and Progress.' This is followed by the address of David Starr Jordan, entitled 'Comrades in Zeal,' before the Sigma Xi Society. Edward S. Holden discusses 'The Predecessors of Copernicus,' giving much information about the early astronomers, and J. Madison Taylor considers 'The Conservation of Energy in those of Advancing Years.' Oliver C. Farrington treats of 'The Geographical Distribution of Meteorites' and Charles P. Pettus describes the origin and progress of 'Washington University,' whose fine and harmonious buildings will be a surprise to many. The final article is by G. A. Miller, on 'What is Group Theory?'

Bird-Lore for January-February opens with an illustrated article on 'The Black Tern at Home,' by Ernest Thompson Seton and Frank M. Chapman, and this is followed by 'Horned Larks in Colorado Springs,' by E. R. Warren. 'The Christmas Bird Census' comprises records by 78 observers scattered well over the country. There is a second paper, with colored plates, on 'The Migration of Warblers,' by W. W. Cooke, and an interesting prize essay in the department 'For Young Observers.' In the editorial section is a protest against 'humanizing the birds,' and under 'The Audubon Society' there is much of interest.

The Museums Journal of Great Britain for January has an article by Benjamin Ives Gilman, 'On the Distinctive Purpose of Museums of Art,' in which the writer takes the ground that there is a marked difference between museums of art and other museums. The function of the art museum is not primarily that of popular instruction, this being of secondary importance to its esthetic influence. The notices of art forgeries contained in the notes should put collectors of paintings and bric-à-brac on their guard.

PROFESSOR R. KRAUSE and Dr. M. Mosse, of Berlin, announce the foundation of a new *Centralblatt f. normale und pathologische Anatomie mit Einschluss der Mikrotechnik.*

SOCIETIES AND ACADEMIES.

NEW YORK ACADEMY OF SCIENCES. SECTION OF ANTHROPOLOGY AND PSYCHOLOGY.

THE regular meeting of the section was held on January 25 at the American Museum of Natural History in conjunction with the New York Branch of the American Psychological Association. Afternoon and evening sessions were held, the members dining together between sessions. The program was as follows:

Primary and Secondary Presentations: Dr. HENRY RUTGERS MARSHALL.

Dr. Marshall in his paper aimed to present evidence that presentations are always new presentations, and that, therefore, images can not be properly said to be copies of impressions, nor can what we call representations be properly said to be duplications of any presentations which have previously existed. His paper was a summary of an article which is presently to appear in *Mind.*

The Generic Relation of Organic Sensation and Simple Feeling: Professor MARGARET E. WASHBURN.

The Universe's Place in Man: Dr. FRANCIS BURKE BRANDT.

The paper emphasized the necessity for a fresh start in modern empirical investigation through a critical restatement of the postulates of experience. The starting point of every empirical science, it was contended, is individual conscious experience. The primary datum of individual experience is a perceptive and a conceptive consciousness combined organically in the unity of a personal life existent in a universe of persons. The material universe thus primarily takes its place in man rather than man his place in the material universe, for scientific philosophy has demonstrated beyond criticism, first, that the visible universe always exists primarily in and for a momentary perceptive consciousness limited in space, and second, that the unseen universe is always primarily a conceptive construction whose validity is always verifiable within the realm of momentary perceptive experience. The material universe, whether conceived

phenomenally or existentially, participates in one case in the content, in the other in the being of absolute personality, and as such, so far as individual man is concerned, is the objectification of the conditions of higher individual development.

Retinal Local Signs: Mr. Walter F. Dearborn.

This paper was offered as a critique of the first of the three Lotzean hypotheses concerning the nature of the retinal local signs. Experiments to determine the accuracy of the motor impulse, as shown by the ability to fixate directly eccentric visual stimuli forty degrees to the right of the primary line of regard, found an average error of corrective movements considerably in excess of the threshold value of local discrimination for the same part of the retina. These discrepancies between the accuracy of the motor impulse and the delicacy of local discrimination seem to necessitate some modification of the traditional view in regard to the nature of the local signs, or at least in regard to the relative importance of the motor factor.

Dewey's 'Studies in Logical Theory': Dr. Henry Davies.

In this paper only the four chapters contributed by Professor Dewey to the above work were considered.

Toward the right understanding of the work two conditions of a historical character must be borne in mind. One of these is the relation of recent logical theory to the Kantian dualism of sense and reason which tended to separate thought from its object. The other is the influence of the evolutionary method, which drives the investigator to study logical distinctions in the light of their genesis in experience.

Both of these conditions exert a profound influence over Dewey's thought. For it is the essence of his contribution to logical theory that he shows that the obstinate manner in which logicians have accepted the Kantian reading of experience is the most fruitful historical cause of the contradictions, *e. g.*, in Lotze's 'Logic' as well as in that of Bradley and Bosanquet. Dewey claims that this is a complete misreading of the thought situation.

On the other hand, common sense and empirical science with their pragmatic and evolutionary method disclose the real situation. Thought is a question of *specific* purposes, *specific* contexts and *specific* conflicts. Common sense and empirical science assume for these specific aims the unity and continuity of experience. The logical problem emerges when this is broken up by an inward conflict into fact and theory, datum and ideatum. The content of thought is just this conflict, which is only a temporary phase of the logical situation, the outcome of which must always be the reestablishment of the original unity in our experience.

It follows from this that logic can not contemplate as its aim a completely rationalized metaphysics. Rather its function is to act as a philosophy of experience, as a *method* by which experience may be advanced towards better and more complete knowledge. But the rectification of experience and the complete correlation of all the functions of experience presuppose a logic of genetic experience. It is Dewey's merit to have pointed this out and to have, in large part, supplied the need in the present work.

The Distribution of Errors in Spelling English Words: Professor Robert MacDougall.

Dr. MacDougall made a provisional report upon an investigation of the distribution of errors in spelling English words. These occur characteristically in the latter part of the word, but do not present a continuous increase from beginning to end. The curve of error is an anticlinal having its maximum in the third quarter of the word and its points of origin the initial and final letters, of which the latter is the higher in the scale of errors. Similar relations are presented by the component syllables, fewest errors occur in the initial, most in the median letters. Considered apart from their relation to the termination of the word, the frequency of error in successive letters is found to increase with each remove from the beginning of the word.

The Ultimate Relation between Magic and Religion: Dr. Irving King.

Magic and religion can not be legitimately

distinguished on the side of the actual content of their respective practices, nor by using such notions as that of the supernatural, unless they are critically reconstructed with reference to the type of culture in which they are applied. It seems more legitimate to differentiate magic and religion according to the types of situations within which they appear. Some tensions in the experience of the primitive man are merely occasional and appeal to him chiefly as an individual; others are more general and appeal more insistently to the consciousness of the social group. In connection with the former sort of tensions magical practices are developed, and in connection with the latter variety religion differentiates.

JAMES E. LOUGH,
Secretary.

BOTANICAL SOCIETY OF WASHINGTON.

THE seventeenth regular meeting of the Botanical Society of Washington was held at the Portner Hotel, January 7, 1904.

Messrs. A. D. Shamel, W. W. Tracy, Sr., Professor C. V. Piper and Professor W. M. Scott were elected to active membership.

At the close of the business meeting the following papers were presented:

The Identity of American Upland Cotton: MR. L. H. DEWEY.

The common cultivated cotton of the southern states is known in American botanical literature as *Gossypium herbaceum* L. European authors, especially in recent years, have referred it to *G. hirsutum* L. Nearly all authorities agree that the cotton of southern Asia, cultivated in India since the earliest records, also cultivated in southern Europe and known as the Levant cotton, is *G. herbaceum*. The descriptions of Linnæus do not characterize the species definitely, though 'five-lobed leaves' applies best to *G. herbaceum*, and 'acutely three- to five-lobed leaves' to *G. hirsutum*, but the authors cited by Linnæus state clearly that *G. hirsutum* is the American cotton.

The name *Gossypium herbaceum* has evidently been applied to American cotton as the result of a misidentification by early American authors and the assumption that it originated from seed brought from Europe. American upland cotton is almost certainly of American origin. Both American and Asiatic cottons exhibit a wide variation, but the general characters within the limits of variation are sufficiently constant to mark them with certainty as distinct species. *Gossypium herbaceum* has leaves with roundish or broadly acuminate lobes, yellow flowers purple at the base of the petals, toothed bracts and nearly spherical umbonate five-celled bolls to which the lint tenaciously clings. *Gossypium hirsutum* has acutely lobed leaves, white flowers, turning purple (but rarely with purple at the base of the petals) deeply cleft bracts, and ovate four- to five-celled bolls from which the lint is free at maturity. Tournefourt, in 1700, described it as the 'finest American cotton with greenish seeds'; Linnæus, in 1763, called it *Gossypium hirsutum*, and this is the name by which it should now be known.

The Influence of Insoluble Substances on the Poisonous Action of Aqueous Solutions on Plants: DR. RODNEY H. TRUE.

The paper by Dr. True, on the effect exerted on the action of poisonous substances by the presence of insoluble bodies in the solutions, presented in a preliminary way the results of a series of experiments, still in progress.

Finely divided paraffine, quartz sand, filter paper, and other insoluble substances were found to reduce the action of salts of the heavy metals and of certain non-electrolytes by their mere presence. This was explained on the basis of a supposed adsorption of the molecules of the poisonous compound by the surface of the insoluble body. A parallel was pointed out between the rates of growth seen in solutions containing a constant amount of copper sulphate provided with increasing quantity of quartz sand, and the growth rates seen in a series of progressively diluted copper sulphate solutions. The effect was similar in both cases, indicating that the insoluble substance in its essential effect removes molecules or ions of the poisonous materials from the free solution. The bearing of this situation on all physiological problems dealing with the soil was pointed out and the

possibility of an important action in the internal physiology of plants was suggested.

The Present Confusion Among the Species of Dioscorea: Mr. W. E. Safford.

Mr. Safford became interested in the classification of the species of *Dioscorea* during his cruises among the islands of the Pacific. On many of them yams are among the principal food staples of the natives, and occur both spontaneously and in cultivation. Many distinct forms occur which have received vernacular names on the various islands, but the delimitation of species and varieties is very difficult. The same species varies under different conditions of light and moisture; leaves vary in shape, pubescence, and relative position on young and old specimens, and, indeed, on different parts of the same plant. Many of the early collectors contented themselves with giving lists of native names together with a brief description of the tubers to which they apply. Many of these names prove to be descriptive, as 'white yam,' 'blue yam,' 'one-head yam,' 'devil yam' and the like. No attempt has been made to bring together the various forms of different island groups for comparison, and no confidence can be placed in existing synonymy.

On the island of Guam the natives have divided the yams into two classes according to the shape of their leaves, calling all those with broadly cordate or orbicular leaves with a deep basal sinus 'Nika,' and those of which the leaves are more or less sagittate or hastate 'Dago.' Gaudichaud, botanist of the Freycinet expedition which visited Guam in 1818, referred the varieties called *Dago* to *Dioscorea alata,* and those called *Nika* to *Dioscorea aculeata.* In Guam the wild Nika ('Nika cimarron,' or 'Gado') differs radically from the cultivated form in having a mass of lateral roots about the base modified into sharp, wiry, branching spines. Whatever may have been the cause of their origin, they serve to protect the sweet farinaceous tuber below. Gaudichaud referred this species to *D. aculeata,* but it proves to be *D. spinosa* Roxb.

Linnæus' descriptions are brief and quite insufficient. Many of them were evidently made from type plants in poor condition, and in some of them a single description included two or more species. According to Sir Joseph Hooker a part of Linnæus' description of *Dioscorea sativa* ('Spec. Pl.,' ed. I., 1033) applies to *D. spinosa* Roxb., to which should also be referred Roxburgh's own *D. aculeata.* The true *D. aculeata* L. is without the basal spines above described, and *D. sativa* L. is a glabrous plant with a terete bulbiferous stem. To the latter species should be referred the *D. bulbosa* of Robert Brown.

In looking over herbarium specimens it becomes apparent that yams can not be studied from dried plants. Points of distinction often lie in the flowers or fruit, which are often wanting in herbaria or are represented by only one sex. Cultivated yams are propagated asexually; and many varieties, like those of sweet potatoes, ginger, *Colocasia,* and other cultivated plants, are seldom seen in flower or fruit. Other species have been differentiated according to the form of their tubers; and these are almost always lacking in herbaria. Still others have been described with reasonable accuracy, but figures of different species have been cited as illustrations.

Sir Joseph Hooker found the species of Indian Dioscoreæ in such indescribable confusion that, after devoting much labor in determining and delimiting them, he had to let them appear in his 'Flora of British India' in a shape most unsatisfactory to himself, saying that he could not hope to avoid errors; that the Roxburghian food-yielding species are for the most part indeterminable, and that the Malayan species are even more loosely described than the Indian; while in the Wallichian collection, which is very complete, the species are often mixed.

It is evident then that food-yielding varieties of *Dioscorea* must be studied on the spot where they are cultivated, and not in market places or in museums. Series of complete specimens of the plants should be secured, showing different parts of the stem, basal and cauline leaves, flowers of both sexes, fruit and photographs of growing plants and tubers attached to the stem, together with specimens in alcohol or formalin of the inflorescence and the tubers themselves.

In this way alone will it be possible to bring together and compare in a satisfactory manner forms from Polynesia, India, the Malay Archipelago, Africa, Australia and America.

HERBERT J. WEBBER,
Corresponding Secretary.

FACULTY SCIENCE CLUB OF WELLESLEY COLLEGE.

THE meetings of the Faculty Science Club for the current academic year have been of sustained interest. Professor Charlotte F. Roberts spoke in October on the 'Action of Metallic Magnesium upon Aqueous Solutions,' detailing experiments performed in the chemical laboratory, the results of which were published in the *Journal of the Chemical Society.*

The November meeting was addressed by Professor Sarah F. Whiting, on 'The Latest Theory of Electricity and its Historical Development.' This paper was amply illustrated by experiment, and finally some radium salt was exhibited, also photographs taken with it, and its action in discharging electricity.

Professor Irving Fisher, of Yale, was the guest of the club in December, and spoke on 'Sundials, their Different Forms and Mathematical Theory.' He especially described a bronze cylindrical sundial of his own construction, which gives not only local apparent time but that of any standard meridian and sidereal time. This dial is, through President Hazard, placed in the Whitin Observatory.

At the January meeting Miss Alice Wilson Wilcox spoke on '*Pectinatella magnifica,*' detailing her own studies of this form. This paper was illustrated by drawings, photographs and microscopes.

GRACE LANGFORD,
Secretary.

THE SCIENCE CLUB OF THE UNIVERSITY OF WISCONSIN.

THE December meeting of the club was held on the 22d inst., President Turneaure in the chair.

The first paper, by Professor Sandsten, on 'Conditions which affect the Production and Fertility of Pollen,' dealt with a number of interesting questions which have been subjects of research by Professor Sandsten. A week's rain at the time of blossoming of apples was shown absolutely to prevent distribution of pollen and cause an orchard to be barren.

The second paper, by Professor Whitson, on 'The Influence of Climate on Soil,' was illustrated by striking examples of plants grown in soil which had been used for ten years in the university greenhouse, as compared with similar plants which had been grown in the same soil which had been only recently removed from the field. The plants in the first case were enormously advanced, while the comparative analysis of the soils showed the greenhouse soil to be much richer in soluble matter and to have undergone marked nitrification.

THE January meeting of the club was called to order on the twenty-sixth at 7:30 P.M. in the physical lecture room of Science Hall, President Turneaure in the chair.

The first part of the evening was devoted to reports of the recent meetings of the science associations. W. H. Hobbs reported on the geology and mineralogy section of the American Association for the Advancement of Science; B. W. Snow on the physics section of the American Association for the Advancement of Science; V. Lenher on the American Chemical Society, E. B. Skinner on the Wisconsin Academy of Sciences, Arts and Letters.

The paper of the evening, 'Some Economic Problems in the Location of the K. L. and J. R. R. in Tennessee,' by W. D. Taylor, was presented in a very interesting manner, being illustrated by lantern slides of the region and of the workings in the construction of the road.

VICTOR LENHER,
Secretary.

THE NORTHEASTERN SECTION OF THE AMERICAN CHEMICAL SOCIETY.

THE forty-ninth regular meeting of the section was held at the rooms of the Tech. Union, Massachusetts Institute of Technology, Boston, Friday, January 22, at 8 P.M., with President W. H. Walker in the chair. Forty members were present.

Mr. Maximilian Toch, of New York, pre-

sented a paper on the 'Permanent Protection of Iron and Steel,' in which he discussed the different kinds of coatings used for the purpose, with especial reference to the good effects obtainable by the use of a paint made from Portland cement of a certain definite composition. Lantern slides were shown illustrating the microscopical character of cements of various compositions, and the effects of corrosion on structural iron and steel.

Arthur M. Comey,
Secretary.

DISCUSSION AND CORRESPONDENCE.

CONVOCATION WEEK.

To the Editor of Science: I, with doubtless many others, feel indebted to you for the clear exposition, in your editorial on convocation week, of certain problems in the policy of the American Association. The purposes of the association to encourage research and specialization and, at the same time, disseminate scientific and useful knowledge among the people, divides the membership of the association now, more than at any time in the past, into two more or less distinct groups—investigators and popular teachers. Under ideal conditions, taste and ability for these two occupations should be perfectly balanced in each individual, but rarely is this the case. With increasing specialization in science, we are approaching more and more nearly to industrial conditions, where production and distribution are the separate functions of the manufacturer and the merchant. These two deal with each other oftenest not directly, but through a middle man. There is, to be sure, a vast difference between knowledge and merchandise, but the similarity in development deserves attention. It must be admitted that at times in the past the two purposes of the association have gone but lamely together. To some lack of community of interest between them, which I grant ought not to have existed, the birth of some of our separate societies was due. If efficiency in each branch were the sole consideration, it would be better to have investigators and specialists in each science in a group by themselves for their serious work, but some point of contact among specialists in the different sciences and with the public at large must be found, or the whole system will fail from too much intellectual in-and-in breeding, on the one hand, if not from lack of popular sympathy and support, on the other. The convocation week meeting of the association, if wisely conducted, can doubtless bring together the meetings of a large number of affiliated societies, and thus effectually emphasize the common ground and common purpose of the sciences, which is now too often forgotten by both scientific societies and scientific men. The function of the association at such a meeting would be largely that of a clearing house, and the second purpose of the association could receive but the scantiest attention. This would be unsatisfactory to what I take to be the larger and more rapidly increasing part of the present membership of the association. I believe, therefore, some ampler provision should be made for this already too much neglected body by a second meeting at a different time of year, preferably in the summer season. It is plain, however, that the most careful judgment and balance must be shown in making up the programs of the two meetings, to meet effectually the double purpose of the association, and still make both meetings attractive, if not of compelling interest, to the whole membership. Aside from such considerations, the financial aspect of two meetings a year may prove to many a vexing one. It may be true that the association can, with its increased membership, carry the financial burden of two meetings; but how about the individual who in most cases is compelled to live on a salary inadequate to his growing obligations? If those who can attend but one meeting a year can be brought to see that their freedom and convenience are better served when they have two meetings from which to choose, the problem will be simplified.

The suggested change of policy seems to me one of such far-reaching importance that it should receive the broadest discussion from the most varied points of view before a decision is attempted.

Ernest Fox Nichols.

Columbia University,
February 2, 1904.