

Current Topics and Events.

IT has been common knowledge for some time in the scientific world that the Royal Society intended to dispose of part of the collection of early printed books in its library, especial attention having been directed to the fact in the report of Council issued to fellows in November last, and published in the Year Book of the Society. While it is true that during the last few years the Society has received large gifts of money, it has to be borne in mind that without exception the application of such moneys has been limited to certain definite objects, and none is available for the general purposes of the Society, however badly it may be needed; that, no doubt, explains the last sentence of the president's letter to the *Times* of March 27, "As circumstances stand, sentiment must be tempered by practical expediency." The larger portion of the books are relics of the collection presented to the Society in 1666 by Henry Howard, afterwards Duke of Norfolk, and only those volumes which have no scientific interest or are duplicates are being offered for sale; but two of the books which are likely to fetch very high prices—a Bible, and Richard Baxter's "A Call to the Unconverted," both translated into the Massachusetts Indian language—were presented to the Society in 1669 by John Winthrop, Governor of Connecticut. One of the features of the collection is a series of several hundred Reformation Tracts printed in Germany, more than one hundred of these being by Martin Luther. Among other books of interest are Caxton's second edition of "The Canterbury Tales," 1484, Fust's "Liber Sextus Decretalium" (1465), and Cicero's "De Officiis" (1466). A first edition of Euclid, included in the sale, is a duplicate. It is the intention of the president and Council that the proceeds shall be kept as a separate fund, known as "The Arundel Library Fund," to be used for the purchase of scientific books. A nucleus has already been formed by the sale to the British Museum, at its own valuation, of some seventy items.

THE Council of the Institution of Electrical Engineers has addressed a letter to the Postmaster-General stating that some of the provisions of the Wireless Signalling Bill are of such far-reaching importance that unless they are modified they will prove a serious hindrance to electrical and physical research. In particular the Council desires that it should be made perfectly clear that the words "any apparatus for wireless telegraphy" apply only to such apparatus when used for signalling purposes. Crystal detectors and radio valves, for example, are used in many physical laboratories for testing apparatus and materials which have no connexion with radio signalling. It should be clearly stated in the Bill that licences are not required in these cases. It is also recommended that all regulations made by the Postmaster-General under Clause 3 (Regulations and Fines) of the Bill should be submitted to a statutory advisory committee for consideration, and it is suggested that the committee should be representative of the Royal

Society, the Institution of Electrical Engineers, the Radio and other interested societies. We think that this suggestion is a good one and would form an effective barrier against legislation which might injuriously affect research. It is also pointed out that Clause 7 of the Bill, which applies its provisions to the use of etheric waves for the transmission of energy, may greatly interfere with research and industrial development. A new clause might be substituted for it rendering liable to penalties any one using electromagnetic radiations of the frequencies commonly employed in radio telegraphy in such a way as to affect injuriously the working of authorised radio telegraphic stations. It is conceivable that in the future important industries may be founded on the transmission of energy by etheric radiations. Several suggestions for utilising these radiations have already been made, and it would not be in the national interest to hamper unnecessarily research in these directions.

THERE has been a considerable addition to our knowledge of scarlet fever during the last year through the researches of G. F. Dick and his wife, Gladys H. Dick, of the John McCormick Institute for Infectious Diseases in Chicago. Hitherto the causation of scarlet fever, like the other exanthemata, has been completely obscure. It was not regarded as likely that any of these fevers were due to ordinary bacteria, for although bacteria have been constantly found in one and all of them, no single bacterium isolated has been able to reproduce the disease in man or animals. The Dicks have, however, obtained (1923) a streptococcus from a case of purulent infection of the hand of a nurse suffering from scarlatina, and have directed attention to certain of its peculiarities. The application of pure cultures of this streptococcus has been alleged to produce scarlet fever in man, and it is concluded that, after all, scarlet fever is probably a bacterial disease analogous to diphtheria in its general pathogenesis. The organism is supposed to produce a local lesion in the throat, and a soluble poison produced in this site is absorbed into the system and is the cause of the rash and some other manifestations of the fever. By applying the toxin of the streptococcus scarlatinæ to the skin, a very definite red area appears in some persons but not in others. Where this "Dick reaction" is positive the individual is presumed to be susceptible to scarlet fever. Where the reaction is negative the individual is immune. These reactions are strictly analogous to the Schick reactions in diphtheria. It is possible to pick out the immunes from the non-immunes, and by inoculating the latter it is hoped that scarlet fever can be completely controlled as diphtheria has been. These results of the Dicks have been confirmed in all important respects by trustworthy workers in the United States, and the subject is now receiving close attention in Great Britain.

A STEP towards the improvement of loan facilities between libraries of university rank in Great Britain has been taken by the Association of University

Teachers, which recently convened a Conference to consider the matter. As a result, regulations for inter-library loans have been approved, and inquiries are now being dealt with by Mr. Oldaker, the University, Edmund Street, Birmingham, to whom all correspondence should be addressed. The movement is a healthy one, for it represents a reaction against the policy of library inflation which was characteristic of library administration in the latter half of last century. It is now seen that the future needs of the research student can only be met by a pooling of the resources of our research institutions. We have, however, some doubt as to the wisdom of instituting at this stage the inquiry office in Birmingham. To provide prompt and accurate answers to inquiries as to the place of deposit of a given work presupposes the existence of an extensive collection of bibliographical serials and library catalogues which are to be found in few municipal or university centres. Moreover, the inquiry officer should have access to the work for the loan of which application is made. Further, the institution to which he is attached should be equipped with modern photographic copying apparatus. Few institutions comply with these requirements. The A.U.T. appears to have overlooked the fact that the bibliographical aspects of the problem should in the first instance have been left to the decision of bibliographers. We think it would be wise even at this stage for the A.U.T. to refer its proposals to a small committee of experts to consider whether the institution of a separate inquiry office is best calculated to secure the professed objects, and in case of an unfavourable answer, to authorise the committee to submit alternative proposals.

SIR OLIVER LODGE'S seventh and last "talk" of the series on "Ether and Reality," which is being broadcasted from the London station 2LO of the British Broadcasting Company, was given on March 31, and dealt with the probable utilisation of the ether. The ether or continuum has perfect properties, while matter is liable to deterioration and dissipates energy. No law of dissipation applies to the ether; matter exists not only inorganically but also as the complex molecules of protoplasm, which can be animated and made a vehicle for "life." But the coherence of all bodies is effected by the etheric connecting medium, and the question arises: Can that ether body be animated too? We usually ignore the ether body because it is outside the ken of our senses, but knowing what we know of matter and its fields of force, it is reasonable to suppose that we act more directly on ether than on the discontinuous particles of matter. All force is exerted through the ether, and it is thus that matter has become indirectly and apparently amenable to life and mind and memory and affection. These psychic attributes belong to the unseen universe; and if they require a physical medium, the ether is permanently available. Our material bodies have thus been built up, and are worked for temporary purposes of demonstration here and now, but they are imperfect and wear out. Mind may always need a vehicle, a body, a habitation,

an instrument, but it need not be made of matter. It is doubtful if matter is ever really animated directly. Our present connexion with matter is probably indirect as well as temporary. Sir Oliver stated that, in his opinion, permanent reality lies in a region which does not appeal to the senses,—a region of inference; and to that region we really belong.

SIR ERNEST RUTHERFORD, in his discourse at the Royal Institution on Friday, March 27, on atomic nuclei, stated that the most direct method for determining the nature and magnitude of the forces that hold the atom in equilibrium, and the size and constitution of the nucleus, is to examine the scattering of swift α particles when they traverse matter. Such experiments have shown that the inverse square law appears to hold over the greater part of the space occupied by the atomic structure. It breaks down, however, when the α particle approaches very close to a light nucleus like that of hydrogen or aluminium. By studying the variation of the number of α particles of different initial velocity scattered nearly backwards from the bombarded material, it has been found that there is a sudden change in the law of scattering for aluminium for a definite velocity. Experiments made with thin films of gold and uranium show that the law of the inverse square holds to the closest distance of approach of the α particle to the nucleus, namely, about 3×10^{-12} cm. This is remarkable, for from radioactive information it is believed that the nuclear structure of uranium extends to more than twice this distance. A distribution of charged electric doublets in the form of satellites extending some distance from the central nucleus may account for these effects. Previous work has shown that a change in nuclear structure can be brought about by intense collisions between α particles and light nuclei, but the fate of the α particle after liberating a proton has been a matter of great uncertainty. Some recent experiments by Blackett show that in the case of nitrogen the α particle may be captured by the nucleus. Thus in the case of nitrogen there is on the whole a building up rather than a disintegration. This result is of great importance and interest, but we are still far from understanding the mechanism of such disintegrating collisions.

A SERIES of interesting demonstrations has been given at Messrs. Selfridge and Co., Ltd., London, W.1., by Mr. J. L. Baird, of an experimental apparatus of his own design for wireless "television" (*i.e.* the simultaneous reproduction at a distance of an image of a fixed or moving object). The inventor does not claim any great perfection for his results, but we have seen the production in the receiver of a recognisable, if rather blurred, image of simple forms, such as letters painted in white on a black card, held up before the transmitter. Mr. Baird has overcome many practical difficulties, but we are afraid that there are many more to be surmounted before ideal television is accomplished. In the transmitting apparatus, the object, strongly illuminated, is placed opposite a revolving disc provided with a series of lenses, each a little nearer to the centre than the last, which project a

series of moving images upon a selenium or other photo-electric cell, each a little displaced laterally from the last. This is the equivalent of passing the cell over the whole surface of the object in a succession of close parallel lines. The light thus reaching the photo-electric cell is rhythmically interrupted by a rapidly revolving slotted disc, and the result is that owing to the variations of resistance of the cell, undulations at an audio-frequency are produced in the current through it, whenever a bright part of the object is being dealt with. These are amplified and supplied to a simple wireless transmitter which is caused to emit corresponding signals..

IN the receiving section of Mr. Baird's television apparatus, the signals sent out from the transmitter are detected and amplified by very powerful valves until they are strong enough to light up a neon tube when a signal is received, *i.e.* when a bright part of the object is being dealt with by the transmitting apparatus. A disc with lenses or holes corresponding to the lenses of the transmitting disc is rotated synchronously with the transmitting disc, causing spots of light produced by the neon tube to appear upon a screen in positions corresponding to the part of the object being dealt with. With a sufficiently rapid rotation of the discs, a recognisable image of the object is produced. A duplicate of the receiving apparatus is provided at the sending end with its disc mounted on the same shaft as the transmitting disc, to enable the necessary adjustments to be made. Synchronism between the sending and receiving discs is obtained by a little alternator with a frequency of about 300 geared to the revolving system, which causes signals to be sent out by another wireless transmitter at this frequency. These are received and amplified at the receiving station to an extent enabling a similar little alternator connected to the receiving discs to be synchronised with them.

DR. A. W. CROSSLEY, presiding at the annual dinner of the Chemical Society on March 26, referred to the difficult position in which the Society finds itself on account of the increased cost of publication. Subscriptions of fellows have been raised, various limitations have been placed upon the distribution of the Society's publications, and papers are curtailed as much as possible, yet there is a financial deficit, and no practical means of avoiding it have yet been found. During the War, chemists saved the nation from disaster by supplying drugs, poison gases and protection from them, and other products demanded by the times, and it does not seem too much to ask that assistance should now be afforded in placing upon record the work they are doing for the advancement of knowledge. When one remembers the vast sums expended upon the verbatim reports of proceedings in Parliament published in the large volumes of Hansard, and considers how trivial most of the matters are in comparison with the original contributions made to a body like the Chemical Society, it is difficult to understand the national sense of value which leaves the Society in its present anxious position. Possibly the additional 1500*l.* received by the Royal Society

in aid of scientific publication will enable a grant to be made to the Chemical Society, but in our opinion a very strong case can be made out by many other scientific societies for assistance towards costs of publication, either from the State or private benefactions, and we should like to see a concerted effort made with the view of securing adequate funds for this purpose.

MR. W. J. U. WOOLCOCK referred at the annual dinner of the Chemical Society on March 26 to a scheme for the establishment in London of a "Chemistry House" which would provide office accommodation for the chief chemical societies as well as one or more lecture theatres and other facilities. The scheme is being put on a business footing, and there is every reason to believe that it will take definite shape before long. It is possible that other scientific societies may like to be housed in the same building, and the plans may be enlarged to enable this to be done if there is a clear demand for such increased accommodation.

So far most of the clinical reports on "Bayer 205," now renamed "Germanin," have encouraged the belief that at last a specific for the treatment of trypanosomiasis has been found. A paper by Dr. Clement Chesterman in the Transactions of the Royal Society of Tropical Medicine and Hygiene (1924, vol. 18, p. 311) is somewhat disturbing from that point of view. Seventeen cases, all well advanced in the "second" or nervous stage of the disease, were treated with the new drug. Of these, nine had already received arsenical drugs without permanent improvement, and eight had not been given any previous treatment. Nine of these cases relapsed in from six weeks to fifteen months after a course of "Bayer 205." Two died of acute nephritis after their discharge from hospital and two from intercurrent bilharzial dysentery. Two more, who had suffered from amblyopia during arsenical treatment, became blind after administration of "Bayer 205," and a third developed amblyopia more quickly than usual when given arsenical treatment after a course of the new drug, due, it is suggested, to the possibility that damage to the kidneys by "Bayer 205" prevented the usual rapid elimination of the arsenic afterwards given. Two cases were definitely improved and have remained so for four and five months respectively. Unfortunately, none of the cases could be re-treated owing to the small supply of the drug available. It is pointed out that the two cases who died from acute nephritis might have been saved by careful nursing but were brought back to hospital too late. Dr. Chesterman has not lost faith completely in "Bayer 205," but thinks it important that "the limitations of yet one more of tropical medicine's 'conquering heroes' should be realised."

THE genesis of "Bayer 205" is described in a recent paper (*Zeitschrift für angewandte Chemie*, 1924, vol. 37, p. 585) by Dr. B. Heymann, one of the chemists who took part in the long and arduous researches which resulted in its discovery. There

is a good deal of special pleading for the Bayer Co.'s refusal to disclose the constitution of the new drug, and this is critically commented on by M. Fourneau (who, it will be remembered, re-discovered "Bayer 205," or at least made an effective substitute for it) in *Chimie et Industrie*, 1925, vol. 13, p. 284. Whatever the ultimate value of "Bayer 205" as a remedy for sleeping sickness may prove to be, there can be no doubt that its advent has provided chemists and pharmacologists with new ideas for chemotherapeutical work.

PROF. H. A. LORENTZ, of Leyden, Holland, will deliver the fifteenth annual May lecture of the Institute of Metals on May 6. The subject of the lecture will be "The Motion of Electricity in Metals."

THE seventy-fifth anniversary of the foundation of the Royal Meteorological Society will be celebrated on April 21 and 22. The celebrations include a visit to Kew Observatory and a lecture by Prof. E. van Everdingen, director of the Royal Netherlands Meteorological Institute, and president of the International Meteorological Committee.

THE Fondation George Montefiore, given every three years for the best original work of the preceding three years on the scientific advance and on the technical applications of electricity, is to be awarded this year. The 1923 award was deferred and the prize now amounts to 22,500 francs. The committee of award consists of ten electrical engineers, five of whom are Belgian, under the chairmanship of the Director of the Montefiore Electrical Institute of Liège. Competing works, addressed to M. le Secrétaire-archiviste de la Fondation George Montefiore, Association des Ingénieurs électriciens sortis de l'Institut électrotechnique Montefiore, rue Saint-Gilles, 31, Liège, must be received by April 30 next.

THE first annual report has been issued of the Ella Sachs Plotz Foundation for the Advancement of Scientific Investigation. Thirty-two applications for grants were received from various countries and eight awards were made, involving a sum of 8550 dollars. For the present, problems in or bearing on medicine are to be favoured and preference will be given to groups of researches on a single problem. Thus last year, four of the grants were for work bearing on chronic nephritis. Two only of last year's awards, to Dr. A. Bezredka, Pasteur Institute, Paris, and to Dr. J. Aberlin, Berne, went outside the United States. Applications for grants for 1925-26 must reach Dr. F. W. Peabody, Boston City Hospital, Boston, Mass., before May 15 next.

ARRANGEMENTS are in progress for a meeting of the Commission for the Exploration of the Upper Air to be held at the Meteorological Office, South Kensington, on April 16-22, under the presidency of Sir Napier Shaw. The Commission is in connexion with the International Meteorological Committee. The principal business of the coming meeting is to discuss the publication of the results obtained by balloons and kites in the various countries of the world during the years 1923 and 1924. A sum to meet the expenses

of a specimen volume was allocated by the Union of Geodesy and Geophysics at Madrid in October last.

AMONG the financial items recently adopted by the French Chamber of Deputies is one of unusual interest to scientific workers. The clause in question is due, according to the *Revue générale des Sciences*, to Prof. Emile Borel, and provides for a tax of 5 centimes on each 100 francs paid in salaries by French commerce and industry, and the products of the tax, which it is estimated will bring in about fourteen million francs a year, is to be allocated to French scientific laboratories. In this way it would seem that industry might be made to contribute directly to the support of the fundamental scientific research on which it is based. The measure has still to be passed by the Senate before becoming law.

THE Norwich Castle Museum Committee of the City Corporation has under consideration the celebration of the centenary of the foundation of the Museum under the presidency of the famous Norwich botanist, Sir James Edward Smith, F.R.S., in 1825. The history of the Museum shows that its fortunes were of a varying character until 1894, when the Corporation took over the collections of the Museum Society and housed them in the spacious galleries adjacent to the Castle. The year 1925 is important for the City of Norwich, as in addition to the celebration of the centenary of the Museum, there will be an official opening of the Bridewell Museum of Local Industries in the 13th-century house of the first Mayor of Norwich, which will provide about 11,000 feet of floor space for the exhibition of material illustrative of the textile and other past and present industries of the City of Norwich.

IN publishing the first biological number of the Science Reports of the Tohoku Imperial University, Sendai, Japan, Prof. S. Hatai announces the formal opening of the Biological Institute of this University and of a Marine Biological Station, located at Asamushi. Among the special features of this station is an under-sea laboratory and a spacious open marine pool for observations on the growth of marine organisms. Several residences and a large dormitory have been erected where investigators may live with their families and where students may find suitable accommodation. Prof. Hatai hopes that his colleagues in Japan and in other countries may take advantage of the facilities offered for research.

YEAR-BOOK No. 23 of the Carnegie Institution of Washington, recently issued, contains a report by the Department of Genetics. The investigations reported upon range from chromosome studies in *Datura* and *Drosophila*, sex conditions in *Cladocera*, pigeons, and moulds, to the genetics of rabbits, mice, and horses, and eugenic studies of Indian-negro-white racial complexes in Virginia, inheritance of exceptional intelligence, the endocrines of mongoloid idiots, and a European study of the ancestry of American immigrants. No attempt can be made here even to outline the results obtained in these and other fields of research, but it is clear that substantial

progress is being made in such problems as the further analysis of the relations between chromosomes and heredity, and the compilation of data on which the improvement (germinally) of the human race could be based.

WE have received the annual report for 1924 of the Crichton Royal Institution, Dumfries—a hospital for mental diseases. Both private and rate-aided patients are admitted, numbering approximately 630 and 339 respectively during the year. Some 70 per cent. of the private admissions were voluntary, but all the rate-aided admissions were under certificate, and the medical superintendent, Dr. Easterbrook, comments forcibly on the obsolescent provisions and objectionable terminology under existing statutes which officially distinguish the latter class as "pauper lunatics," and he points out that the absence of definite statutory provision for the treatment of rate-aided patients as voluntaries has had unfortunate results. A well-equipped clinical and pathological laboratory conducts much useful work at the Institution, which has received commendation from the Commissioners of the General Board of Control after inspection.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned: Grade IV. of the Civilian Educational Staff of the Royal Air

Force, preferably with engineering qualifications and experience.—The Secretary, Air Ministry, Adastral House, Kingsway, W.C.2; Bio-chemist at Dove Marine Laboratory, Cullercoats.—The Registrar, Armstrong College, Newcastle-upon-Tyne; an assistant lecturer in the department of physiology of the Welsh National School of Medicine.—The Secretary, University College, Cardiff (April 11); a lecturer in morbid anatomy and histology in the University of Manchester.—The Internal Registrar (April 15); a research fellowship at Somerville College, Oxford, open to Oxford women graduates.—Miss Lorimer, at the College (April 16); woman as principal administrative officer of King's College for Women, Household and Social Science Department, Campden Hill Road, W.8.—The Chairman of the Executive Committee (April 16); two assistant lectureships in physics in the University of Manchester.—The Internal Registrar (April 18); the professorship of bio-chemistry at Middlesex Hospital Medical School.—The Academic Registrar, University of London, South Kensington, S.W.7 (April 23); the professorship of chemistry and directorship of the department of chemistry, the University of Birmingham.—The Secretary (May 1); four scientific assistants for the science exhibition of the Royal Society at the British Empire Exhibition.—The Secretary, British Empire Exhibition Committee, Royal Society, Burlington House, W.1.

Our Astronomical Column.

TWO NEW COMETS.—Comet 1925 *a* was discovered by Herr Schain at Simeis Observatory, Crimea, on March 23. It is of the tenth magnitude and visible in moderate telescopes. When discovered it was near β Virginis, and was moving slowly to the north-west. Being nearly opposite to the sun, it is observable for most of the night. The following positions have come to hand:

G.M.T. (new).	App. R.A.	App. N. Decl.	Observer.	Place.
d. h. m.	d. h. m. s.	" "		
Mar. 23. 22 43.6	11 47 48.9	1 43 49	Schorr	Bergedorf.
" 25. 23 42.3	11 44 8.3	1 53 46	Vinterhausen	Copenhagen.
" 27. 23 37.5	11 40 32.2	2 3 22	Stevenson	Norwood.
" 29. 0 22.0	11 38 39.7	2 7 53	"	"

The last place depends on an approximate position of the star $BD + 2^\circ 2468$, mag. 9.5; assumed place for 1925.0, $11^h 39^m 6.3^s$, $2^\circ 12' 12''$. Use should not be made of this position until a better star-place is available. The comet's R.A. is diminishing by about $1^m 53^s$ daily, its declination increasing by $5'$ daily.

The orbit has not yet been calculated, but the ascending node is evidently near 0° , and the inclination not large; this fact would make an elliptical orbit not unexpected.

Comet 1925 *b* was found by Mr. William Reid at Cape Town on March 24. It should be stated, in correction of some paragraphs in the press, that Mr. Reid, whose diligence and success in comet-sweeping are well known, is not on the staff of the Cape Observatory, but is an amateur.

This comet is brighter than the other, being of magnitude 8, but its low altitude is a hindrance to easy observation in England. The following positions have come to hand:

G.M.T. (new).	App. R.A.	App. S. Decl.	Observer.	Place.
d. h. m.	d. h. m. s.	" "		
Mar. 24. 21 33.0	13 29 47	20 16 0	Reid	Cape Town.
" 28. 1 9.4	13 26 58.3	21 5 16	Stevenson	Norwood.
" 28. 2 49.0	13 26 54.5	21 6 15		Algiers.
" 29. 1 12.0	13 26 0.1	21 20 36	Stevenson	Norwood
" 29. 1 29.0	13 25 59.8	21 20 54	"	"

NO. 2892, VOL. 115]

The R.A. is diminishing by 54 sec. daily, the south declination increasing by nearly $16'$ daily.

The orbit has not yet been calculated, but, as in the case of Comet 1925 *a*, the observations given should be sufficient to deduce preliminary orbits. Reid's comet is not far from γ Hydræ, and is due south about three-quarters of an hour after midnight. There will be more chance of observing the comets after the moon has set.

BROADENING STELLAR SPECTRA.—In Mon. Not. R.A.S., vol. 85, p. 47, Dr. W. J. S. Lockyer, Director of the Norman Lockyer Observatory at Sidmouth, describes a new method of broadening stellar spectra for purposes of reproduction. Since stellar images are merely points, the spectra have no breadth unless special methods are adopted to broaden them. For practical purposes it is customary to allow the image of the star to "trail" on the photographic plate by a suitable adjustment of the rate of the driving clock, but very little breadth is usually possible owing to the increased time of exposure entailed. Further, various unavoidable irregularities in brightness make the spectra broadened in this way unsuitable for picturesque reproduction. In the arrangement devised by Dr. Lockyer, the original negative, showing a narrow spectrum (after being specially prepared in a manner explained in the paper) is allowed to fall under gravity in a direction parallel to the spectrum lines, its speed being regulated by a flow of oil which, by an ingenious arrangement, is produced by the fall. During the fall the negative is illuminated by a constant source of light and photographed, the breadth of the spectrum thus obtained clearly being determined by the distance of descent. The paper contains an account of investigations made to determine the most satisfactory time of exposure, and also a beautiful photograph of the spectrum of α Cygni broadened by the new method.