at the posterior end of the body there is a series of delicate dorsal and ventral processes; these latter are segmentally arranged, developed in pairs upon the last sixty segments or so of the body. There is no connection between the setæ and these processes, as in Bourne's Chætobranchus, also found in the same tank. This worm is referred to the Tubificidæ, without having any certain affinities to any of the known genera.—On the formation of the germ-layers in *Crangon vulgaris*, by W. F. R. Weldon, M.A. (plates xx. to xxii.). The author's conception of the early development differs widely from that of Kingsley.—On the pigment cells of the retina, by I. S. Boden and F. C. Sprawson. The retinal pigment cells are not, as usually represented, invariably hexagonal; in specimens taken from the eyes of sheep, ox, rabbit, kitten, pig, hen, and frog, while hexagonal cells were the most numerous, heptagonal cells were frequently found and scattered at intervals. Cells with four, five, eight, nine, ten, and eleven sides were found.—Observations upon the development of the segmentation cavity, the archenteron, the germinal layers, and the amnion in mammals, by Dr. Arthur Robinson (Plates xxiii. to xxvii.). There is a general description of the development of the ova of the rat and mouse up to the period of the completion of the blastodermic vesicle, and a comparison with the results obtained by Fraser, Duval, and Selenka: there is a description of the formation of the mesoblast and of the chorda dorsalis, followed by a comparison of the ova of the rat and mouse with the ova of other mammals and the lower vertebrates and by a description of the formation of the amnion and a discussion of the relation of amnion formation to "inversion," and by a description of the formation of the cœlom.

June.—Contains:—On the primitive segmentation of the vertebrate brain, by Bertram H. Waters, B.A. (Plate xxviii.); concludes that the fore-brain is composed of at least two well-marked neuromeres, possibly of three; that the mid-brain consists of two neuromeres, from which there is every reason to think that the third and fourth nerves take their origin, and hence these deserve to be recognized as segmental structures; and that the hind brain consists of six neuromeres. On the oscula and anatomy of *Leucosolenia clathrus*, O.S., by E. A. Minchin, B.A. (Plate xxix.). In this sponge, in the fresh and healthy condition, not only are there oscula, "but in the full-sized specimens larger oscula than in any other Leucosolenia known to me, whether from pictures or in the flesh." These oscula are provided with a sphincter, and can be so tightly closed as to escape notice. Hœckel's four varieties of the sponge are only different states of contraction.—Researches into the embryology of the Oligochæta, No. 1: on certain points in the development of *Acanthodrilus multiporus*, by Frank E. Beddard, M.A. (Plates xxx. and xxxi.).—On the Innervation of the Cerata of some Nudibranchiata, by Dr. W. A. Herdman and J. A. Clutt (Plates xxxii. to xxxiv.). If the cerata of Nudibranchs cannot all be said to be true epipodia innervated by the pedals, it would seem equally impossible to regard them in all cases as pallial outgrowths supplied by the pleural ganglia. It is possible that they may have been epipodial in origin, although there be now, in some, a connection with pleural nerves.—Notes on Elasmobranch development, by Adam Sedgwick, M.A. (Plate xxxv.). On the paired nephridia of Prosobranchs, the homologies of the only remaining nephridium of most Prosobranchs, and the relations of the nephridia to the gonad and the genital duct, by Dr. R. v. Erlanger (Plates xxxvi. and xxxvii.).

## SOCIETIES AND ACADEMIES.

### LONDON.

**Royal Society**, June 16.—"The Physiological Action of the Nitrites of the Paraffin Series considered in connection with their Chemical Constitution. Part II. Action of the Nitrites on Muscular Tissue and Discussion of Results." By J. Theodore Cash, M.D., F.R.S., Professor of Materia Medica in the University of Aberdeen, and Wyndham R. Dunstan, M.A., Professor of Chemistry to the Pharmaceutical Society of Great Britain.

Continuing the examination of the physiological action of various pure organic nitrites of the paraffin series (Part I.; Roy. Soc. Proc., 1891), the authors have studied their effect on striated muscular tissue. When the vapours of these nitrites come into contact with the muscle a paralysant effect is observed. All the experiments were made with the triceps and gastrocnemius of *Rana temporaria*. The muscle was contained in a specially constructed air-tight chamber. A very extensive series of experiments was necessary in order to obtain reliable contrasts. The amounts of the nitrites employed varied between $\frac{1}{30}$ and $\frac{1}{400}$ c.c.

Several series of concordant results have thus been obtained which lead to two different orders of activity, viz. (1) with reference to the extent to which equal quantities of nitrites shorten the resting muscle, and (2) with reference to the rapidity with which the shortening is produced. The order of activity of the nitrites as regards the extent of the shortening they induce is as follows:—(i.) Iso-butyl, (ii.) tertiary amyl, (iii.) secondary butyl, (iv.) secondary propyl, (v.) propyl, (vi.) tertiary butyl, (vii.) butyl, (viii.) α-amyl, (ix.) β amyl, (x.) ethyl, (xi.) methyl. The order representing the speed with which shortening occurs is (i.) methyl, (ii.) ethyl, (iii.) secondary propyl, (iv.) tertiary amyl, (v.) primary propyl, (vi.) tertiary butyl, (vii.) secondary butyl, (viii.) α-amyl, (ix.) β-amyl, (x.) primary butyl, (xi.) iso-butyl.

The effect of these nutrites in interfering with the active contraction of a stimulated muscle has also been studied, and it has been ascertained that very minute doses, insufficient to cause passive contraction, interfere in a marked degree with the active contraction, and cause the muscle to fail in responding to stimulation, whilst the companion muscle, contained in a closed chamber free from nitrite vapour, still responded to stimulation.

The remainder of the paper is devoted to a discussion of the connection between the various phases of physiological action and the chemical constitution of the nitrites which gave rise to them. The principal conclusions which have been arrived at are briefly as follows:—The physiological action of these nitrites is not solely, and in some cases not even mainly, dependent on the amount of nitroxyl ($NO_2$) they contain.

In respect of all phases of physiological activity, the secondary and tertiary nitrites are more powerful than the corresponding primary compounds. This is to be chiefly attributed not to the direct physiological action of the secondary and tertiary groups, but to the great facility with which these compounds suffer decomposition mainly into the alcohol and nitrous acid. In respect of the acceleration of the pulse, the power of the nitrites is directly as their molecular weight, and inversely as the quantity of nitroxyl they contain. They, therefore, fall into an order of physiological activity which is identical with that in which they stand in the homologous series. This same relationship holds, though less uniformly, in their power of reducing blood-pressure, and of inducing muscular contraction.

This order appears to be the result not so much of the direct physiological influence of the substituted methyl groups as of the increased chemical instability which their presence confers on the higher members of the series. In respect of the duration of subnormal pressure, as well as of the rapidity with which muscular contraction ensues, the activity of the nitrites is expressed by an order which is for the most part the reverse of that representing their power in accelerating the pulse, reducing blood-pressure, and contracting muscular fibre, this order being in general contrary to that of the homologous series. In these respects the more volatile nitrites of low molecular weight which contain relatively more nitroxyl are the most active. It appears probable that these simpler nitrites more readily attach themselves to certain constituents of blood and muscle, and thus act more quickly than the higher compounds, whilst their greater stability causes their effects, *i.e.*, reduction of blood-pressure, &c., to endure for a greater length of time than that of the higher and more easily decomposed bodies.

A large proportion of an organic nitrite is changed into nitrate in its passage through the organism, and is excreted as an alkali nitrate in the urine.

The results which have been gained by this research have an important bearing on the therapeutic employment of the nitrites. It is proposed elsewhere to consider what the outcome of this investigation is for practical medicine.

### PARIS.

**Academy of Sciences**, July 25.—M. d'Abbadie in the chair.—Some new observations on the employment of the calorimetric shell, by M. Berthelot. Different bodies must be treated differently, according as they are fixed, volatile, or gaseous. For fixed compounds, solid or liquid, the ratio between the weight of the combustible and the weight of oxygen ought to be such that the gas which remains after combustion contains at least 60

per cent. of free oxygen ; otherwise some half-burnt gases will remain in the vessel, notably carbonic oxide. Excess of oxygen, especially if under a pressure of 25 atmospheres, ensures that the temperature of the centre of combustion should remain as high as possible. In the case of gases the oxygen should only be in very slight excess, and should be introduced by tenths of an atmosphere, until the most favourable pressure is reached. Volatile bodies should, if possible, be burnt in the liquid state.—Study of boron trisulphide, by M. Henri Moissan. Five new methods of obtaining this body are described: by the action of fused sulphur on boron iodide ; by burning boron in sulphur vapour at 610° ; by the action of hydrogen sulphide on pure boron ; by the action of carbon bisulphide on boron ; and by the action of the sulphides of arsenic, antimony, and tin upon boron. The substance thus obtained shows several remarkable properties.—Researches on the chemical constitution of the peptones, by M. P. Schutzenberger.—On two ruminants of the Neolithic epoch of Algeria, by M. A. Pomel.—The two candidates selected for the Directorship of the Paris Observatory were M. Tisserand and M. Loewy.—*Résumé* of solar observations made at the Royal Observatory of the Roman College during the second quarter of 1892. A letter from M. P. Tacchini to the President. The spots, faculæ, and prominences observed show a considerable increase since last quarter.—Sun observations made at the Lyons Observatory (Brunner equatorial) during the first half of 1892, by M. Em. Marchand. 125 groups of sun-spots have been counted, as against 101 in the previous half-year. The southern hemisphere, which used to contain less spots, has lately shown nearly as many as the northern. The latitude of the groups continues to diminish.—New results with regard to hydrogen, obtained by the spectroscopic study of the sun. Similarity with the new star in the Charioteer, by M. Deslandres. In addition to the nine ultra-violet lines of hydrogen already known, five more have been photographed in the spectrum of a very brilliant prominence, extending up to the oscillation frequency 271,700. They correspond very closely with the frequencies calculated from Balmer's harmonic series. The interest of the discovery is augmented by the circumstance that the spectrum obtained shows a great similarity with that of the new star in the Charioteer.—On the velocity of propagation of the electromagnetic undulations in insulating media, and on Maxwell's relation, by M. R. Blondlot. Given an oscillator, the wave-length which it is susceptible of emitting remains the same, whatever may be the insulating medium in which the experiment is made.—On the heat of formation of permolybdic acid and the permolybdates, by M. E. Péchard.—On crystallized phosphide of mercury, by M. Granger.—On the mineralizing action of ammonium sulphate, by M. T. Klobb.—Micrographic analysis of the alloys, by M. Georges Guillemin.—On homopyrocatechine, and two derived nitrides of homopyrocatechine, by M. H. Cousin.—On a new class of combinations, the metallic nitrides, and on the properties of nitrogen peroxide, by MM. Paul Sabatier and J. B. Senderens.—The specific heat of the atoms and their mechanical constitution, by M. G. Hinrichs. On monopropyl urea and dissymmetrical dipropyl urea, by M. F. Chancel.—On the composition of fossil bones, and the variation in their percentage of fluorine during the various geological periods, by M. Adolphe Carnot.—Distribution and state of the iron in barley, by M. P. Petit.—On the comparative number of nerve fibres of cerebral origin serving as motor nerves for the upper and lower limbs of man respectively, by MM. Paul Blocq and M. J. Onanoff.—On the comparative toxic effects of the metals of the alkalies and of the alkaline earths, by M. Paul Binet.—Experimental regeneration of the sporogenic property of the *Bacillus anthracis*, previously deprived of it by heat, by M. C. Phisalix.—Excretion in the pulmonate gasteropods, by M. L. Cuénot.—On a colourless globuline which possesses a respiratory property, by M. A. B. Griffiths.—On the constitution of the cystoliths and of membranes encrusted with carbonate of lime, by M. Louis Mangin.—On a fresh-water perforating alga, by MM. J. Huber and F. Jadin.—On the causes of the catastrophe of St. Gervais (Haute-Savoie) on July 12, 1892, by MM. J. Vallot and A. Delebecque.—Contribution to the improvement of cultivated plants, by M. Schribaux.—The solar period and the last volcanic eruptions, by M. Ch. V. Zenger.

BERLIN.

**Physiological Society**, July 8.—Prof. Munck, President, in the chair.—Dr. Dessoir spoke on the sense of temperature regarded from the anatomical, psychological, and physiological, point of view. He did not believe in the existence of separate senses for heat and cold since he had failed to obtain sensations of heat and cold by either mechanical or electrical stimulation of certain points of the skin. The temperature sense is localized, since portions of the body-surface can be found which are quite insensitive. The above communication was followed by a lengthy discussion.

July 22.—Prof. Munck, President, in the chair.—Prof. Zuntz had long ago observed that strong muscular exertion has a different effect on the alkalinity of the blood of carnivora as compared with herbivora; thus in dogs the power of their blood to absorb carbon dioxide was practically unaltered by exercise, whereas in rabbits it was considerably lessened. This point had recently been reinvestigated in the speaker's laboratory by Dr. Cohnstein, who found that the blood of a dog at hard work on a treadmill showed no alteration of alkalinity. The result was unaffected by diet, since it was the same when the dog was fed with meat alone, or with rice and fat. During very prolonged exertion the blood was finally found to possess an increased alkalinity. Dr. Lilienfeld had recently discovered Prof. Kossel's "histon" in the leucocytes of blood, united to neuclein as "nucleo-histon." Histon prevents the clotting of blood, whereas nuclein promotes the formation of fibrin. These two facts were regarded as explaining the various phenomena connected with blood clotting. Thus the blood is fluid in the blood vessels because nucleo-histon is retained by the leucocytes. On the other hand, when the blood is shed some of the leucocytes or platelets die, whereupon the nucleo-histon escapes into the plasma, is decomposed by the calcium salts there present into nuclein and histon, and the former (nuclein) then causes clotting. These facts also explain the action of calcium salts in promoting clotting. Prof. Zuntz stated that, according to his researches, a taste-sensation, as of something sweet, is very markedly increased when some other stimulus is simultaneously applied to the organ of taste, even when the stimulus is too weak to alone produce any sensation. Thus, for example, a solution of sugar tastes more sweet if it is mixed with some solution of common salt so weak that it excites no saline taste. The same result was obtained by the addition of a solution of quinine, also too weak to itself give rise to any sensation of taste.

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