While in South Africa Koch has studied horse-sickness, and in a recent report on his work he speaks of "encouraging results which . . . impress me with the conviction that a practical method of protective inoculation against Horse-sickness is within our reach." A serum has been prepared which has slight curative but high protective properties. Unfortunately, the immunity conferred by the serum lasts only for some fifteen days, so that a horse cannot be "salted" by inoculation, and to be safe from an attack the animal must have already had horse-sickness in some form. The "practical method" which Koch proposes consists in producing horse-sickness by an injection of virus, and then arresting its progress by injections of the protective serum before it becomes dangerous. The method has been practised successfully on more than a dozen animals. As the result of his experiments Koch recommends the following treatment:—Seven injections of virus at intervals of twelve days, the doses increasing from 0.01 c.c. to 5 c.c. Four days after each of the first three injections of virus, doses of 100 c.c., 50 c.c., and 50 c.c. of protective serum to be given. The injections of both virus and serum are made subcutaneously in the neck.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The Frank Smart studentship in botany has been awarded to Mr. A. M. Smith, of Emmanuel College.

Mr. E. R. Burdon, of Sidney Sussex College, has been appointed assistant curator of the botanical museum.

Science announces the resignation of Prof. G. Trumbull Ladd as head of the department of mental philosophy and metaphysics of Yale University.

LORD STRATHCONA has given 4000*l.* to the scientific department of the Manitoba University. A block of land sufficient to yield a large annual income is also to be placed at the university's disposal.

THE chair of chemistry in University College, Sheffield, has been accepted by Dr. W. P. Wynne, F.R.S., at present professor of chemistry in the School of Pharmacy of the Pharmaceutical Society of Great Britain.

DR. C. SCHUCHERT, of the U.S. National Museum, has been appointed professor of historical geology in the Sheffield Scientific School of Yale University, and curator of the geological collections in succession to the late Prof. Beecher.

THE "Year-book" for the session 1904–5 of the Armour Institute of Technology, Chicago, a copy of which has reached us, contains full particulars of the course in fire protection engineering instituted last year. The course is arranged to furnish instruction in modern methods of fire prevention and extinction. Since fire insurance interests are closely connected with the work of the course, a portion of the time of senior students is devoted to the study of modern practice of fire underwriting. Prof. Taylor, who is in charge of this department of the institute, has rightly given great prominence in his syllabus to the scientific principles upon which successful work in fire extinction depends.

THE consultative committee to the Board of Education has submitted a number of suggestions to the board for a system of school certificates. The committee is of opinion that, with the object of diminishing the multiplicity of examinations affecting secondary schools, and of providing a test of adequate general education which may be widely accepted, a general system of school certificates is desirable. The committee does not think it is desirable that examinations for such certificates should be conducted by means of papers set for the whole country from a single central organisation. It suggests that such examinations should be controlled by a recognised examining body, which should be either a university or a combination of universities, or an examination board representative of a university or universities, and of the local authorities which are prepared to cooperate with them. It proposes that recognition of these examining bodies should mean recognition by the Board of Education, acting on the advice of the consultative committee. The establishment is suggested of a central board for England consisting of representatives from the Board of Education and from the different examining bodies, the duty of which should be to coordinate and control the standards of these examinations, to secure the interchangeability of certificates, and to consider and, as far as possible, to adjust the relations of the examining bodies and their spheres of external action. There can be little doubt that some such plan as the consultative committee proposes would enable schoolmasters to utilise in the better education of their boys much of the time now absorbed by the preparation for numerous special examinations.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, July 11.—M. Mascart in the chair.—Thermochemical investigation of the solution and polymerisation of cyanogen: M. **Berthelot.** Potassium cyanide has considerable thermal effect on a solution of cyanogen whether in water or alcohol.—Note on the heat of transformation of black crystalline sulphide of antimony into the orange coloured precipitate: M. **Berthelot.**—Condensation of glycol bromoacetate with acetoacetic and acetone dicarboxylic esters: A. **Haller** and F. **March.**—Origin in food of the arsenic normally found in man: Armand **Gautier** and P. **Clausmann.** Practically all food materials, particularly fish, contain traces of arsenic, the total arsenic received by an average man in a year being 7·66 mg.—The relation between external work and total expenditure of energy in a muscle in dynamic contraction, when the muscle is doing negative work, against the fall of a load, by gradually elongating as the load falls: A. **Chauveau.** It is concluded that the expenditure of energy is greater in negative work than in fixed contraction, but less than in positive work under the same conditions of load, stimulus, &c., and that in negative work the expenditure of energy increases more rapidly, when the work is increased by increase of load, than by increase of movement.—Note on a new method of observing *n*-rays: R. **Blondlot.**—Analysis of the ashes contained in the urns of Materpa (Thebes, eighteenth dynasty): MM. **Lortet** and **Hugoumenq.**—Regulation of watches at sea by wireless telegraphy: J. A. **Normand.**—The academy appointed MM. Mascart, Troost, Moissan, Guyon, and Lacroix to assist at the inauguration of the Pasteur monument in Paris.—Two problems on isothermic surfaces: L. **Raffy.**—Explosion waves: E. **Jonguet.**—Kathode rays and magnetofriction; reply to Villard: H. **Pellat.**—Note on the refractive indices of solutions: Edmond **Van Aubel.**—The relation between the pressure of a gas in a vacuous tube and the length of the spark produced: Gaston **Séguy.** As the pressure decreases in geometric progression the length of the spark increases in arithmetic progression.—The densities of sulphurous anhydride and of oxygen: Adrien **Jaquerod** and Alexandre **Pintza.** Morley's method of weighing the gas by the loss in weight of the generating apparatus was used with concordant results in the case of sulphurous anhydride.—The heat of combustion of organic sulphur compounds, and a note on that of compounds containing halogens: P. **Lemoult.** Results of experiments are compared with those obtained by calculation according to the position of the sulphur.—Reactions of the esters of 2 : 3-butanonic acid. (1) Action of phenyl hydrazine: L. **Bouveault** and A. **Wahl.** The phenyl hydrazone obtained in the cold is proved to be that in the 2-position by the formation of the paranitrophenyl hydrazone of methyl phenyl acetopyrazolone previously obtained by Bülow.—Researches in the pyrane series: E. **Blaise** and H. **Gault.**—On some phenolic ethers of the pseudo allyl chain $R—C(CH_3)=CH_2$: MM. **Behal** and **Tiffeneau.** These bodies are obtained by the magnesium methiodide reaction on the corresponding esters, using one or two molecules in excess of the magnesium methiodide, and are intermediate between the corresponding allyl and isoallyl compounds in boiling point, density, and refractive index.—Action of traces of some salts, and of caustic alkalis on diphenyl carbonic ester: R. **Fosse.**—Mechanism of the action of the cytoplasm in seeds during germination, and the synthetic realisation of this mechanism *in vitro*: Maurice **Nicloux.** The development of acid in oily seeds, when

germinating, is proved to be due to the hydrolytic action of the cytoplasm on the oil. The name *lipaséidine* is proposed for the active substance in the cytoplasm. The action requires some acid to start it, but CO_2 is proved by experiment *in vitro* to be sufficient, and CO_2 is produced in germination.—A new trypanosome in birds: M. **Thiroux.**—Some phenomena during ovogenesis among the cirripedes, particularly in *Scalpellum velutinum*: A. **Gruvel.**—On the structure of the heart in gasteropods and lamellibranchs: F. **Marceau.**—On the development of black rot (*Guignardia Bidwellii*): P. **Viala** and P. **Pacottet.** For rapid development black rot requires a warm temperature and a moist atmosphere, but at low temperatures growth proceeds slowly. It is, moreover, highly resistant towards acids and toxic substances generally.—Garéwaite, a new fibrous basic rock of the North Urals: L. **Duparc** and F. **Pearce.**—Stationary waves observed in the neighbourhood of the human body: Augustin **Charpentier.**—Localisation of iodine in the African turtle: MM. **Doyon** and **Chenu.**—Action of salts of the alkaline earths on living substance: N. C. **Paulesco.**—Influence of sterilisation on food-stuffs: A. **Charrin.**—On the contractility of protoplasm, i., action of chlorhydrate of amyleine on ciliary movement: L. **Launoy.**—On the supposed chlorophyll of silk: Jules **Villard.**

July 18.—M. Mascart in the chair.—Experiments on the slow oxidation of cyanogen and cyanides by free oxygen: M. **Berthelot.** The absorption of oxygen from air by the following solutions is examined:—potassium cyanide, hydrocyanic acid, and cyanogen in water and in alcohol, alcohol alone, and alcoholic potash, also by these solutions in the presence of mercury. Absorption of oxygen is observed in every case, but becomes more rapid when the tube is heated or exposed to light. When mercury is present, the absorption of oxygen causes solution of some mercury, particularly with the cyanides.—The natural immunity of cynocephales towards trypanosomiases, and the activity of their serum towards trypanosomes: A. **Laveran.**—Hypsometric tables of Cretaceous strata in the north of France: J. **Gosselet.**—Pamphlets presented to the academy:—Considerations on the principles of arithmetic: L. **Gros.**—Researches on the quantity of citric acid in wines: Lucien **Robin.**—A work on tables of corrections of the times of the moon's rising and setting: S. **Abdullah.**—A supplement to the general problems of flight: M. **Averly.**—The secretary read several telegrams concerning the earthquakes of July 12 and 13.—Steered balloons. Longitudinal stability: Ch. **Renard.**—On the anomalous propagation of light in the neighbourhood of a focal line, and on the interference of vibrations the amplitudes of which are different functions of the distance: G. **Sagnac.**—On the disappearance of some of the silicon lines in the spectra of certain stars: A. **de Gramont.**—Variation of the index of refraction of an electrolyte under the action of the current: H. **Bordier.** Chlorides of copper and of zinc were used. It was found that, when the current is constant, the reduction of index of refraction decreases with increase in the concentration of the electrolyte, whilst, when the concentration is constant, the decrease of refractive index plotted in a curve against the strength of the current forms a straight line.—The influence of the density of the current in electrolysis with alternating current: André **Brochet** and Joseph **Petit.** Nickel electrodes in a solution of potassium cyanide were used, and the relation between the amount of nickel dissolved and the density of the current investigated for different frequencies, when the time and total current were constant.—On the fundamental law of the phenomena of osmosis: E. **Ariès.**—On the constitution of dissolved salts: Albert **Colson.** The formula

$$HSO_4Zn—O—Zn—SO_4H$$

is assigned to zinc sulphate from considerations of the basic sulphates obtained by alkalis, and of the freezing point of solutions of zinc sulphate.—On some crystalline iodates of copper: A. **Granger** and A. **de Schulten.**—Dextrolactic acid and lævolactic acid are not alike in their reactions: E. **Jungfleisch.** *l*-Lactic is much more easily racemised than *d*-lactic, so much so that in separating *d*- and *l*- from *in*-lactic by the quinine salts, *d*-lactic is easily obtained, but the supposed *l*-lactic is mainly $d+l$.—Orthophosphoric anilide and its homologues; the non-existence of the compound $C_6H_5NH—P\equiv(NC_6H_5)_2$: P. **Lemoult.**—Condensation of acetylene ketones with alcohols and phenols: Ch. **Moureu** and M. **Brachin.**—Action of oxalacetic ester on benzaldehyde in the presence of primary amines: L. J. **Simon** and A. **Conduché.**—The heat of neutralisation and acidity of monomethylarsenious acid: A. **Astruc** and E. **Baud.**—On a frequent source of error in the analysis of coal: Just **Alix** and Isidore **Bay.**—On some points in the anatomy of the cirripedes: A. **Gruvel.**—Antimeridian plants: Édouard **de Janczewski.**—Carpellised stamens of the wallflower: C. **Gerber.**—Bravais's law considered as a law of observation: G. **Friedel.**—A new theory of ouralitisation: L. **Duparc** and Th. **Hornung.**—On the terraces of the Carpathian rivers in Roumania: E. **de Martonne.**—Researches on the genital poisons of different animals: Gustave **Loisel.** The extract of an ovary is always more poisonous than that of a testis, and varies in different animals, that of the frog being most poisonous towards a rabbit. The toxic effect is nervous, producing tetanus and dyspnœa.—The influence of lactation on the resistance of the organism to morbid agencies: MM. **Charrin** and **Vitry.** A female in lactation is less resistant than the normal to alkaloids and bacteria.—The mechanical cleansing of the blood: Ch. **Répin.** To remove poisonous substances from the blood a method is used by which the plasma is removed, being replaced by artificial serum, but the corpuscles, being separated centrifugally, are immediately returned to the blood stream.—Researches on arsenic in some food-stuffs: V. **Bordas.**—A new contribution to the bacterial purification of spring and river waters by means of fine sand, which is not submerged: P. **Miquel** and H. **Mouchet.**—On the duration of the experiments in the treatment of arterial hypertension by d'Arsonvalisation: A. **Moutier.**—On a new type of piezometer: M. **Buchanan.**—The Hirondelle deep in the archipelago of the Azores: M. **Thoulet.**

CONTENTS.