pyrenean systems. A summary is given of its geological constituents, ranging from the Middle and Upper Jurassic to the Tertiary conglomerates and marls.—On the male fertilisations of *Arthropitus* and *Bornia*, by M. Renault.—A contribution to the study of pre-foetation and pre-efflorescence in fossil plants, by M. L. Crié.—Remarks on a meteor observed at the Trocadero on June 13, by M. L. Jaubert.

STOCKHOLM

Academy of Sciences, June 9.—On the Academy's Zoological Station in the province of Bohus, by Prof. Sven Lovén.—On the resistance of mixtures of acids against electrical conductivity, by Dr. S. Arrhenius.—A collection of ethnographical objects of Central American Indians, presented to the National Museum by the Swedish Consul-General in Guatemala, Mr. S. Ascoli, exhibited and explained by Prof. F. A. Smith.—On the new elementary body germanium, and some of its combinations, by Prof. L. Fr. Nilsson. The researches of Prof. Nilsson and Petterson, made at the request of Prof. Winkler, the discoverer of germanium, show that his suggestion that germanium might possibly be identical with Mendelejeff's ekasilicium is quite correct, and in accordance with the true facts.—Methods for the determination of elements of refraction in prisms having great refracting angles, by Mr. W. Ramsay.—On the mode of occurrence of the sand-worm stones in the Cambrian strata at Lugnäs, in Sweden, by Prof. A. G. Nathorst.

BOOKS AND PAMPHLETS RECEIVED

"The First Report upon the Fauna of Liverpool Bay and the Neighbouring Seas," Edited by Prof. Herdman (Longmans).—"L'Inclinaison des Vents" R. P. Marc Dechevrens (Chang Hai).—"Die Alchemie in Alter und Neuerer Zeit," Erster und Zweiter Theil, by H. Kopp (Winter, Heidelberg).—"An Elementary Treatise on Geometrical Optics," 2nd edition, revised, by W. S. Aldis (Deighton, Bell, and Co.).—"Records of the Saidapt Experimental Farm," by Chas. Benson (Keys, Madras).—"New Commercial Plants and Drugs," No. 9, by T. Christy (Christy).—"Bulletin of the Illinois State Laboratory of Natural History," Vol. II, Art. V. "Studies from the Contagious Diseases of Insects," by S. A. Forbes (Franks, Peoria).—"Cornell University: Proceedings in Memory of Louis Agassiz and in Honour of Hiram Sibley, June 17, 1885."

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