But these bodies, perhaps from their simple structure, appear to be adapted to attack all parts of the animal organisation, and they are apt to affect the nervous system and circulation. In order to avoid these disadvantages, various attempts have been made to obtain bodies of a similar but more complicated structure, which should have a more specialised action, and would lower the temperature while leaving the nervous system and circulation unaffected. These attempts have been more or less successful, and we owe to them the introduction of three new remedies—kairin, thallin, and antipyrin. The former two, after a brief period of trial, have been found more or less unsatisfactory; but the latter is perhaps, upon the whole, the best antipyretic that we possess, reducing the temperature and, at the same time, having few disadvantages. Salicylate of soda is nearly allied in chemical constitution to resorcin, and as a general antipyretic it is almost equal to antipyrin, and superior to it in cases of rheumatic fever. It is possible that we may still obtain antipyretics more powerful than any we yet possess, and specially adapted to the febrile conditions arising from different causes, for these antipyretics do not appear to be equally successful in different kinds of fever. Antipyrin is best in hectic fever, and salicylate of soda in rheumatic fever, but an antipyretic which will be thoroughly satisfactory in typhoid fever is still a desideratum.

I have said that antipyrin is generally free from any disagreeable action; but this is not always so, for it sometimes may produce collapse. This shows us that in the action of all our drugs we have two factors to consider, namely, the drug itself and the body into which we introduce it. We have just been considering the alterations in physiological action which may be produced by changes in the chemical constitution of our drugs; but there is another factor which is perhaps more difficult to investigate, and still more important in the treatment of disease, namely, the condition of our patients. The failure of our drugs to produce the effects we desire is one of the most trying occurrences in medical practice. Thus, in fever, we sometimes find that drugs will not reduce the pulse as they do in non-febrile conditions, and digitalis in pneumonia sometimes appears to have lost its sedative action on the heart altogether. Some years ago I thought that possibly this might be due to the high temperature producing paralysis of the nervous apparatus which restrains the heart, and supposed that the peripheral ends of the vagus in the heart might be paralysed. I then made some experiments, which showed that I was wrong in this supposition. Several years afterwards my friend Dr. Cash and I made some further experiments, which showed that the failure of digitalis to slow the heart in febrile conditions is really due to paralysis of the regulating nerves of the heart; but the part of them which is paralysed by the heat is their roots in the medulla, and not their endings in the heart.

In other experiments which we made together we found that the muscle of a frog poisoned by barium could be restored to its normal condition by a high temperature, and also by the application of potash salts. It occurred to us that, if we could saturate the body of an animal with potassium, we should be able to render it proof against the poisonous action of barium. On trying this, we succeeded in rendering animals so far resistant to the action of the poison that they were alive and well after animals of similar size, but unprotected, had succumbed to the action of the same dose of poison, although we did not succeed in ultimately saving the animals.

But Dr. Cash has pursued this line of investigation far beyond the limits of our mutual research, and he has obtained results which seem to me to be amongst the most extraordinary and the most promising in pharmacology. Knowing, as he did, that corrosive sublimate was an exceedingly powerful disinfectant, it occurred to him that it might be more harmful to disease-germs than to the bodies of higher animals, and that he might be able, by the introduction of the poison into the body of an animal, to render it insusceptible to zymotic diseases. A similar idea had occurred to Koch, who injected corrosive sublimate into animals after previously inoculating them with anthrax; but his experiments failed, while Cash has proved successful by introducing the corrosive sublimate before inoculating with anthrax, and thus giving the drug the start of the disease. These experiments acquire an additional interest from the fact that M. Pasteur, although uncertain regarding the exact mode in which his process of inoculation for hydrophobia has brought about such satisfactory results, is disposed to think that the agent which prevents the disease is a chemical substance, and not a microbe.

When we look back for twenty years and see how far pharmacology has advanced since Crum Brown and Fraser's experiments directed it into a new path, we may hope that twenty years more may not only have greatly added to our stock of new remedies, but will have enabled us so to ascertain the condition of our patients that, either by the proper modification of a single remedy, by the proper admixture of remedies, or by proper changes in the food or surroundings of each patient, we may insure the action we desire, and we shall not have to feel, as we painfully do at the present, that our patients often die for lack of knowledge, not on our part, but on that of our art.

Nothing is more painful to a medical man than having to answer in the negative the agonised appeal, "Oh, doctor, can you do nothing?" of those who see passing away friends who are dearer to them than their own life. It is because we medical men know the value of human life and the extent of human suffering; because we are called upon to prolong the lives of those whom not only their friends but their country and the world at large can ill spare; because we must, if possible, relieve pain sometimes amounting to extreme torture in the sufferers themselves, and felt hardly less keenly by their friends, that we consider it is not only permissible, but is our imperative duty to gain the knowledge we require to attain our object, even though we sacrifice the lives of animals, and inflict upon them some pain—never wantonly, never carelessly, and almost always slight in comparison with what we often see our patients feel. Moreover, the lower animals suffer from disease as well as men, and we may hope that the advance of pharmacology will give us the means of relieving pain and prolonging life in them as well as in man.

SCIENTIFIC SERIALS

Journal de Physique, June.—P. Garbe, experimental researches on radiation. Examination of the formulæ proposed by Dulong and Petit, by E. Becquerel, by Violle, and by Stefan. The author holds Stefan's law to be true for absolutely black bodies only. The verifications have been made by spectrophotometric measures of glow-lamps fed from accumulators.—G. Wyrouboff, the structure of crystalline bodies endowed with rotatory power. This is a remarkable paper, traversing several conclusions hitherto believed to be proven. The author states that the alleged necessary and constant relation between rotatory power and the existence of facets indicating non-superposable hemihedry is untrue, for of eighteen such substances known, only four have been proved to have such facets, while the nitrates of lead and of baryta which are cubic with facets of this kind have no rotatory power. The author now propounds the view, which he supports by the discovery of striated structures upon the facets in question and by various strong arguments, that the real physical cause of this rotatory power is that such crystals consist of superposed laminæ crossing at different angles, and possessing biaxial refraction. In fact, he holds that these substances are only pseudo-symmetrical, and that the built-up mica plates of Reusch which show rotatory power are actual types of the phenomenon in general. He particularly refers to the optical behaviour of amethyst, and further declares that he has succeeded in proving that the true crystalline form of sulphate of quinine is clinorhombic. He regards as absolutely illusory, in the vast majority of cases, the so-called measurement of the angle of rotation by these substances.—L. Laurent, practical methods for the execution of objectives intended for instrume of precision. This paper describes means for testing dur process of manufacture the curvatures, &c., of lenses intend for spectroscopes, goniometers, and such instruments.—Th. and A. Duboscq, saccharimeter for white light. This saccharimeter has a Senarmont polariscope placed between the polariser and analyser. The Senarmont polariscope consists of four wedges of quartz disposed so as to show two fringes with black central band, which in the dark field are situated exactly in line with one another. On introducing any substance that rotates the plane of polarisation, the fringes move right and left. A quartz compensator is added.—J. Voisenat, influence of nature and form of conductors upon the self-induction of an electric current. A summary of the recent papers of Hughes and H. F. Weber.—K. Ångström, on the diffusion of radiant heat from plane surfaces.—Ch. Soret, researches on the refraction and the dispersion of the crystallised alums.—E. Wartmann, the compensated rheolyser. This instrument consists of a circular modification of Wheatstone's bridge with mercurial conductors.—R. Pictet,

new freezing-machines. Notes on industrial applications of a new liquid, namely a mixture of sulphurous acid and carbonic acid obtained on the commercial scale by the action of sulphuric acid on carbon.—J. Maurer, influence of altitude on diurnal variations of declination.—H. Schneebeli, absolute value of coefficient of friction of air. The results, which agree with Obermeyer, were made by Graham's method.—H. Schneebeli, experimental researches on the impact of elastic bodies.

Bulletins de la Société d'Anthropologie de Paris, tome ix. fasc. 2.—Continuation of M. Topinard's paper on the cephalic index. In his revised system of nomenclature M. Topinard virtually rejects Broca's method in favour of the quintuple division adopted by Prof. Flower, and generally followed by English and American anthropologists. For his old terms of "*sus*" and "*sous*" he further adopts those of "ultra" and "hyper." Thus, for example, while he considers that the true dolichocephalic group is represented by the index of 70-74 inclusive, his ultra- and hyper-dolicho- subdivisions exhibit respectively the indices of 60-64 and 65-69. The medium group standing between the dolicho- and the brachy-cephalic limits he characterises as "mesaticephalic," with an index of 75-79 inclusive; while his brachycephalic divisions range from 80, beginning with the mean representatives of the groups, to 94 as the extreme limit of the ultra-brachycephalic index.—At a later meeting, M. Topinard drew attention to the necessity for using greater exactitude in the definition of the methods to be employed in making anthropometric determinations, those of M. Bertillon as set down in his instructions regarding anthropometric identification being, in his opinion, at once complex and inexact.—On the so-called "Lenape" stone, by M. de Nadaillac, whose opinion of the possible genuineness of the stone is, as he informs us, based only on the testimony of others.—On the occurrence of amber in the prehistoric graves of the Département des Basses Alpes, by M. Bonnemère. These finds were formerly so frequent that the peasants in some districts used amber for lighting their dwellings, and hence it was locally known as "peïra cremarela," or burning stone. This name is still applied to it at Salignac, where many of the villagers are in possession of amber, all of which is more or less red in colour.—At a later meeting, M. Bonnemère described to the Society some curious bronze disks found by M. Ollivier in graves near Salignac, and which appear to have been used to strengthen the outer surface of cuirasses and other forms of protective armour. In a cemetery in Carniola, belonging to the early Iron Age, a helmet has been found composed of similar bronze knobs fastened in rows to an inner skin lining.—Anthropology and philology, by M. Beauregard. The object of the writer is to show the importance of the comparative study of languages to determine the usages, and moral and mental status of various nations. He specially passes in review the languages of Egypt and South Africa, Mexico, Peru, and the Red Indians, indulging in many fanciful deductions regarding assumed ethnic affinities.—On the origin of life, by M. Fauvelle. The author believes that modern science justifies the theory that the simplest forms of green Algæ represent the earliest manifestations of organised beings, in which chlorophyll was the active agent.—On impregnation, and the influence exercised on subsequent offspring by the first conception, by M. Fauvelle.—On the effects of long and short periods of military service in the French army on the health and physical development of the men, by M. Lagneau.—On the origin of the fabrication of glass, by M. Mortillet.—Morphological description of the brain of Gambetta, by MM. Chudzinski and Mathias Duval. This extremely minute report of the *post-mortem* examination, undertaken at the instance of the Society, is illustrated by numerous sectional drawings of the various convolutions, which exhibit a remarkable degree of complexity, and an unusual regularity in the arrangement of the folds.—M. Beauregard laid before the Society various objects obtained from the Gauchos of the Pampas, including the curious "botas de potro," or boots made from the skin of the hind legs of horses, mules, or oxen.—On the exploration of the tumulus of Kergouret at Carnac, in 1885, by M. Gaillard. A few implements and a diorite hatchet are almost the only finds yielded by the recent explorations of these dolmens, which were nearly destroyed, and their contents almost wholly removed at the time of their original discovery about twenty years ago.—Report, by M. Hamy, of the results of the explorations, conducted by M. Charney, in the mountainous region of Popocatapetl, in Mexico. Unusual interest attaches to these researches, which have brought to light the existence of two ancient Mexican cemeteries, in one of which the remains belonged exclusively to young children. Among the numerous fragments of bones were a great mass of broken jars and vases decorated with various emblems of the divinities Chalchiutlicue and Tlaloc, to the latter of whom young children were sacrificed on high places to secure rain.

Bulletin de l'Académie Royale de Belgique, June.—On the origin of the phosphate of lime in the brown chalk phosphatic beds of Ciply, by F. L. Cornet. These beds, which have a mean thickness of 21 metres, and about 18 per cent. of phosphate, are shown to be undoubtedly of animal origin, as attested by the large proportion of nitrous organic substances contained in them. The brown chalk appears to have been deposited in a shallow sea inhabited by a numerous fauna of invertebrates, fishes, and large Saurians. The deposits were slowly formed in tranquil waters during a long geological epoch, as shown by the great thickness of the phosphatic beds, the perfect regularity of the layers, and the state of the fossil shells found in them. These deposits, which occur nowhere else, may have been caused by the periodical destruction of fish, such as at present occurs annually in the Gulf of Aden.—Note on the parallelism between the Carboniferous Limestone of North-West England and Belgium, by L. G. de Koninck. It is pointed out that the synchronism of these various systems is far from being fully established. The Tournai formation would appear to be older than the English fossiliferous mountain limestone, while the Visé rocks may be contemporary of the Yoredale series. On the other hand, the zone of *Productus giganteus* seems to have acquired a far greater development in the north of England than in Belgium.—Remarks on the law regulating the tension of fluids, by P. de Heen. The formula recently announced by the author is here shown to apply not only to stable fluids, but also to those whose physical constitution varies with the temperature.

SOCIETIES AND ACADEMIES

SYDNEY

Linnean Society of New South Wales, June 30.—Prof. W. J. Stephens, F.G.S., President, in the chair.—The following papers were read:—Note on *Ctenodax wilkinsoni*, by William Macleay, F.L.S. It is here explained that the fish described by Mr. Macleay under the above name has been a certained by Dr. Ramsay, of the Australian Museum, to be closely allied to *Tetragonurus cuvieri*, of Risso. Some remarks are also made on the habits and affinities of the fish.—Notes on the recent eruptions in the Taupo Zone, New Zealand, by Prof. Stephens, M.A., F.G.S. In this note the author gives particulars of the late volcanic disturbances, and such information as to the geographical and geological features of the district, as may perhaps enable those living at a distance to understand more clearly the accounts of the recent outbreak which have already appeared in the newspapers.—Notes on Australian earthworms, Part I., by J. J. Fletcher, M.A., B.Sc. Up to the present time but three Australian earthworms have been described, *Lumbricus novæ-hollandiæ*, Kinberg, and *Digaster lumbricoides*, Perrier, from N.S.W., and *Megascolides australis*, McCoy, from Victoria. In this paper a fuller account is given of Kinberg's species, and descriptions are given of six new or undescribed worms from the rich volcanic soil of Burrawang and of Mt. Wilson. Of these, two species (*P. coxii* and *P. australis*) are referred to Schmarda's genus *Perichæta;* two others (*N. camdenensis* and *N. grandis*, are included in a new *intraclitellian* genus *Notoscolex;* a fifth (*Didymogaster silvaticus*) also is *intraclitellian*, but differs from *Notoscolex;* and the sixth (*Cryptodrilus*) is *postclitellian*, with eight rows of setæ, but is different from *Digaster*. Three of these, as far as is known at present, occur only at Burrawang, one at Mt. Wilson only, one is common to both localities as well as Sydney, and one occurs at Burrawang, Springwood, and Jervis Bay. Mr. Fletcher has heard of the occurrence of worms, some of them very large, in the Hunter and Manning River districts, and probably these, as well as Illawarra, the Richmond and Clarence districts, and other parts of the colony will yield, when systematically searched, a good harvest of earthworms. He therefore appeals to the members of the Society resident in these or other localities, either for information or for specimens put alive into good methylated spirit, or sent alive packed in a tin box or large bottle, with a little earth and plenty of damp moss. Information as to the existence or otherwise of earthworms in