

News and Views.

THE managing committee of the National Trust estate at Ashridge has recently let the shooting over the property to some local sportsmen. Many naturalists are much concerned at the inevitable interference with the wild life and the consequent destruction of hawks, owls, and other 'vermin.' At a recent meeting, the Herts Natural History Society unanimously passed a resolution deploring the action of the National Trust in letting the shooting rights on the Ashridge estate, recently acquired for the nation by public subscription. The resolution points out that the preservation and shooting of game inevitably entails the destruction, disturbance, and discouragement of various beautiful and interesting forms of wild life; and that the establishment of the Ashridge estate as a national Nature reserve is much more in accord with public feeling, and with æsthetic and scientific interests, than the letting of shooting rights to private persons. Having regard to the facts above stated, the Herts Society urges the National Trust definitely to establish the Ashridge estate as a Nature reserve and wild life sanctuary, which step the continuance of game preserving and shooting on the estate would render impossible. The establishment of Nature reserves is an ecological experiment of the results of which we know at present very little. Animals may need a certain amount of control as well as the vegetation, and aliens such as the grey squirrel have to be prevented from interfering. But at present we imagine that all biologists would agree that the best thing to do is to leave the animals alone and see what happens. Shooting for sport must always be detrimental.

THE growing interest in the evidence for so-called spiritualistic phenomena is reflected in the popular symposium which the *Daily News* is publishing. The series of articles appears under the names of a number of different persons in various walks of life who attempt to reply to three questions set them under the terms of reference. The first deals with the point of whether the claims of the spiritualists are proved or disproved, or whether indeed they are likely to be proved or disproved. The second asks for the evidence upon which the conclusions of the writer are based; and the third seeks information concerning the opinion of each contributor as to whether the pursuit of spiritualistic practices tends to be injurious to the minds and bodies of those taking part in them. Mr. Robert Blatchford opened the discussion in a characteristic article, which, however, failed to appreciate altogether the scientific aspect of the question. The symposium is being continued by a number of other writers, including Sir Oliver Lodge, who, in the issue of Dec. 8, wisely refrains from answering directly any of the three questions, contenting himself with an attack upon the mechanistic interpretation of life, and concluding with the statement that the evidence for survival has grown of late years and is still growing. Mr. J. M. Robertson, in the issue of Dec. 10, holds that the history of fifty years fails to afford scientific proof

either of (1) 'spiritual' control of inanimate objects, or (2) communications to human beings from deceased persons. The series, although of little importance to scientific men, may be of some interest in so far as it may throw light upon the attraction that spiritualism appears to have for numbers of people, thereby illustrating some curious points in religious psychology and the foundations of belief.

UNDER the chairmanship of Brigadier-General G. H. Gater, Education Officer to the London County Council, Mr. Ormsby-Gore, Parliamentary Under-Secretary of State for the Colonies, gave a valuable address on "Developments and Opportunities in the Colonial Empire" on Dec. 6, at University College, London, at a public meeting arranged by the Association of Scientific Workers. To the concentration of attention upon the settlement, development, and constitutional issues of the British self-governing Dominions may be attributed the lack of appreciation by the public of the remarkable developments which have taken place during the lifetime of the present generation of the non-self-governing dependencies, said Mr. Ormsby-Gore. After giving a number of striking illustrations of the rapid economic expansion of different colonies, he outlined the tasks of the Colonial Office. The Colonial Office is responsible for the opening up and development of new means of communication in these overseas territories, and the application of science to the problems of agricultural production, public health, and education. The demand for adequately trained personnel is increasing, more especially the demand for those who have received a thorough training in the biological sciences. In particular, the dependencies are now thoroughly alive to the importance of the plant geneticist for the development of new and higher-yielding varieties of all the various tropical crops. But apart from that particular outlet, biologically trained men will find scope for the application of this special knowledge in the administrative and political services. Such knowledge will be an invaluable asset, for it will give them a greater appreciation of the problems awaiting solution and a fuller understanding of the peoples for whose development they are accepting responsibility.

IN his introductory remarks, General Gater paid tribute to the energy, enthusiasm, and appreciative understanding which Mr. Ormsby-Gore has brought to bear upon the problem of Empire development. The four personal visits he has paid to the non-self-governing dependencies, first to the West Indies and British Guiana, to East and Central Africa in 1924, to West Africa in 1926, and that to Malaya and Ceylon from which he has only recently returned, indicate his desire to study problems on the spot. The suggestions and recommendations contained in the reports dealing with these visits are alike admirable, and have played a great part in promoting the expansion of the scientific services. As chairman of the Advisory Committee on Native Education in Tropical Africa, Mr. Ormsby-Gore has given abundant evidence also

of his grasp of the essentials in education policy. In thanking Mr. Ormsby-Gore for his address, Sir Thomas Holland endorsed the appeal which he had made for biological teaching in the schools, and for trained biologists for the Colonial Services. Sir Richard Gregory reinforced this appeal, and also referred to the significance of Mr. Ormsby-Gore's appreciative understanding of the rôle which science plays in the development of the world's resources and man's knowledge of his environment, without which there can be no healthy mental and physical growth. Scientific workers are greatly indebted to Mr. Ormsby-Gore for his persistent advocacy in Parliament of the cause of science. Mr. Ormsby-Gore's address will be printed in full in the December issue of the *Scientific Worker*, the official organ of the Association of Scientific Workers. Copies of this journal may be obtained by forwarding threepence in stamps to the General Secretary, Association of Scientific Workers, 25 Victoria Street, London, S.W.1.

AN interesting case of so-called voodoo, or more properly witchcraft, is reported from Pennsylvania by the New York correspondent of the *Times* in the issue of Dec. 5. Three persons have been accused of the murder of a farmer named Ribmeyer in York County. Of the accused, one was a local 'pow-wow' doctor, while of the other two, aged respectively eighteen and fourteen, the family of the elder, named Hess, was convinced that it had been bewitched and consequently had suffered a series of misfortunes. The help of the pow-wow doctor was sought, and he accused Ribmeyer, who lived as a recluse on his farm, and said that the spell would never be broken until they had obtained a lock of his hair. This is a variation of the well-known method of breaking a witch's spell by drawing blood from the witch, but the use of a lock of hair is familiar in principle both in English and American folklore as a method of curing ills such as headache, toothache, or other which may well be the result of a spell. It was stated by the coroner that during the last two years no less than five infants had died in York County as the results of witch-doctoring, but members of the County Medical Society say this figure is much too low. A determined effort is to be made to drive out 'pow-wow' doctors. It is said that voodooism has been practised in York County and rural Pennsylvania since revolutionary times. Presumably 'voodooism' is not to be taken literally, but as a descriptive term for the arts of the witch and dispenser of charms and spells.

DISCUSSING human speech and expression by gesture in a lecture delivered on Dec. 6 at the Royal Institution, Sir Richard Paget stated that children when they invent words for themselves commonly do so by making (unconsciously) a pantomime with their mouths. In archaic Chinese, in ancient Sumerian (as spoken at Ur of the Chaldees), in the Aryan and Semitic languages and even in Polynesia and on the west coast of North America, the same root words occur—made by the same descriptive tongue gesture—as for example the upward movement of the tongue which produces the word 'al,' meaning 'high,' or

'strong' or 'protect' or 'rise.' The human courtship gesture words 'lub' and 'kam' are also found (with small variation) in all these languages. To the objection that the theory of mouth pantomime is fanciful, it may be replied that so is man's unconscious mind, and that we are all born full fledged for flights of fancy but soon moult or are plucked in the course of our education. 85 per cent of the word groups in the first 20 pages of Kailgren's Dictionary show pantomime evidence, while for Aryan roots the proportion is 77 per cent or more, and 86 per cent for groups of Polynesian and North American Indian words collected by Paul Rivet. Both the names and the symbols of the so-called Arabic numerals are formed by mouth or hand pantomime. Hand gestures were less used by the northern races than the southern, because the northerners led harder lives and had less hand leisure. Originally human speech may have been a simple universal language like the universal sign language of deaf mutes; it has since become elaborated and conventionalised. In song the musical language of emotion and the pantomime language of thought are ceremonially wedded. Poetry is a descriptive dance of the tongue and lips performed under the joint direction of the mind and the emotions.

THE problem of the origin of life has been much discussed, and little progress has been made in spite of the researches of the colloid chemist and the experimental physiologist. It has revolved about the relatively simple and yet complex enough microscopic organisms in which plant life and animal life seem to join hands. The problem is, however, pushed one stage further back, speculatively and tentatively, by J. B. S. Haldane in an article on "The Origin of Life" in the *Rationalist Annual* for 1929. He visualises the beginning of living things in a far-back primitive ocean, which, through the uninterrupted action of the ultra-violet rays of the sun acting upon a mixture of water, carbon dioxide, and ammonia in the absence of atmospheric oxygen, had reached the consistency of hot dilute soup (probably rather clear than thick). The discoveries of the bacteriophage and the gene, and that the main difference between the former and a lethal gene, namely, that the latter is only known within a cell and the latter outside, points to the bacteriophage as a gene which has broken loose, and as an ultramicroscopic something, which if not actually alive is on the verge of life. It is a step beyond the enzyme on the road to life. At about the same stage are the viruses which cause such diseases as smallpox and hydrophobia. They can multiply only in living tissue, and pass through filters which stop bacteria.

MR. HALDANE thinks that the primitive organisms were probably ultramicroscopic; further, since they lived in an atmosphere containing little or no oxygen, they must have obtained the energy they needed for growth by some other process than oxidation, namely, by fermentation. The embryos of the most highly organised creatures, chicks and mammals, start life in an anaerobic fashion; so that the phylogenetic test supports the hypothesis. Probably the first living or

half-living things were large molecules synthesised under the influence of the sun's radiation, and only capable of reproduction in the particularly favourable medium in which they originated. But the molecules of organic things possess a persistent type of build, and that suggests a common molecular ancestor, or, in other words, that one, and only one, primitive organism was the fountain-head of all things living. This may have been due to a single happy synthesis, or more likely to the start obtained by the progeny of the first success enabling them to swamp later tentative entrants to the organic world. There is many a 'perhaps' and an 'if' in the story, but it is a speculation which, one of these days, will be put to the experimental test.

THE leading article in NATURE of Nov. 3 on "The Understanding of Relativity" has drawn an inquiry from a correspondent with regard to the idea of gravitational attraction. The questions asked are: "Does the sun exercise an attraction upon the earth? Does the earth exercise an attraction upon a pendulum? Does the attraction of a mountain deflect a plumb-line?" Our correspondent goes on to say that the highest authorities answer these questions in the negative, and their answers are not intelligible to the ordinary student, who is hampered not by want of faith, but by want of understanding. It might be suggested to those who share this difficulty that they ask themselves whether their understanding would be any clearer if the questions were answered in the affirmative. The simple facts that the earth moves towards the sun, that a pendulum tends towards its lowest point, and that a plumb-line leans towards a mountain, are of course data of experience, independent of any theory or explanation, and no one has any difficulty in visualising them. But if one goes further and asks why they happen, is his question really answered more intelligibly if he is told that the sun, or the earth, or the mountain has some mysterious power by which it attracts its distant votary, than if he is told that the latter behaves in the manner natural to it in the circumstances in which it finds itself? Neither answer is of course an 'explanation' in the true sense of the word, and our correspondent might well consider whether his preference for the *Deus ex machina* of gravitational force is not a legacy of early years, when anthropomorphic conceptions were more satisfying than abstract descriptions. The contention of the article in question was, of course, not that the whole detailed structure and development of the theory of relativity were simple to understand, any more than are those of the classical electromagnetic theory, for example, but that the special difficulty that is supposed to envelop relativity is the result, not of an intrinsically esoteric character, but of instinctive incredulity on the part of the student.

THERE are many obvious advantages in using battery eliminators to get rid of the trouble of charging the accumulators used with ordinary radio receiving sets. When the eliminators are directly connected with the electric mains of the supply company serious risks, however, may arise unless special pre-

cautions are taken. The requisite precautions are laid down in the wiring rules of the Institution of Electrical Engineers. In our opinion, the responsibility of instructing the public lies with the retailers of the eliminators. We think that there is a real danger. In the *Electrical Review* for Nov. 30, Mr. Rawll describes some appalling cases of dangerous wiring. In one case he found that a bare wire taken from the supply terminals passed through the kitchen to the receiving set worked off the supply mains in the living room. The full pressure of the supply existed between the water tap in the kitchen and this wire, and in certain circumstances this might easily give a fatal shock to anyone making a circuit between the two. This had been going on for months without those in the house realising the risk they were running. The pressure between one of the supply mains and the gas or water pipes or a damp floor or wall in Great Britain is usually 230 volts. Touching the wire and an earthed conductor with dry fingers the electric shock is usually slight. But between moist hands, or between a moist hand and the feet in damp boots on a damp floor, the shock can be dangerously severe. Experience has shown that the shocks received from alternating current supply mains are more severe than those from direct current supply. When properly installed, radio battery eliminators can be made as safe as the electric wiring used for lighting a house. Apparently many of the amateurs who instal the apparatus are quite ignorant of the risks arising from electric shock.

THE annual congress of the British Institute of Radiology and Röntgen Society, which was held at the Central Hall, Westminster, on Nov. 14-17, proved a pronounced success. The attendances were large and much interest was evinced. The president, Dr. G. W. C. Kaye, Superintendent of Physics at the National Physical Laboratory, referred in his presidential address to the steady growth of the Institute, which, with the affiliated members, now has a membership of 800, and to the increased scientific facilities at the house of the Institute at 32 Welbeck Street. The address included a historical review of the genesis and evolution of the electrical discharge tube in the seventeenth and eighteenth centuries, particular reference being made to the work of von Guericke, Boyle, Newton, Hauksbee, Gray, Nollet, and others. Prof. W. L. Bragg gave the ninth Mackenzie Davidson memorial lecture on the subject of "X-ray Optics," and Mr. Sampson Handley delivered the eleventh Silvanus Thompson memorial lecture on "Radiology from a Surgeon's Standpoint." A day was devoted to a medical discussion on the value of the opaque meal in diagnosis. Among the physical and technical papers read was one by Dr. G. Shearer on industrial applications of X-ray spectroscopy, one by Mr. W. E. Schall on recent developments in X-ray apparatus, and one by Mr. W. V. Mayneord on X-ray dosage and distribution. The British X-ray manufacturers organised an exhibition of apparatus which attracted large numbers and, in its comprehensiveness and progressive nature, was highly to be commended.

A large party of members accepted the kind invitation of the Director of the National Physical Laboratory to visit the Laboratory where, among other things, they were shown in operation the million volt equipment, a Coolidge cathode-ray tube, constant-potential X-ray outfits, together with demonstrations relative to X-ray spectrometry, measurement, and protection.

AMONG the finds which have recently been retrieved from the tomb of Tutankhamen is mentioned an interesting cult object which illustrates the beliefs of the ancient Egyptians in regard to the relation of the god Osiris, the king, and the crops. This was a figure found in a wooden box and heavily wrapped in linen. When the bandages were removed, a hollow figure of wood was found which had been filled with silt from the Nile. In this, grain had been planted and it had then been wrapped as a mummy. The sprouting of the grain would thus make the mummy a symbol of the resurrection of the god Osiris or of Tutankhamen himself.

ON Nov. 30 occurred the centenary of the birth of Gustav Anton Zeuner, the distinguished German professor and director of, first, the Zurich Polytechnic, then of the Freiburg School of Mines, and from 1873 until 1895 of the Dresden Polytechnic. Born in Chemnitz, he passed through the School of Mines in Freiburg, spent some time in Paris, where he became friends with Poncelet and Regnault, and in 1853 assisted to found the journal *Civil ingénieur*. Six years later, the same year that Rankine included in his "Treatise on the Steam Engine" a section on the new science of thermodynamics, Zeuner published his "Grundzüge der mechanischen Wärmetheorie," which was followed by many valuable works on this and other subjects. Zeuner retired from the directorship of the Polytechnic at Dresden in 1895 and died there on Oct. 17, 1907.

THE unity of science was well illustrated in the recent Thomas Lowe Gray Lecture of the Institution of Mechanical Engineers, delivered on Nov. 30, by Prof. W. E. Dalby, who dealt with the possible vibration of a ship's hull under the action of an unbalanced engine. Commencing with the well-known differential equation of vibration of an elastic body when subjected to damping and forced oscillation, Prof. Dalby examined the consequences which ensue when an engine, unbalanced in various ways, is placed at various positions in a ship's hull either coinciding with nodes or between them. Some results of modern practice were described, in which engine vibration trouble in ships had been successfully overcome, and an interesting parallel was drawn between these and the effects of unbalanced railway locomotives on bridges which have been examined recently by a joint committee representing the Department of Scientific and Industrial Research and the railway companies.

THE Council of the Institute of Metals has found it necessary to alter the date of the twenty-first annual general meeting and 'coming-of-age' celebrations of the Institute, from that originally announced (Mar. 6 and 7) to Mar. 13 and 14 next. The programme

includes a dinner and dance at the Trocadero on Mar. 13, and a *conversazione* and exhibition to be held in the Science Museum, South Kensington, on Mar. 14, when objects of special interest in relation to the work of the Institute will be displayed; offers of such objects are invited and should be made to the secretary, Mr. G. Shaw Scott, 36-38 Victoria Street, Westminster, London, S.W.1. The annual May Lecture of the Institute is to be given on May 7 by Sir Oliver Lodge. The annual autumn meeting will be held in Düsseldorf next September, and it is proposed to hold there a general discussion on laboratory methods of metallurgical research.

THE "Statistical Report of the Health of the Navy" for the year 1926 has recently been issued (London: H.M.S.O.). The returns for the total force show a decrease in the incidence of disease as compared with the five years' average and also with relation to 1925. The disease showing much the largest incidence was influenza, of which there were 1769 cases, all of a mild type. Of malaria there were 280 cases, and it is remarked that it is difficult to render a hammock mosquito-proof by means of a mosquito net. Experiments with various types of net-spreaders will, it is hoped, result in obtaining more efficient protection.

A STANDARD time conversion chart, at the low price of ten cents, has been published by Bureau of Standards, Department of Commerce, U.S.A. It consists of a cardboard disc on which the twenty-four hours are marked, twelve in white and twelve in black. The disc revolves on a card on which the meridians east and west of Greenwich are marked. Against certain of the meridians there are place names. More could easily be added by the user. There can obviously be nothing novel in the construction of such a chart, but it is strongly made and boldly printed, and should prove useful in many schools and elsewhere.

AMONG the forthcoming books of Messrs. W. Heinemann (Medical Books), Ltd., are the following: "On Nephritis," Dr. A. C. Alport; "Fruit and Health," Dr. S. M. Belfrage; "The Machine of Life," Dr. Ethel Browning; "Clinical Observations on Infant Feeding and Nutrition," Dr. H. Gladstone; "Common Colds," Dr. Leonard E. Hill and M. Clement; "The Treatment of Varicose Veins by Intravenous Injections," Dr. J. D. P. McLatchie; "The Mechanism of the Larynx," V. E. Negus; and "The Art of Surgery," Dr. H. S. Souttar.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—A lecturer in geography and geology at the Exeter Diocesan College for Schoolmasters—The Principal, Saint Luke's College, Exeter (Dec. 20). A lecturer in chemistry, with special qualifications in physical chemistry, in the Bradford Technical College—The Principal, Technical College, Bradford (Dec. 28). A rural science teacher and assistant agricultural organiser under the Merioneth Education Committee—The Secretary to the Merioneth L.E.A., Education Department, Dolgellay (Dec. 28). A head of the

department of metallurgy, including pure science, of Constantine Technical College, Middlesbrough—The Director of Education, Education Offices, Middlesbrough (Dec. 31). A lecturer in zoology in the Egyptian University, Faculty of Science—The Dean of the Faculty of Science, Egyptian University, Cairo (Jan. 1). A physiologist at the Experimental and Research Station, Cheshunt, for the investigation of virus diseases of plants—The Director, Experimental and Research Station, Cheshunt, Herts (Jan. 31). A full-time teacher of engineering at the Verdin Technical School, Northwich—The Director of Education, Dept. "C," County Education Offices, City Road, Chester. An assistant in the mechanical engineering section of the engineering department of the Halifax

Municipal Technical College—The Principal, Municipal Technical College, Halifax. A master to teach workshop practice (particularly metal-work) and either engineering or building trades subjects at the Sheerness Technical Institute and Junior Technical School—The Principal, Technical Institute and Junior Technical School, Sheerness. A man with teaching experience in physics, chemistry, and mechanics, at Cordwainers Technical College—The Principal, Cordwainers Technical College, St. John's Lane, E.C.1.

ERRATUM.—In the letter "Elastic Constants of Single-crystal Aluminium Wire" in NATURE of Oct. 27, p. 650, line 14, for "tenths of a gram" read "tens of grams."

Our Astronomical Column.

USE OF THE 24-HOUR DAY.—About forty years ago an effort was made to assimilate the astronomical and the civil day, making both begin at midnight and using 24-hour reckoning. The effort was a failure, little encouragement being given by astronomers as a whole, and no response being received from the general public. In the last few years the situation has changed; astronomers in general have abandoned the plan of beginning the day at noon, and now follow the civil reckoning in this respect (except that they do not use summer time). This change was suggested by the British Admiralty, and after international discussion was adopted in all the ephemerides from the beginning of 1925. The International Astronomical Union, which met at Cambridge in July 1925, gave further endorsement to the new system, making, however, an exception in the case of the Julian day, which still begins at Greenwich noon.

As regards the use of 24-hour reckoning, there is one department of civil life, namely, the railway timetables, in which its introduction seems desirable. For short journeys there is little difficulty; the use of the symbols A.M. and P.M. at the heads of columns sufficiently meets the difficulty. But in the case of journeys lasting for a large fraction of 24 hours, probably most people find some trouble in interpreting the indications of the tables. The trouble may not be very grave, but it would certainly be diminished by carrying the reckoning of hours up to 24.

The council of the Royal Astronomical Society recently authorised Prof. H. H. Turner to approach the railway companies of Great Britain with this end in view. They replied that they had no objection to the change, but desired an expression of opinion from the general public before making it. Accordingly, a letter appeared in the *Times* of Dec. 8, signed by the Astronomer Royal, by Rev. T. E. R. Phillips (president of the R.A.S.), and Prof. Turner. It gives a brief rehearsal of the above facts, notes that the 24-hour system is general in Continental timetables, and emphasises the fact that the change proposed is strictly limited to railway tables. The failure of forty years ago was largely due to the attempt then made to introduce 24-hour reckoning for all civil purposes: this attempt is now abandoned, so that people may continue to lunch at one and dine at eight, instead of substituting thirteen and twenty. It is hoped that there will be sufficient public response, in one direction or the other, to give the railway companies an indication of the general trend of opinion.

A NAKED-EYE SUNSPOT.—Although not unusually big, a recent group of spots was seen by a number of people through fog or thin cloud prevalent at times

during the transit of the spots across the sun's disc. One observer, near Piccadilly, previously unaware of the existence of the spots, saw the two terminal members of the group as separate dots on Dec. 4 when the angle subtended by them was less than 4'. The group was of stream type with the components closely packed, and changes in their shape denoted considerable activity. Spectroscopic observations made at Worthing on Nov. 30 and Dec. 1 provided more precise evidence of this activity. Position and area of the group are as follows:

No.	Date on Disc.	Central Meridian Passage.	Latitude.	Maximum Area.
11	Nov. 30–Dec. 11	Dec. 5.6	9° N.	1/800 of hemisphere

A magnetic disturbance was recorded at Greenwich between Dec. 5, 22h. and Dec. 6, 5h.; range in declination, about 40'.

FORBES'S COMET.—From the three positions given in NATURE of Dec. 1, p. 856, Dr. A. C. D. Crommelin has deduced the following elements of this comet:

T	1928 Nov. 7-040 U.T.
ω	198° 32' 6"
Ω	248 59 4
i	28 39 26
$\log q$	9.87346

These resemble very closely the elements of Comet 1873 VII, discovered independently by Coggia and Winnecke; the latter again resemble those of Comet 1818 I, discovered by Pons. Argelander and Schulhof had already suspected that these two comets were identical, with a period of either 55 years or some sub-multiple of this; since the observed arcs in both years were very short (4 days and 5 days) it was impossible to deduce the period from them. There is good reason to believe that Forbes's comet is the same object, and to hope that it will be observed long enough at the present return to settle the question of the period. The observed intervals are 55.8 and 54.9 years, which do not differ more widely than planetary perturbations give us a right to expect; the recent revolution of Halley's comet was two years shorter than the one before. If the period is 55 years, the aphelion distance would be $28\frac{1}{2}$ units, not far inside Neptune's orbit, so that it might be looked on as belonging to that family.

The comet is now out of reach in England, but should be followed in the southern hemisphere for two or three months. In the middle of October it was far north of the equator and comparatively near the earth, so that it is rather surprising that it was not discovered then.