

Physiological Chemistry.

Digestion in Birds. By L. PAIRA-MALL (*Pflüger's Archiv*, 1900, 80, 600—627).—In pigeons and hens, during hunger, the gastric cells are laden with granules of ferment or zymogen. These granules are believed to be converted into the enzyme by the acid formed. The amount of pepsin obtainable from the mucous membrane continuously diminishes during digestion, reaching its minimum 6 to 8 hours after the meal. Restoration begins 2 or 3 hours later. The gizzard does not form pepsin. The gullet and crop secrete only mucus. The so-called middle-stomach of crows and magpies forms pepsin in the same way as described above. The histological changes in the cells of the pancreas are similar to those described by Heidenhain in the dog. This gland forms both proteolytic and amylolytic enzymes.

W. D. H.

Peptic Digestion. By EMIL SCHÜTZ and KARL H. HUPPERT (*Pflüger's Archiv*, 1900, 80, 470—526).—The experiments were conducted with egg-albumin freed from globulin; ovo-mucoid is not affected by gastric digestion, or may be removed by boiling with neutral ferric acetate. Determinations, mainly by the polarimeter, were made after digestion with artificial gastric juice of (1) acid-albumin, (2) primary proteoses, (3) secondary proteoses. The results are given in tables, and show the influence of temperature, of the degree of acidity, of the amount of albumin originally taken, of the length of time of digestion, of the volume of the fluid, and of the amount of pepsin on the relative quantities of the three groups of products just mentioned.

W. D. H.

The Bile as a Digestive Juice. By G. G. BRUNO (*Chem. Centr.*, 1900, i, 916; from *Arch. Sci. biol. St. Petersburg*, 7, 87—142).—The flow of bile ceases when the stomach is empty; it begins to flow with the entrance of food into the stomach. Water, proteid, or carbohydrate does not intensify the rate of secretion, but fat does.

The bile contains a proteolytic and a fat-splitting enzyme. It also assists the pancreatic juice in all its activities.

W. D. H.

Secretion of the Pancreas. By A. A. WALTER (*Chem. Centr.*, 1900, i, 916; from *Arch. Sci. biol. St. Petersburg*, 7, 1—86).—The secretion of pancreatic juice in dogs is stimulated by the hydrochloric acid of the stomach, and this largely depends on the appetite of the animal. The amount of secretion runs parallel with the amount of water in the food. Food rich in proteid, carbohydrate and fat calls forth respectively an increase of trypsin, amyllopsin, and steapsin.

High acidity of the gastric is accompanied by high alkalinity of the pancreatic juice. The signal for all these reflex effects is the stimulation of the nerve-endings of the intestinal mucous membrane.

W. D. H.

Metabolism in Horses. By THEODOR PFEIFFER (*Landw. Versuchs-Stat.*, 1900, 54, 101—112. Compare *J. Landw.*, 1890, 38, 258).—A criticism of Zuntz and Lehmann's methods and conclusions (*Abstr.*, 1889, 911; *Landw. Versuchs-Stat.*, 1891, 38, 340; and *Landw. Jahrb.*, 1894, 23, 125, and 1898, 27, *Ergänzungsbd.*, iii). Respiration experiments during short periods furnish data as regards the direction of metabolism under different conditions, but cannot show exactly the absolute extent of the effects of the feeding.

N. H. J. M.

Influence of Extract of Ovaries on the Changes Produced in Nutrition During Pregnancy. By ALBERT CHARRIN and GUILLEMONAT (*Compt. rend.*, 1900, 130, 1787—1789).—During pregnancy, the activity of the organs of nutrition is notably diminished, less oxygen being consumed, and smaller quantities of carbon dioxide and urea eliminated. Injections of extracts of liver, spleen, and muscle do not stimulate these organs to any appreciable extent, whereas the extract of one or two ovaries, obtained by digesting these glands with a dilute solution of glycerol and sodium chloride, has a marked effect in increasing the excretion of urea. This result can only be maintained, however, by repeating the injection at least once in three days.

G. T. M.

Action of Increased Osmotic Pressure on the Ovum. By E. BATAILLON (*Compt. rend.*, 1900, 130, 1480—1482).—By placing the egg-cells of *Petromyzon* in isotonic solutions of salt or sugar, the separation of the blastosphere into its early segmentation spheres is accelerated, and may even result in a complete division, and formation of two embryos. Similar mechanical processes may possibly explain the occurrence of double monsters, or other abnormalities, in the higher animals.

W. D. H.

Relationship between the Nitrogen and Chlorides of the Stomach-contents. By JUSTIN WINTER and FALLOISE (*Compt. rend.*, 1900, 130, 1646—1648).—Attention is drawn to a fixed relationship which exists between the chlorine of the gastric juice and the amount of nitrogenous substances which pass into solution. This ratio is expressed by a mathematical formula.

W. D. H.

Thiocyanate in Human Saliva. By LAFAYETTE B. MENDEL and E. C. SCHNEIDER (*Proc. Amer. Physiol. Soc.*, 1900, vii—viii; *Amer. J. Physiol.*, 4).—The saliva of non-smokers and smokers shows an average of 0.0029 and 0.0134 of potassium thiocyanate per cent. respectively. The parotid saliva is uniformly richer in this substance than the submaxillary saliva.

W. D. H.

Action of Anti-leucocytic Serums on Blood-coagulation. By C. DELEZENNE (*Compt. rend.*, 1900, 130, 1488—1490. Compare this vol., ii, 423).—Further experiments are brought forward to show that certain serums like 'peptone' when injected intra-

venously lead to the liberation of an anti-coagulating substance. The importance of the liver as well as of the leucocytes is insisted on. Probably, when the leucocytes disintegrate, two substances are liberated, one assisting, the other hindering, coagulation of the blood; the former is retained by the liver, the latter remains in the blood.

W. D. H.

Iodine in the Blood. By EUGÈNE GLEY and PAUL BOURCET (*Compt. rend.*, 1900, 130, 1721—1724).—In the blood of the dog, iodine combined with nucleo-proteid is present normally in solution. Its amount, like that of iodine in the thyroid, is variable. In the analyses quoted, the amount of iodine in the thyroid varied from 0.18 to 1.06, and in a litre of blood from 0.013 to 0.11 milligram.

W. D. H.

Artificial Production of Normal Larvæ from Unfertilised Eggs of the Sea Urchin. By JACQUES LOEB (*Amer. J. Physiol.*, 1900, 3, 434—471).—The paper describes in full a large number of experiments which show that the eggs of the sea urchin will develop with somewhat imperfect embryos even though fertilisation has not occurred. To promote this, 'physiologically balanced salt solutions' were used similar to those employed previously in the study of muscular contraction and other vital contractile phenomena.

W. D. H.

Organic Substance of the Shells of *Mytilus* and *Pinna*. By G. WETZEL (*Zeit. physiol. Chem.*, 1900, 29, 386—410).—The organic basis of the shells of *Mytilus* and *Pinna* is mainly conchiolin. On being decomposed by sulphuric acid, it yields tyrosine, leucine, and glycine. The occurrence of phenylaminopropionic acid or other phenyl-amino-acids is not probable. It contains also a 'hexon' nucleus; the yield of bases places it between casein and egg-albumin. The quantity of nitrogen split off as ammonia amounts to 3.47 per cent. of the whole. The organic residue of the mother-of-pearl substance of the mussel shell differs from that obtained from the rest of the shell by a smaller percentage of carbon.

W. D. H.

Mucin. By ISAAC LEVIN (*Amer. J. Physiol.*, 1900, 4, 90—95).—Mucin prepared from connective tissue, when injected into the blood-stream of dogs and rabbits, produces a depressive effect on the central nervous system, which is chiefly shown by a fall of blood-pressure. It is, however, not fatal unless the animal has been previously deprived of its thyroid. Mucinæmia may be one of the pathological conditions resulting from the absence of the thyroid function.

W. D. H.

Chemistry of Paranucleo-compounds. By P. A. LEVENE and C. L. ALSBERG (*Proc. Amer. Physiol. Soc.*, 1900, xi; *Amer. J. Physiol.*, 4).—The ichthulin of the cod-fish egg differs from that described by Walter in its percentage composition and in containing no carbohydrate radicle in its molecule. On treatment with alkalis, both ovotellin and ichthulin yield substances akin to true nucleic acids, but differing from them in the absence of purine bases, and in containing proteid in their molecule. This proteid does not resemble the protamines, as can be concluded by the yield of 'hexon' bases. Iron

enters into the molecule of the paranucleins in a combination probably similar to that of the ethereal acids. W. D. H.

Chemistry of the Lymphatic Glands. By LAFAYETTE B. MENDEL and R. NAKASEKO (*Proc. Amer. Physiol. Soc.*, 1900, xii; *Amer. J. Physiol.*, 4).—In view of a possible compensatory action of the lymphatic glands after splenectomy (an operation which does not lessen uric acid excretion), the Horbaczewski-Spitzer experiments were repeated with these organs. At most, only traces of uric acid were obtained by treatment of 100–300 grams of material. Xanthine bases were found in larger quantity. The glands are rich in nucleic acid, the study of which is being continued. W. D. H.

Urea in Human Milk. By BERNHARD SCHÖNDORFF (*Pflüger's Archiv*, 1900, 81, 42–47).—Polemical. The values for urea in human milk given previously are maintained to be correct, and those given by Camerer and Söldner incorrect, and much too small. W. D. H.

Xanthine Bases in Fæces. By WILLIAM H. PARKER (*Amer. J. Physiol.*, 1900, 4, 83–89).—From experiments on man, it is found that under normal conditions on a diet containing no nuclein there is a constant excretion of combined xanthine bases derived from the cells of the alimentary canal. The amount excreted is about 30 milligrams a day, and is about equal to that which leaves the body by the urine under the same conditions. The amount is nearly doubled with a mixed diet. This increase may not be necessarily due to the nuclein and alloxuric substances in the food, but may arise indirectly from an influence exerted on the processes of metabolism and secretion. W. D. H.

Excretion of Sulphur after Extirpation of the Liver. By S. LANG (*Zeit. physiol. Chem.*, 1900, 29, 305–319).—After the extirpation of the liver in birds, the amount and relationships of the various forms of sulphur in the urine show no noteworthy departure from the normal. The liver plays practically no part in the formation of sulphuric acid from the sulphur of the food. W. D. H.

Albumin in Normal Urine. By A. BELLOCQ (*J. Pharm.*, 1900, [vi], 11, 478–482).—After carefully defining what shall be considered as "normal" urine, the author states that the latter produces a faint turbidity with Tanret's iodo-mercuric reagent in presence of a saturated solution of citric acid. This turbidity, although almost unnoticeable alone, is distinctly visible when compared with the original limpid urine. Finely-divided manganese dioxide carries down from normal urine the whole of its albumin, the latter being recovered as a whitish mucilage; on dissolving the dioxide in a saturated solution of sulphurous acid, adding 30 per cent. of alcohol of 85° containing citric acid, and filtering, ordinary albumin contaminated with uric acid is obtained. W. A. D.

Decrease of Water in the Central Nervous System of the Growing White Rat. By HENRY H. DONALDSON (*Proc. Amer. Physiol. Soc.*, 1900, v—vi; *Amer. J. Physiol.*, 4).—In the spinal cord of rats,

the percentage of water decreases from 85 at birth to 70 in old age; in the brain the numbers respectively are 88 and 77.5. The most rapid stage of loss of water is from the tenth to the fiftieth day of life, the period during which the process of myelination of the nerve fibres is proceeding most rapidly. W. D. H.

Physiological Action of Extracts of Sympathetic Ganglia. By ALLEN CLEGHORN (*J. Boston Soc. Med. Sciences*, 1900, 4, 239—242. Compare Abstr., 1899, ii, 569, and this vol., ii, 423).—The idea that choline is the substance responsible for the fall of blood-pressure produced by the injection of extracts of sympathetic ganglia is combated. The extracts in the present experiments were made with alcohol; this was evaporated off, and the residue dissolved in saline solution. Choline is admittedly present, but after the removal of choline by platinic chloride and filtering, the filtrate was evaporated to dryness, and the residue extracted with saline solution. Injection of this still produced a fall of blood-pressure. Moreover, it is stated that the depressor effect of the ganglionic extract is not abolished by atropine. W. D. H.

The Anti-rennin of Serum in Pathological Conditions. By CH. ACHARD and A. CLERC (*Compt. rend.*, 1900, 130, 1727—1729).—Previous observers have shown that normal blood-serum contains some substance which hinders the action of rennin on milk. In the present research, thirty-four human serums from various cases of disease were examined, with the general result that the anti-rennin substance diminishes in grave pathological disorders. W. D. H.

Analysis of the Liquid contained in a Mesenteric Cyst. By A. RICHAUD and R. BONNEAU (*J. Pharm.*, 1900, [vi], 11, 535—541).—The liquid had a sp. gr. 1.025, an alkaline reaction, and did not deposit fibrin after 18 hours; it contained 94.14 per cent. of water, 4.15 per cent. of proteid material (precipitated by alcohol acidified with acetic acid), 0.45 per cent. of fat, 0.77 per cent. of extractives, and gave a solid residue of 5.86 per cent., and 0.49 per cent. of ash. The ash contained sulphates, chlorides, and carbonates, but no phosphates. On adding an excess of alcohol of 95°, a viscous, fibrous mass of proteids was precipitated; this mass shared the character of both the true and the pseudo-mucins, since on heating with dilute sulphuric acid for 1 hour at 115—120° it yielded a substance having reducing properties (reaction of true mucin), and yet on peptic digestion gave an ash rich in phosphorus (characteristic of pseudo-mucin). Finally, it is noteworthy that the secretion contained only minute quantities of serin, globulin, or casein. W. A. D.

Action of Diphtheria Toxin on the Motor Cells of the Spinal Cord. By H. RAINY (*J. Pathol. and Bacteriol.*, 1900, 6, 435—458).—Diphtheritic paralysis is associated, not only with changes in peripheral nerves, but also with alterations in the cord itself, namely, moderate chromatolysis and vacuolation of the protoplasm of the motor cells. W. D. H.

Diphtheritic Paralysis and Antitoxin. By F. RANSOM (*J. Pathol. and Bacteriol.*, 1900, 6, 397—414).—Experiments on animals

show that with suitable doses, the administration of antitoxin prevents the development of paralysis caused by the diphtheritic toxin.

W. D. H.

The Lymph after Intravenous Injection of Tetanus Toxin and Antitoxin. By F. RANSOM (*Zeit. physiol. Chem.*, 1900, 29, 349—372).—After the injection of the tetanus poison into the bloodstream, an important part of it passes rapidly into the lymph, and after 26 hours, the amounts in blood and lymph are about equal. If the thoracic duct is opened before the injection of the toxin, so that the lymph drains away, the toxic value of the blood remains, for at least 6 hours, higher than that of the lymph. Much the same is true for the antitoxic horse-serum, except that even 68 hours after the injection the blood still contains more antitoxin than the lymph. The toxin thus behaves like an inorganic constituent, and the antitoxin like a proteid constituent of the blood-lymph system.

W. D. H.

Interaction of Toxin and Antitoxin. By WALTER MYERS (*J. Pathol. and Bacteriol.*, 1900, 6, 415—434).—In cobra venom there are two poisons, one, *cobralysin*, acts hæmolytically, the other, *cobraneurin*, causes death by its action on the respiratory centre. The present paper relates principally to the first, and to the methods by means of which it may be estimated physiologically, and the amount of anti-venene necessary to neutralise it. Ehrlich's methods appear to have guided the experiments, and the formation of toxoids is confirmed. This combines with antitoxin, but does not act on the blood corpuscles.

W. D. H.

Use of Alkaline Solutions in Surgical Shock. By WILLIAM H. HOWELL (*Proc. Amer. Physiol. Soc.*, 1900, xiv—xv; *Amer. J. Physiol.*, 4).—Conditions of shock in animals produced, for instance, by operations on the brain, are associated with heart failure and fall of blood pressure. This can be largely counteracted by the injection of 0·5 per cent. solution of sodium carbonate into the veins or into the rectum. If injection is made into the veins, care must be taken to use a moderate amount of solution, not more than sufficient to raise the alkalinity of the blood by 0·1 to 0·2 per cent. Rectal injections are safer. 'Shock-blood' contains no poisonous substances.

W. D. H.

Action of Phloridzin on Muscle. By FREDERIC S. LEE and C. C. HARROLD (*Proc. Amer. Physiol. Soc.*, 1900, ix—x; *Amer. J. Physiol.*, 4).—One gram of phloridzin was injected three times daily for two to four days into fasting cats. The course of fatigue in the *tibialis anticus* muscle was then studied, when the animals were killed. Instead of giving 800 to 1000 contractions, it gives only 200 to 400, and the curves obtained resemble those obtained in the last stages of normal fatigue. This is due to removal of carbohydrates; subsequent injection of dextrose largely restores the muscle. Phloridzinised muscle rapidly goes into rigor.

W. D. H.

Influence of Phloridzin Diabetes on Lactation. By GRAHAM LUSK (*Proc. Amer. Physiol. Soc.*, 1900, xi; *Amer. J. Physiol.*, 4).—In fasting goats, phloridzin diabetes stops milk formation. This is

probably the result of the diabetes, and not of the specific action of phloridzin on the gland. In sugar elimination, the fasting goat resembles the rabbit, since in the urine the ratio of dextrose to nitrogen is 2·8 to 1.

W. D. H.

Toxicity of Urine. By ALBERT CHARRIN (*Compt. rend.*, 1900, 130, 1724—1726).—Support is given to Bouchard's views of auto-intoxication, and that the toxicity of urine is, at any rate in part, due to products of katabolism.

W. D. H.

Action on the Heart of Toxic Products of the Typhoid Bacillus. By GEORGE T. KEMP and MISS S. L. DEWEY (*Proc. Amer. Physiol. Soc.*, 1900, viii—ix; *Amer. J. Physiol.*, 4).—The culture medium used was alkali-albumin prepared from egg white *plus* Ringer's solution in the proportion 1 : 10. This has no action on the heart. The cultures of the typhoid bacillus were filtered, and tested on terrapins' hearts. The heart is gradually weakened without being slowed, and it finally stops in diastole. If the poison has not acted too long, the heart can be revived by Ringer's solution. This property is associated with the presence of proteid (albumin or globulin); the alcoholic filtrate, which is proteid-free, when evaporated to dryness and dissolved in Ringer's solution, increases the strength of the heart-beat without affecting the rate; the proteid precipitate, dissolved in the same solution, gives the same effect on the heart as the culture, but is somewhat less powerful.

W. D. H.

Combination of Nucleins with Metallic Compounds, Alkaloids, and Toxins. By H. STASSANO (*Compt. rend.*, 1900, 131, 72—74).—Ammonium hydrosulphide has no immediate action on mercury and arsenic contained in the nuclein derived from animals poisoned with compounds of these metals. The mercury may be eliminated by electrolysis, but less rapidly than from solutions of its salts, and the separation is accompanied by the destruction of the nuclein by the electric current. An aqueous solution of hæmatoxylin, which is rendered turbid by mercuric chloride dissolved in water or serum, remains unaltered in nuclein solutions containing mercury. These results indicate that the metallic radicles are actually in combination with the nuclein.

Morphine and strychnine can be rapidly extracted by ether from alkaline mixtures of the nucleins; the alkaloids are also liberated by electrolysis, the action being attended by the decomposition of the nuclein. The separation of nucleins from animal tissues by peptic digestion requires two days, whereas the nucleo-albumins can be isolated in one hour; the alkaloids may be eliminated from the latter substances quite as readily as from the former.

The nucleo-albumins prepared from the liver, spleen, and kidneys of dogs poisoned with ricin or tetanin are subjected to the action of a feeble electric current until the decomposition of the nuclein compounds is complete. The toxin and proteids are then precipitated together by alcohol, and from the precipitate the base is extracted with brine.

G. T. M.