

his efforts in the cause of local scientific education received recognition by the award to him of the Kingsley Medal by the Chester Literary and Philosophical Society.

Plummer took an early interest in seismology, and was for many years a member of the Seismological Committee of the British Association. Before the beginning of his final illness, he co-operated actively in the foundation of the Tidal Institute, the work of which is already proving to be of importance.

Mr. Plummer leaves a family of two sons and a daughter: the elder son, Prof. H. C. Plummer, was Royal Astronomer of Ireland in the years 1912-21, and is now professor of mathematics in the Military College of Science, Woolwich.

DR. EDGAR WILLIAM WILLETT, who died at Hartfield, Sussex, on April 12, aged seventy-two years, was a son of the late Mr. Henry Willett of Brighton, and inherited his father's interest in geology. In 1881 he explored the mammal deposit in the Purbeck Beds at Swanage, and read a paper on a jaw of *Triconodon* to the Geological Society. In 1901 he investigated the occurrence of glossy flint implements in a gravel pit in Savernake Park, and read a paper on the subject to the Royal Anthropological Institute.

WE regret to announce the following deaths:

Mr. Cyrus C. Adams, of New York, geographer and formerly associate editor of the *Bulletin* of the American Geographical Society, aged seventy-eight years.

Dr. Bird T. Baldwin, head of the Iowa Child Welfare Research Station at the University of Iowa, and a past secretary and chairman of Section Q of the American Association for the Advancement of Science, on May 12, aged fifty-three years.

Prof. Gaetano Lanza, Cavaliere dell' Ordine dei Santi Maurizio e Lazzaro, emeritus professor of theoretical and applied mechanics at the Massachusetts Institute of Technology, on Mar. 21, aged seventy-nine years.

Prof. R. Lepetit, president of the Italian Society of Chemical Industry, known for his work on the synthesis of indigo and for the production of 'Italian green,' on Mar. 27, aged sixty-two years.

Prof. I. P. Roberts, formerly professor of agriculture, dean of the New York State College of Agriculture, on Mar. 17, aged ninety-four years.

Dr. Joseph Nelson Rose, associate curator of botany in the U.S. National Museum, an authority on the Cactaceae and other Mexican and South American plants, on May 4, aged sixty-six years.

Prof. Arthur Schönfliess, of the University of Frankfurt on Main, the well-known mathematician, author with Prof. Nernst of "Einführung in die mathematische Behandlung der Naturwissenschaften," which has run into ten editions, on May 27, at the age of seventy-five years.

News and Views.

THE physical inheritance of man having been placed in proper relation to its animal ancestry, Sir Arthur Keith turns to man's mental attributes, and at the University of Manchester on May 9 delivered what may be regarded as a supplement to his British Association address at Leeds. The spiritual characteristics of mankind have always proved the most obstinate to be enrolled under the banner of evolution, and Sir Arthur's frank statement of his conclusions has given rise to much newspaper controversy, some of which scarcely did justice to his views. The Manchester lecture appears under the title "Implications of Darwinism" in the *English Review* for June; but the title might as well have been "The Uniqueness of Man's Spiritual Attributes," for care is taken to show that the crude mental inheritance derived from his animal ancestry is overlaid in man by a more perfected control. It comes to this: that while man's brain, and with it man's mentality, are grounded upon those of his ancestral apes, the balance has been altered by the expansion and finer development of the brain matter, so that what are looked upon as higher centres predominate over the lower or crude animal centres.

SOME of the specific points made by Sir Arthur Keith may be instanced. He rejects duality in the brain: there is here no compound of substance and spirit, but a living organ and its essential manifestation—"mind, spirit, soul are the manifestations of a living brain just as flame is the manifest spirit of a burning candle." Human nature is in its basis animal. There is the same sort of drive induced by

the primary instincts of hunger or sex, and the more primitive the race of mankind the more bestial is the response to the urge. But repression is the normal means of human progress, and the higher the stage of civilisation the more the elemental instincts are held in control by the development of the higher powers of reason. Yet a complete rationalising of mankind is impossible and undesirable, since a complete subordination of the primary instincts would mean race suicide. "Our aim should be not to eradicate the animal propensities within us, but to bend them so as to serve best the interests of both individual and country."

ALTHOUGH the British School of Archaeology in Jerusalem was established in 1919 only, it has already done much valuable work in archaeological exploration. The discovery of the Galilee skull is alone of sufficient importance to justify its existence. It has, however, done much more. As the headquarters of British students and in some sort a centre of British society in Palestine, it has both served science well and also enhanced British prestige among the people in a way that is difficult for those unacquainted with conditions in the Near East to appreciate. Under the Directorship of Prof. John Garstang, the School was also responsible for the functions of a department of antiquities, but the double duties were made distinct in 1926, when a separate organisation for the record and preservation of archaeological remains was set up. In the following year the Government grant of £500, upon which the School had been largely dependent, was discontinued. Now, therefore, the School is entirely dependent upon

voluntary subscriptions, and there is considerable danger that its activities may come to an end unless a guarantee can be obtained that an adequate annual sum will be forthcoming. An appeal has been issued asking for a sum of £1150 per annum, but the particulars given in the statement show that this is sufficient for bare maintenance only, and that for anything like effectual performance of its functions, at least £2000 per annum is required. It would be less than creditable to Great Britain if the School of Archaeology in a mandated territory, in which other nations maintain centres for organised research, had to be discontinued. Further, Palestine, it is scarcely necessary to point out, is a country not only intrinsically of the greatest archaeological and historical importance, but it is one to the culture of which the English-speaking peoples owe much through the traditional position of the Bible in their life and literature. Subscriptions may be sent to the British School of Archaeology in Jerusalem, c/o Palestine Exploration Fund, 2 Hinde Street, London, W.1.

FURTHER broadcast messages from General Nobile give an account of the wreck of the *Italia*. The airship appears to have lost buoyancy and descended rapidly, striking the ice. More than half the crew reached the ice in safety, although two were injured. The wreck, with the remaining seven of the crew, was carried onwards. These men are probably on the ice to the east of the main party, but their position is unknown. The greater part of the expedition's stores is with them. Whether the shipwrecked men reach land or remain on the drifting ice, their rescue is not improbable provided they manage to secure food from seals or polar bears. General Nobile, however, seems to lack firearms, and there is no one with the party who is versed in Eskimo methods of hunting. Captain Sir Hubert Wilkins, writing in the *Times*, points out that the expenditure of energy of the shipwrecked men will be small if open water prevents their travelling over the pack and that consequently a small amount of food should suffice. The large aeroplanes now on their way to Spitsbergen will be useful in locating the parties and dropping food and firearms, but a combination of the efforts of ship and dog teams indicates the most likely road to safety.

THE British Non-Ferrous Metals Research Association has just published its eighth Annual Report, from which it appears that its expenditure on experimental work during 1927 amounted to no less than £20,000. As an example of the practical results obtained, the research on lead cable sheathing has led to the discovery of ternary alloys which are greatly superior to the usual sheathing material, and the Post Office has now ordered a new submarine cable to be sheathed with one of them, and manufacturing production has been begun. These new alloys have been protected by patent. The work on alloys suitable for exposure to high temperatures has also made important progress, and is closely connected with an investigation of the causes of wastage of locomotive firebox stays, a subject of

great importance to railway engineers. The systematic study of the effect of various impurities on copper, and application of spectroscopic methods to the laboratory analysis of metals and alloys, are among the other interesting subjects of research in hand. It has been the experience of this and other research associations that the direct communication of the results of laboratory research to manufacturers does not always lead to their full utilisation, and it has been found desirable to set up a new Development Section, the function of which is to assist members to apply in their works the scientific results obtained by the investigators. This Section, staffed by qualified men, has already proved a great success, and its work will be followed with interest by all who are concerned with the proper utilisation of the results of science by industry. It is certain that the gap exists, and this effort to bridge it deserves success.

AN earthquake of moderate intensity was recorded at Kew Observatory at 6 hr. 26 min. 18 sec. G.M.T., on June 15. The epicentre was about 7000 miles away, but the initial impulse was too small to give any indication of the bearing. The earthquake that disturbed the greater part of southern Mexico late in the evening of June 16 was registered at Kew Observatory on June 17 at 3 hr. 31 min. 49 sec. G.M.T. The records indicate that the epicentre must have been under the Pacific Ocean off the coast of Mexico (near lat. 15° N. long. 100° W.). The earthquake was evidently of a strength far greater than the first accounts seem to indicate. From the seismogram obtained at the Government station at Tucubaya it is inferred that the epicentre lay 262 miles south-east of Mexico City, and this agrees nearly with the statement that the damage was greatest in the town of Oaxaca, which lies about 230 miles south-east of that city. It is probable, however, that the focus extended a considerable distance to the north-west of Oaxaca, for in Mexico City many lightly constructed houses collapsed and water-pipes burst, while the shock continued of great strength for about four minutes. At the Oxford University Observatory, a great earthquake, with its epicentre 82½° distant and probably in Central America, was recorded at 3.20 A.M. on June 17.

THE Bill to regulate the date of Easter Day and days dependent thereon came before the House of Commons on June 15 and received a third reading. The Bill as it now stands provides that Easter Day shall be the first Sunday after the second Saturday in April in the calendar year next but one after the commencement of the Act and in all subsequent years. A further clause provides that the Bill shall come into operation on a date to be fixed by Order in Council, but not until a draft Order has been approved by both Houses of Parliament.

At the invitation of the Rector and the Senate, Sir J. C. Bose delivered a series of two lectures before the University of Vienna on June 9-11. The first, on "The Plant as a Sensitive Structure," illustrated by experiments, demonstrated identical physiological mechanism in plants and in animals. The

second, on "The Action of Drugs and Alkaloids on Pulse-Beats of Plant and Animal," was given before members of the Faculty of Medicine, who were greatly interested in the effect of new Indian drugs on the animal heart, demonstrated by the resonant cardiograph, recently constructed at the Bose Institute. Much interest was also shown in the extreme delicacy of a battery of new instruments by which the activities in the interior of the plant may be shown. The infinitesimal contraction recorder measures the contraction of a single cell under stimulation; the pumping action of the active layer in propulsion of sap in plants was visibly demonstrated by an apparatus which magnified invisible cellular pulsations more than a million times. In recognition of the importance of his discoveries in advancing knowledge of plant physiology, Sir J. C. Bose has been elected a foreign member of the Academy of Sciences, Vienna.

PROF. RUGGLES GATES, professor of botany at King's College, London, sails for Canada on June 23 on an expedition down the Mackenzie River. A permit has been received from the Canadian Government to carry on botanical and anthropological investigations in the North-West Territories and Mackenzie River District. He is taking a cinema camera and 3000 feet of film, in addition to photographic apparatus and collecting materials, which will be admitted free of duty. The intention is to compare the flora of this region with the tundra of Russian Lapland, and to make an anthropological study of Eskimo and half-breeds in comparison with the Ojibway Indians of Northern Ontario. It is hoped to include in this study the blood groups, as well as skin, hair, and eye characters. The Royal Botanic Gardens, Kew, is supplying plant-drying apparatus, and the Governor of the Hudson's Bay Company has made a grant towards the expenses of the expedition. Mr. K. Mellanby, a young botanist from Cambridge, will accompany Prof. Ruggles Gates.

IN December last there was published in New York the first number of an illustrated monthly journal bearing the name *Evolution*. It has the active support of the leading biologists of the United States. Its editors announced in the first issue that *Evolution* "will carry the positive message of facts from every field of natural science and leave it to the reader to make his own mental readjustment." A survey of subsequent issues shows that this policy is being successfully carried out by zoologists and anthropologists of the highest standing, and for the modest sum of ten cents the American public can learn what scientific men have to teach concerning man's origin. The chief aim of *Evolution* is to deprive "fundamentalists of having a strategic advantage in their nearness to the public ear, men of science being separated from the masses by their vocabulary, dislike of publicity, and absorption in work." It is, perhaps, too much to hope that this new venture will gain the ear of Fundamentalists, but it will certainly provide its readers with sound science plainly stated, and hence we wish it every success.

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IN connexion with the physical and chemical survey of the coal resources of Great Britain, the Department of Scientific and Industrial Research has recently appointed a committee to deal with the South Wales Coalfield. The committee includes representatives of the Monmouthshire and South Wales Coal Owners' Association, the South Wales Institute of Engineers, the Geological Survey of Great Britain, and the Department of Scientific and Industrial Research. Similar regional committees are already at work in Durham and Northumberland, Lancashire and Cheshire, South Yorkshire, Nottinghamshire and Derbyshire, North Staffordshire, and in Scotland. The object of the survey is to investigate the characteristics of the various coal seams with the view of their utilisation to the best advantage. Local laboratories are established in each area for the examination of samples and, when necessary, large scale investigations are carried out at H.M. Fuel Research Station or elsewhere. The work of each committee is to advise as to which seams should be investigated, to recommend what large scale work should be undertaken, and to bring to the Department's notice any problems of particular local interest which may require investigation.

FOR fifty-eight years the Pharmaceutical Society of Great Britain has published annually a *Year-Book of Pharmacy*. The interest taken in pharmaceutical and pharmacological research and the development of the pharmacological activities of the Society, indicated by the recent establishment of pharmacological laboratories, have rendered it desirable that recent work should be published or reviewed more promptly than can be the case with a yearly publication. The Society is therefore issuing a *Quarterly Journal of Pharmacy and Allied Sciences*, incorporating the *Year-Book of Pharmacy*, the first number of which we have recently received. The first 60 pages are occupied by original papers on pharmacology and pharmacy: the remaining 100 pages are devoted to abstracts on the chemistry of drugs, pharmacognosy, pharmacy, pharmacology and therapeutics, clinical tests and new remedies. Among the papers in the first part, the following may be noted: the pharmacological assay of digitalis by different methods, by J. W. Trevan, E. Boeck, J. H. Burn, and J. H. Gaddum; a method of assay of the antirachitic vitamin D, by K. H. Coward; the growth-promoting properties of vitamin D, by A. L. Bacharach; strychnine hydrochloride: its composition and solubility, by J. E. Driver and S. P. Thompson: the solubility and rate of solution of arsenious oxide B.P., by G. E. Trease. In her paper Dr. Coward advocates the use of a 'unit' of vitamin D activity: it is suggested that the standard be a stable preparation of irradiated ergosterol, and that 0.0001 mgm. of this preparation be taken as the 'unit.' This quantity will suffice to give healing of rickets in rats maintained on a rachitic diet, when administered to the animals daily for 10 days. The *Journal* should be read by all pharmacists and pharmacologists: it should be especially useful to those interested in the methods of biological assay, which are assuming an increasing importance in pharmacology. We shall await further numbers with interest.

THE King has approved of the following title being taken by the Right Hon. Sir Alfred Mond, Bart. : Baron Melchett of Landford, in the County of Southampton.

THE Institution of Electrical Engineers will hold a conversazione at the Natural History Museum, Cromwell Road, S.W.7, on Thursday July 5, at 8.30 P.M.

PROF. J. C. McLennan, professor of physics in the University of Toronto, will deliver the Bakerian Lecture before the Royal Society on June 28 ; he will take as his subject "The Aurora and its Spectrum."

THE diploma of honorary membership of the University of Innsbruck has just been conferred on Mrs. Ogilvie Gordon in recognition of her valuable geological researches on the Dolomites of South Tyrol. Mrs. Ogilvie Gordon has also been nominated as an honorary correspondent by the Geological Survey of Austria.

THE appointments to scientific and technical departments made recently by the Secretary of State for the Colonies include a cotton investigator, Mr. T. C. Cairns, and a game ranger, Captain J. Minnery, to Tanganyika Territory ; a live-stock officer, Mr. W. D. D. Jardine, to Kenya Colony ; an assistant conservator of forests, Mr. D. McIntosh, and an assistant manager, oil palm plantation, Mr. I. G. C. Squire, to Sierra Leone.

THE Albert Medal of the Royal Society of Arts for the current year has been awarded by the Council, with the approval of the president, H.R.H. the Duke of Connaught, to Sir Ernest Rutherford, Cavendish professor of experimental physics in the University of Cambridge, "for his pioneer researches into the structure of matter." The Medal was founded in 1863 as a memorial to Prince Albert, for eighteen years president of the Society, and is awarded each year "for distinguished merit in promoting Arts, Manufactures, and Commerce."

KING Edward's Hospital Fund for London has arranged, by courtesy of a number of firms, a series of visits to factories in and around London which are the sources of many of the amenities of modern life and will be of interest to scientific workers. The programme includes the following works : Osram (General Electric Co., Ltd.) Lamp Works, Brook Green, Hammersmith (June 27) ; The Gramophone Co., Ltd. ("His Master's Voice"), Hayes, Middlesex (July 4) ; Kodak, Ltd., Wealdstone, Middlesex (July 11) ; Messrs. Bryant and May, Ltd., Fairfield Road, Bow (July 18) ; United Glass Bottle Manufacturers, Ltd., Anchor and Hope Lane, Charlton (July 25) ; Messrs. J. Lyons and Co., Ltd., Ice and Confectionery Factories, Greenford, Middlesex (July 30 and 31). Full particulars of the visits can be obtained from the secretary of the Fund, 7 Walbrook, E.C.4.

THE Liverpool meeting of the Institute of Metals, to be held on Sept. 4-7, is evidently proving attractive ; already more than two hundred members—including many from overseas—have indicated their intention

of taking part. The papers to be presented include a valuable series dealing with the die-casting of alloys, as well as the eighth report to the Corrosion Research Committee. A full discussion of corrosion problems will form a feature of the meeting, as is appropriate in a maritime centre such as Liverpool. On July 4 an election of members is taking place in connexion with the Liverpool meeting, full particulars of which can be obtained from Mr. G. Shaw Scott, Secretary, Institute of Metals, 14 Members' Mansions, Westminster, London, S.W.1.

THE Swiss Society of Natural Science is holding its annual conference this year at Lausanne on Aug. 30-Sept. 2. The provisional programme which has been issued announces papers by Prof. E. Bosshard, of Zurich, on chemical industry, its past and future ; Prof. C. Schröter, of Zurich, on a journey through Java in 1927 ; Prof. M. Askenasy, of Geneva, on the aims of research on tumours and the results already obtained ; and Prof. A. Reymond, of Lausanne, on occult science in antiquity. The proceedings of the meeting will be organised in seventeen sections, covering all branches of science, pharmacy, engineering, the history of medicine and of science, etc. Communications for the sections should be notified to Prof. A. Maillefer, Musée de Botanique, Palais de Rumine, Lausanne, by June 30. Some beautiful and interesting excursions are promised. Full particulars of the meeting can be obtained from the president, Dr. J. Amann, 2 Avenue Rambert, Lausanne.

A recent *Daily Science News Bulletin* issued by Science Service, Washington, D.C., announces a gift by Mr. Jeremiah Milbank of 250,000 dollars for an international research upon infantile paralysis. Dr. William H. Park, of New York University, is chairman of the committee, and the universities of Chicago, Columbia, Harvard, New York, and Brussels, the Lister Institute of London, and the Metropolitan Life Insurance Company, will participate in the work.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned :—A full-time assistant-master for science and mathematics at the London County Council Beaufoy Institute, Prince's Road, Vauxhall, S.E.11—Education Officer (T. 1a), The County Hall, Westminster Bridge, S.E.1 (June 26). An assistant lecturer in physiology and an assistant lecturer in biochemistry at the University of Birmingham—The Secretary, The University, Edmund Street, Birmingham (June 28). A full-time teacher in the mechanical engineering department of Lincoln Technical College—The Principal, The Technical College, Lincoln (June 28). Two lecturers at the Municipal Technical College, Swansea, with qualifications in two of the following three subjects : chemistry, botany, pharmacy—Director of Education, Education Office, Dynevor Place, Swansea (June 28). A full-time assistant lecturer in engineering at the Technical College, Cardiff—The Principal, The Technical College, Cardiff (June 30). Principal of the Wigan and District Mining and Technical College—Registrar, Wigan and District Mining and Technical College, Wigan (June 30). An assistant master at

the Rugby College of Technology and Arts, with good chemistry qualifications and subsidiary physics—The Organiser of Further Education in Rugby, 61 Clifton Road, Rugby (July 4). A lecturer in agricultural zoology at the University College of the South West of England, Exeter (for work jointly with the Seale Hayne Agricultural College, Newton Abbot)—The Registrar, University College, Exeter (July 4). An assistant lecturer in zoology at the University of Birmingham—The Secretary, The University, Edmund Street, Birmingham (July 5). A reader in materia medica and therapeutics at the University of Manchester—The Registrar, The University, Manchester (July 7). A technical officer at the Royal Aircraft Establishment, South Farnborough, for design and experimental work in connexion with electrical equipment for use on aircraft—Chief Superintendent (No. A 282), Royal Aircraft Establishment, South Farnborough, Hants (July 14). Candidates for not less than two vacancies for geologists on the Geological Survey of Great Britain—The Director, Geological Survey and Museum, 28 Jermyn Street, S.W.1 (July 14). A non-established

draughtsman in the Ministry of Agriculture and Fisheries—The Secretary, Civil Service Commission, Burlington Gardens, W.1 (July 26). A senior lecturer in physics and applied mathematics at the Huguenot University College, Wellington, C.P., South Africa—The Registrar, Huguenot University College, Wellington, C.P., South Africa (Aug. 31). A professor of mathematics at the University College, Pietermaritzburg—The Registrar, Natal University College, Pietermaritzburg, Natal (Nov. 1). A zoological laboratory steward at University College, Hull—The Secretary, University College, Hull. A full-time science master at the Technical Institute, Tunbridge Wells—Dr. J. Lister, Technical Institute, Tunbridge Wells. Three junior assistants at the Directorate of Ballistics Research, Woolwich—The Chief Superintendent, Research Department, Woolwich, S.E.18. A capable research chemist or physicist in a research laboratory in London—Box No. 71, c/o NATURE Office, St. Martin's Street, W.C.2. A junior assistant at the Directorate of Metallurgical Research, Woolwich—The Chief Superintendent, Research Department, Woolwich, S.E.18.

Our Astronomical Column.

METEORS AND SKJELLERUP'S COMET.—Mr W. F. Denning writes: "The only nights favourable at Bristol for the observations of meteors, possibly connected with Skjellerup's comet, of last December, were June 10 and 11, which provided two excellent opportunities. The cometary orbit, however, approaches the earth's path to the nearest point on about June 7-8, so that this date had passed before the weather permitted suitable watching of the skies. Very few meteors were seen on June 10 and 11, and two only, out of about twelve observed, were directed from the region in which the cometary radiant was placed. There may have occurred a shower on preceding nights, but no information has come to hand with details of successful results, and I fear that none were obtained.

"Four fairly bright meteors were observed at Bristol, and as they may have been recorded elsewhere, I give their apparent paths:—

	G.M.T.	Mag.	From	To
June 10	11.5	1	313° + 69°	23° + 70°
" "	12.5	Jupiter	325 + 56½	334 + 52
June 11	11.27	Jupiter	243 - 19	234 - 8
" "	12.10	Jupiter	310 + 32½	308 + 31

The first two were observed by me; the others by an assistant. The radiant of the meteors were probably 251° - 25°, 310° + 62°, 251° - 25°, and 314° + 34°."

COLOUR PHOTOGRAPHY OF THE MOON.—Mr. F. J. Hargreaves, Director of the Photographic section of the B.A.A., was one of the first to obtain successful colour photographs of the moon; these were exhibited at a meeting of the B.A.A. some two years ago, and led to the conclusion that the colour of the greater part of the moon's surface resembles that of a weathered stone wall of a light brown or yellowish tint.

Mr. Hargreaves contributes an article on his photographic methods to the March number of the *Taylor-Hobson Outlook*, illustrated by two photographs; one is of the moon (not coloured) taken with a 6½-inch mirror and an equivalent focal length of 25 feet; the exposure was 2 seconds; a large amount of detail is visible both in the dark and brighter regions. The other is of the Andromeda nebula, exposure 1½ hours, focal length 20 inches; a good deal of detail is visible,

the dark spaces between the whorls of the spiral being plainly discernible. It is noted that the picture of the farther edge of the nebula is some thirty thousand years older than that of the nearer edge.

These pictures are the more creditable in that the mounting of the equatorial is of the simplest character and almost entirely home-made. It will be remembered that the comet Grigg-Skjellerup at its return last year was first detected on Mr. Hargreaves's plates, although the huge instruments at the Yerkes and Bergedorf Observatories were already engaged in the search.

THE DISTANCES OF THE SPIRAL NEBULÆ.—An article by R. Hess in *Astr. Nach.*, 5561, brings out an interesting point regarding Dr. Hubble's estimates of the distances of the spirals. Hubble began by tabulating the apparent and absolute magnitudes of seven objects, including the Andromeda nebula, the two Magellanic clouds, and M 33. He thus deduced the average absolute magnitude of a spiral nebula as -15.0; he used -15.2 in deducing the distances of the fainter spirals from their apparent magnitudes. Mr. Hess points out, however, that in our star system there is a correlation between apparent and absolute magnitude; this feature also appears among the seven objects used for getting the scale; those with fainter apparent magnitude have also fainter absolute magnitude. Thus it is unsafe to use the value -15.2 derived from bright spirals as the correct mean to take for much fainter ones.

Mr. Hess admits that the material is insufficient to obtain the law of correlation, but he has made a preliminary attempt. He gives the following example of its application. Dr. Hubble estimated the distance of spirals of apparent magnitude 16.7 (which need an exposure of an hour with the Mt. Wilson 60-inch reflector) as 80 million light years. Hess's correlation law would reduce this to ten million light years, which would make the distribution of spirals in space some 500 times as dense as Hubble's value. No claim of accuracy is made for the correlation law deduced by Hess, but he seems to be correct in indicating the need for assuming such a law, which would lead to an appreciable diminution of Hubble's estimates for the fainter spirals.