

different kinds. Argand employs the following classification—the particular examples quoted belong to the Alpine Cycle :

(1) Deformation of thick comparatively unconsolidated marine sediments. This gives rise to *coastal chains*, such as girdle the Pacific Ocean, and to *geosynclinal chains* (generally double), represented by the great series that reaches from the Himalayas, by way of Persia, Anatolia, and Greece, through the Carpathians and Alps, and so into Spain. The Indo-African-Eurasian geosynclinal series unites with the Asiatic coastal series in the Malay Archipelago.

(2) Continental deformations that affect the foundations and cover of continental areas. The foundations of a continent consist of sediments compacted by some early cycle of mountain building (along with batholithic intrusions). The cover is the veneer of relatively unconsolidated sediments locally deposited on the foundations in epicontinental seas, fresh-water lakes, etc. *Foundation folds*, or *plis de fond*, may reach from any depth up to the surface. Where cover exists, it may be bent along with the foundation, and so give rise to one type of *cover fold*. Another type is exemplified in the Jura mountains, where cover has parted company with foundation.

Argand attributes very great importance to foundation folds. Their existence can be detected in a variety of ways. In Scandinavia it is the *present* height of the mountain chain that betrays its Alpine date. The Alpine fold responsible for the elevation (or re-elevation) is of so great a radius of curvature that it escapes purely geological search—all the readable folding and thrusting in this district are admittedly Caledonian. In the Pyrenees, Caucasus and Thianshan, matters are easier for the geologist. These chains consist of groups of accentuated foundation folds that have broken into semi-rigid nappes, and have involved very considerable thicknesses of post-foundation cover. Many foundation folds, and these, the more important, are a direct expression of the

same push as makes the geosynclinal folds. Others, like the Mt. Blanc massif, have been produced indirectly through interaction with geosynclinal folds.

In his more definitely theoretical pages, Argand adopts Wegener's hypothesis of continental rafts of sial drifting upon sima. Geosynclines are intra-continental regions characterised by thick marine sedimentation. Their site is generally determined by a tendency for two parts of a continental complex to drift asunder. The connecting sial stretches, and as it stretches, its upper surface sags and thus provides a trough for the sea and its sediments, while its lower surface rises, followed by underlying sima. So long as the stretched connecting sial holds together, the subsidence is geosynclinal. Where the sial parts, the subsidence becomes oceanic. Eurasia and Indo-Africa have passed through long periods when they tended to drift apart. Such periods have seen the growth of the geosynclinal sea known to geologists as the Tethys, of which the Mediterranean is the latest recrudescence. During other periods, the two continental masses have tended to drift together, and have squeezed up geosynclinal mountains, that include the Himalayas of to-day as a supreme example.

One might continue this summary indefinitely, and discuss the making of the Mediterranean or the bow and stern phenomena of drifting continental rafts as exhibited along their oceanic margins. Space forbids. Let us merely recall the advice given to young Darwin preparing for his voyage on the *Beagle*. Lyell's "Principles" had just appeared. "Get the book," said orthodox old Henslow, "study it, but don't believe it." Argand has succeeded in correlating an enormous number of geological phenomena, and has thus given them a realisable unity. It may be wise, for the present, to consider his co-ordinating principles with a perfectly open mind; but this should not render us any the less grateful for the accomplishment of a singularly arduous and helpful piece of research.

E. B. BAILEY.

Obituary.

SIR STEWART STOCKMAN.

IN the debate on foot-and-mouth disease in the House of Lords on Thursday, June 3, Lord Bledisloe, Parliamentary Secretary to the Ministry of Agriculture, said that Sir Stewart Stockman, Chief Veterinary Officer to the Ministry of Agriculture, had died on Wednesday in Scotland, and Sir William Leishman, chairman of the Foot-and-Mouth Disease Investigation Committee, had died in London. In both cases the Ministry had lost very able research workers and administrators, and the loss, so far as his department was concerned, was a very serious one.

Stockman's name will be readily connected with the drastic action taken in Great Britain during recent years, at enormous expenditure, in dealing with the menace of foot-and-mouth disease by the 'stamping out' process—a method of disease control obviously impracticable to the epidemiologist, but in certain circumstances the proper means of combat in the face of epizootic diseases. Although in its application crude, *primâ facie*, consisting in the wholesale slaughter of

known infected and all possibly contaminated animals, the policy of 'stamping-out' as understood by epizootologists is the rationally correct mode of attack when no other system can be readily applied or is likely to be efficacious, and the cost of the process is estimated to fall most decidedly below the losses to the community that will most certainly occur without resort to the method. It is by the adoption of the 'stamping-out' system that the cattle population of England was effectively cleared of formidable scourges in the shape of cattle-plague (rinderpest) and contagious pleuropneumonia during the latter half of the last century, and the same method was applied to foot-and-mouth disease, with, when one compares the incidence of this disease in neighbouring continental countries, most salutary influence upon the live-stock industry of the country.

During this period the disease has reappeared from time to time, usually for some mysterious reason, among our herds, but has been dealt with consistently in the same manner. Within the last few years, how-

ever, the disease has made its appearance with disturbing frequency and spread often to an alarming extent before it could be coped with by the "stamping-out" process. The heavy responsibility of deciding upon adherence to the standard policy fell during this time upon Sir Stewart Stockman, in his technical capacity as Chief Veterinary Officer to the Ministry of Agriculture, and the amount of direct observation and estimation of the technical situation that devolved upon him must have told very heavily upon his physical strength, for he was never a robust man. It is in connexion with his clear-sightedness and determination in the face of problems in disease control of almost unprecedented economic gravity that scientific workers in this pursuit will in future years appraise Stockman as a man of exceptional merit, claiming a status in epizootology comparable to that of the greatest workers, such as Gorgas, in the field of epidemiology.

Born in 1869, the fourth son of the late Mr. W. J. Stockman, merchant, of Edinburgh and Leith, Sir Stewart Stockman was educated at the Edinburgh High School and received his professional training at the Royal (Dick) Veterinary College, Edinburgh, whence he qualified as member of the Royal College of Veterinary Surgeons in 1890. He then studied at the École Nationale Vétérinaire, Alfort, Paris, and afterwards occupied the posts successively of demonstrator of pathology and professor of pathology at the Royal (Dick) Veterinary College, Edinburgh. He resigned his teaching appointment in 1900 to serve in the South African War (where he contracted dysentery, which undermined his health in later years), and after the termination of the war accepted a post in the Indian Civil Veterinary Department, which had then just been thrown open to recruitment by civilian veterinary surgeons. His stay in India was brief, for he was appointed Principal Veterinary Officer to the Transvaal in 1902; but while in India he already showed promise of his capacities for dealing with epizootic disease; his work on rinderpest in that country was of high value. In South Africa he was confronted with most acute problems in epizootology, for the cattle population of the country had become exposed to the ravages of rinderpest since 1896, and new epizootics, in the form of East-coast fever and "red-water," had appeared, threatening the virtual ruin of the live-stock industry of the country. The dispositions taken by Stockman then to bring under control and eradicate these diseases and restore the live-stock industry to one of paramount importance in the economy of the country remain models of veterinary police organisation, and his researches in collaboration with Sir Arnold Theiler, then veterinary research officer to the Transvaal, exhibit his genius as an experimenter. His early training, therefore, first as a research assistant and teacher, serving a prolonged apprenticeship under such masters as McFadyean, in England (with whom he remained in lifelong collaboration), and Nocard, in France, and secondly, as an executive administrative officer in countries where epizootic disease plays an extraordinarily conspicuous rôle in the economy of their populations, fitted him peculiarly for the assumption of the specially arduous duties of his later years.

In 1905 Stockman was appointed Chief Veterinary Officer to the Board (now the Ministry) of Agriculture

and Fisheries, to administer the Diseases of Animals Acts. His activities lay in two directions in this capacity—first, in the organisation and development of a field service, comprised entirely of qualified veterinary surgeons trained to deal promptly and efficaciously with epizootics; and secondly, in the foundation of a properly staffed research section, to carry out investigation work into the nature and proper methods of control of disease directly affecting the interests of the British agriculturist. He was admirably supported in developing the research activities of his department by the Right Hon. Walter Runciman while Minister of Agriculture, and a first-class laboratory—the first institute of its kind in Great Britain—was erected near Weybridge for research into the animal diseases. The laboratory has since been amply justified, both by the character and output of the researches from it, and among works published dealing with animal pathology, those upon "red-water," epizootic abortion, and other diseases of cattle, scrapie and louping-ill of sheep, swine fever, and certain diseases of poultry, deserve special mention, while the investigations now carried out there upon the nature of the foot-and-mouth disease virus are of a highly delicate technical order and aim at the solution of one of the most distressing factors besetting the valuable live-stock industry of Britain. Stockman's research work into animal disease, and in particular his researches into bovine epizootic abortion, performed largely in collaboration with Sir John McFadyean, have earned him an international reputation as a shrewd and careful observer and as a resourceful experimenter. He was appointed Director of Veterinary Research to the Ministry when the Laboratory was opened.

As mentioned above, however, it is as an epizootologist that Stockman must be meted the largest measure of distinction. He worked laboriously to mitigate the dangers of epizootic disease afflicting British live-stock, and succeeded, taking advantage of the insular situation of the country, to an extent wholly unknown elsewhere. Mention may be made of his efforts to suppress rabies, to eliminate glanders, to mitigate the ravages of swine fever, to control epizootic abortion, and bring about the gradually diminishing incidence of sheep-scab. The responsibility shouldered by him, practically alone, in the face of the recent incursions of foot-and-mouth disease, is well known, and the strain entailed must have told very heavily upon him. He had only just returned from a three months' tour to the Argentine, to investigate the conditions of the meat trade there with Great Britain, but was unable to resume his duties on his return. He had journeyed to Glasgow to consult his brother, Dr. Ralph Stockman, professor of materia medica and therapeutics in the University of Glasgow, about his health, and succumbed suddenly at his residence on June 2.

Stockman was joint editor of the *Journal of Comparative Pathology and Therapeutics*, a member of the council and president for the year 1924-25 of the Royal College of Veterinary Surgeons, a former member of the council of the Royal Society of Tropical Medicine and Hygiene, member of the managing committees of the Tropical Diseases Bureau and Imperial Bureau of Entomology, and a member of the Board of Governors of the Royal Veterinary College, London. He edited

Walley's "Meat Inspection." He was knighted in the New Year's honours list of 1913 for his services. By his conscientious and unassuming manner he inspired the confidence to an extraordinary degree of the Ministry he served, the veterinary profession, and the farming community of Great Britain. He married in 1908 Ethel, elder daughter of Sir John McFadyean, Principal of the Royal Veterinary College, London, and he is survived by her and two daughters, to whom we tender our deepest condolences in their sad loss.

WE regret to announce the following deaths :

Dr. Albert B. Lyons, for many years a consulting chemist in Detroit, and formerly a member of the committee of revision of the "U.S. Pharmacopœia," on April 13, aged eighty-five years.

Sir Henry Morris, Bart., president in 1906-9 of the Royal College of Surgeons and in 1910-12 of the Royal College of Medicine, on June 14, aged eighty-two years.

Sir Frederick Walker Mott, K.B.E., F.R.S., formerly pathologist to the London County Asylums, on June 8, aged seventy-two years

News and Views.

THE letter from the president and treasurer of the Chemical Society, printed on p. 859 of this issue, raises a question that is of considerable direct importance to learned societies in Great Britain and of no small moment to the cause of science. Hitherto the Inland Revenue has allowed the Society's claims for repayment of income-tax deducted at source, and now such claims are to be disputed. The grounds upon which the Inland Revenue is changing its attitude are not stated, but presumably it will contend that the societies in question (for other societies are also involved) are not described as "charitable institutions" in their charters, and, perhaps, also that they lose any right to this appellation by making profits from advertisements inserted in their publications. On the other side, the societies will rightly contend that they should not be classed with purely commercial undertakings; their work is not undertaken for pecuniary profit, and it is of educational nature and of national importance. Remembering Napoleon's gibe and the saying that "a country has the government it deserves," our national neglect of science is not surprising, but it would not have been so persistent if scientific organisations had learned to speak with one voice. Here is an excellent opportunity for united action, and if a test-case comes into court, it is to be hoped that the scientific societies will stand together, possibly under the leadership of the Royal Society, which is a "charitable institution" by the terms of its charter.

IN view of the difficult times through which the professional classes and the learned societies have been passing since the War, it is very regrettable that the Inland Revenue should now go out of its way to increase their hardships, and unless a strong stand is made we fear that some of the scientific societies will be severely hit by the new exactment. The statement made by Profs. Baker and Thorpe with reference to the Chemical Society that the "margin between solvency and bankruptcy is small, and may disappear if the Society is subjected to the taxation suggested," seems to require, however, some slight modification. According to its published accounts in the year 1925 the Society had more than 39,000*l.* invested in high-class securities, and it recovered 188*l.* in respect of income-tax deducted at source. If the Inland Revenue were to claim tax on dividends from the 5 per cent. War Loan, 1929/47, which are paid free of tax, the maximum total claim for income-tax (at 4*s.* in the *l.*) from the Society would be about 340*l.* Now the excess of income over expenditure in

1925 was 466*l.*, so that the question is one of a margin between a surplus and a deficit on a year's working, and not of a margin between solvency and bankruptcy. We point this out because we think that any semblance of overstatement should be avoided in prosecuting what is from every point of view (except, possibly, the legal one, upon which we express no opinion) a very strong case.

IN the House of Commons on June 8, in Committee on the Finance Bill, a discussion took place on Clause 10 (Continuation and Amendment of Part I. of the Safeguarding of Industries Act 1921). This clause provides, among other things, for the continuance in force for a further period of ten years from August 19, 1926, of Part I. of the Act. The materials affected by the proposed duties are numerous—one speaker said that no fewer than six thousand separate articles were included in Part I. of the Act. The industries to be safeguarded in the way prescribed by the Act include the manufactures of optical glass, optical instruments and the component parts of optical instruments, as well as, for example, the manufactures of magnetos, fine chemicals and arc carbons. In the course of the debate some interesting statements were made by the President of the Board of Trade, Sir P. Cunliffe-Lister. Out of 37 motor manufacturing concerns in Great Britain only three were using British magnetos before the War; to-day all but three are using exclusively British magnetos. It was also stated that Great Britain is producing something like 75 per cent. of our home consumption of fine chemicals, compared with 10 per cent. before the War. In respect to insulin, Great Britain has a very large share, not only of the home market, but also of the world market as well. To-day there are three or four times the number of skilled chemists employed in the British fine chemical industry compared with the number employed formerly, while the optical glass industry is now being developed. (This is but a pale paraphrase of the tribute to the progress of that industry paid by Mr. F. Twyman in his presidential address to the British Optical Instrument Manufacturers' Association.) Those responsible for equipping the Army, Navy and Air Forces have all said that their most minute requirements are met by the optical industry, and the industry has developed a new testing apparatus which is better than any apparatus developed in other countries. (This, presumably, refers to the camera lens and photographic lens interferometers of Messrs. Adam Hilger, Ltd.)