3. Classify in greater detail. Enter a paper under each subject heading of which it treats even though it seem unimportant.

F. B. WEEKS.

SCIENTIFIC JOURNALS AND ARTICLES.

THE *Bulletin of the Michigan Ornithological Club* for December contains articles on the 'Nesting of the White-breasted Nuthatch,' by Edwin G. Mummery; 'Purple Martin Notes from Waynesburg, Pa.,' by J. Warren Jacobs; 'Nesting of the Sandhill Crane in Michigan,' by Edward Arnold. There is the third series of portraits of Michigan ornithologists and other illustrations, including a half-tone of the University of Michigan Museum. Besides the papers above mentioned and the official 'Minutes of Club Meetings,' book reviews and the constitution of the organization there are numerous notes including 'Another Parasitic Jaeger (*Stercorarius parasiticus*) from Michigan,' by Alexander W. Blain, Jr., and 'Nesting of the Cardinal Grosbeak (*C. cardinalis*) in Ingham County, Michigan,' by Professor Walter B. Barrows, being the first authentic record of the breeding of the cardinal in the state. Beginning with 1904 Charles E. Wisner, of Detroit, will assume the business management of the *Bulletin*.

SOCIETIES AND ACADEMIES.

NORTH CAROLINA SECTION OF THE AMERICAN CHEMICAL SOCIETY.

THE seventh annual meeting of the section was held in the chemical lecture room of the Agricultural and Mechanical College, West Raleigh, on November 28, 1903, at 11 A.M., with presiding officer, Chas. E. Brewer, in the chair.

Preceding the presentation of papers a short business meeting was held and the following officers were elected for the ensuing year:

President—Dr. A. S. Wheeler, Chapel Hill, N. C.
Vice-President—Dr. R. W. Page, Raleigh, N. C.
Secretary-Treasurer—C. D. Harris, Raleigh, N. C.
Councillor—Professor W. A. Withers, Raleigh, N. C.
Reporters—W. G. Morrison, West Raleigh, and S. E. Asbury, Raleigh, N. C.

The following papers were presented and discussed:

Action of Ultra-violet Light upon Rare Earth Oxides: CHARLES BASKERVILLE.

See *American Journal of Science*, December, 1903.

On the Action of Radium Compounds upon Rare Earth Oxides and the Production of Permanently Luminous Preparations by Mixing the Former with Powdered Minerals: CHARLES BASKERVILLE AND GEO. F. KUNZ.

Will appear in *American Journal of Science*, January, 1904.

Phosphorescent Thorium Oxide: CHARLES BASKERVILLE.

As previously shown, thorium dioxide is one of the two rare earth oxides (zirconium dioxide being the other) and the only radio-active one which phosphoresces with ultra-violet light. This method of testing was applied to different fractions obtained from the thorium dioxide by volatilization of the chlorides. The three fractions obtained varied as follows: The residue (containing the carolinium) is only faintly phosphorescent, due doubtless to the retention of some thorium. The crystalline sublimate is about ten times as phosphorescent as the original oxide, whereas the very volatile fraction (*weisser Dampff* of Berzelius) does not phosphoresce at all. The last-mentioned preparation contains a little thorium. The radio-activity is greatest in the residue and least in the volatile body. The name *berzelium* is proposed for this third fraction of thorium.

A Simple Device for Illustrating the Periodic Law: CHARLES BASKERVILLE.

The device consists of blocks cut in length according to the atomic weight, taking one half inch for hydrogen. The blocks are planed, presenting flat surfaces corresponding to the valency. The electro-positive and negative properties are indicated by painting blue or red. When these blocks are arranged in an ascending series according to their heights, the resemblance of the properties of the ele-

ments in the different families of the periodic law is strikingly presented.

Upward Filtration and Its Application in the Determination of Crude Fiber: J. M. PICKELL.

This is a rapid method of washing and filtering fiber by sucking the fiber (contained in a beaker) up against a linen filter which is stretched across the top of a small funnel, or better, across a 'carbon filter,' which is provided with a rim for this purpose. The time consumed in a filtration is usually a fraction of a minute, but in the more difficult cases, two, three, four and in rare cases, ten or fifteen minutes. In the few cases tested (cotton-seed meal, wheat bran) it was found to pass (and thus lose) 0.2 per cent. to 0.3 per cent. of solids, which a good thick, but slow-filtering asbestos (Gooch) filter took out. With cotton-seed meal, corn bran, wheat bran, rice chaff, ground corn cobs, peanut hulls, peanut middlings, it gave duplicates agreeing within 0.01 per cent. to 0.30 per cent. A detailed description of the apparatus and method will be soon published. It is thought that unglazed terra-cotta disks and with suitable protection, even filter paper, especially the *hardened* variety, may be substituted for linen, and the method applied quantitatively to difficult filtrations other than those of fiber. Experiments in this line are in view.

The Constitution of Cellulose (a report): ALVIN S. WHEELER.

A review of the literature on the subject up to date. The empirical formula of the reacting unit is $C_6H_{10}O_5$. The evidence favors a cyclic formula for the unit. The fact that the tetra acetate of cellulose is a normal ester shows that four oxygens are hydroxylic. The fifth oxygen is carbonyl oxygen and the behavior of cellulose clearly indicates the CO group to be ketonic and not aldehydic. Fenton and Gostling's production of ω-brommethylfurfural from cellulose is exceedingly interesting in this connection. The provisional formula $CO < (CHOH)_4 > CH_2$ has many suggestions in it. The subject is a very complicated one.

C. D. HARRIS,
Secretary.

THE AMERICAN CHEMICAL SOCIETY. NEW YORK SECTION.

AT the regular meeting held on December 4 the section elected to the council of the society, Professors E. H. Miller and Virgil Coblentz, and Drs. Leo Baekeland, Hugo Schweitzer and Durand Woodman.

The following papers were then read:

The Dissociation of Lead Nitrate: LEO BAEKELAND.

Dr. Baekeland described the methods and results of an extended investigation of the dissociation of lead nitrate under different conditions and discussed the principles of chemical dynamics involved in the interpretation of his results. Several pieces of apparatus especially designed for this research were described and illustrated.

On the Conversion of Lead Sulphate to Barium Sulphate and a Method for the Determination of Sulphur in Lead Slags: E. H. MILLER AND J. F. THOMPSON.

This paper showed that the conversion which would be expected from the difference in the solubility products of the sulphates could not be made to take place, as the mechanical coating of the lead sulphate by barium sulphate or a barium lead sulphate always prevented complete conversion. By varying the procedure and dissolving the lead sulphate in hydrochloric acid, a satisfactory precipitation of SO_4 ions as barium sulphate was obtained. This was made the basis of a method for sulphur in lead slags. A variety of slags were tested in comparison with the Fahlberg-Iles method.

The End Products of Self-Digestion of Animal Glands (first communication): P. A. LEVENE.

Dr. Levene gave the results of experiments with the pancreas gland and the liver. The pancreas was subjected to self-digestion in a 0.5 per cent. sodium carbonate solution, the liver in a 0.2 per cent. acetic acid solution. The present report covers the examination of the end-products for amino-acids. Alanin, amino-isovalerianic acid, leucin, glutamic acid, phenylalanin and tyrosin were found in each case. The presence among the digestion

products of α-pyrolydin-carbonic acid could not be established with certainty.

A Restant Source of Error in Optical Sugar Analysis: F. G. WIECHMANN.

Dr. Wiechmann's paper dealt with the error due to the space occupied by the precipitate formed by basic lead acetate used as a clarifying agent. After a discussion of the extent of the error thus introduced in the examination of different classes of raw sugars, the author outlined briefly the results of a study of the methods proposed by Scheibler and by Sachs for the determination of the volume of the precipitate. This paper will be found in the *School of Mines Quarterly* for November, 1903.

Dry Defecation in Optical Sugar Analysis: W. D. HORNE.

Dr. Horne described a method for clarifying sugar solutions so as to avoid or minimize the error discussed by Dr. Wiechmann. The 'normal weight' of sugar is dissolved and diluted to 100 cubic centimeters and the solution clarified by the addition of pulverized anhydrous subacetate of lead. The acetic acid going into solution appears to replace in volume the organic acid, precipitated by the lead, so closely that the polarizations obtained on such solutions approximate the theoretical.

After the reading of the above papers, Dr. G. Plath, of Berlin, exhibited and explained a number of specimens of improved stoneware apparatus designed for use in chemical operations.

H. C. SHERMAN,
Secretary.

CHEMICAL SOCIETY OF WASHINGTON.

THE 146th regular meeting of the Washington Chemical Society was held Thursday, December 10, at 8 P.M., in the assembly room of the Cosmos Club. The program for the evening consisted of the following three papers.

The first paper, entitled 'The Bromine Absorption of Oils,' was presented by Mr. L. M. Tolman.

A comparison of the results obtained by different methods was made, and it was shown that the one third normal bromine in carbon tetrachloride gave as high addition figures as the Wij's and Hanus methods, when the carbon tetrachloride was dry and the reaction was allowed to take place in the light. Moisture was found to have a very marked effect on both the addition and substitution values. The length of time necessary to obtain complete reaction was found to vary in the light, 30 to 60 minutes being necessary, while in the dark a definite point was reached in a very short time, but the results were much below those obtained in the light. Experiments were reported using iodine chloride and iodine bromide in carbon tetrachloride solution. The iodine chloride in carbon tetrachloride was found to be the most satisfactory.

The second paper on the program, entitled 'The Action of Sal Ammoniac on Certain Chlorides,' was presented by Dr. P. Fireman. The action of ammonium chloride upon inorganic and organic polychlorides in sealed tubes at temperatures about 450° C. was investigated. The author found that those inorganic polychlorides which are themselves dissociable, react with ammonium chloride in a manner similar to the reaction between ammonium chloride and phosphorus pentachloride. With respect to organic polychlorides, it was found that under certain conditions carbon tetrachloride reacts with ammonium chloride, with the liberation of hydrochloric acid and the formation of a yellowish compound which is probably a polymeric modification of cyanogen chloride.

The third paper on the program, entitled 'The Solubility of some Slightly Soluble Phosphates,' was presented by Dr. F. K. Cameron. The author briefly reviewed the literature bearing on the solubility of the phosphates of calcium, aluminum and iron, and gave a preliminary announcement of some experimental investigations he has been carrying on with Dr. Seidell and Mr. Hurst. It appears that the evidence obtained can not be brought in harmony with the indications of the dissociation hypothesis, even in very dilute solutions. But some of the apparent discrepancies between the hypothesis and the observed facts are undoubtedly due to the fact

that these substances are very slightly soluble in themselves, but hydrolize greatly with the formation of a readily soluble constituent.

A. Seidell,
Secretary.

THE BIOLOGICAL SOCIETY OF WASHINGTON.

The 378th meeting was held on Saturday, December 12.

William H. Ashmead presented some 'Remarks on Japanese Hymenoptera,' stating that a recent study of specimens in the U. S. National Museum had raised the number of known species to over five hundred and fifty. Some of these were represented in eastern and southern Asia, while the relationship of the parasitic forms were largely North American. Specimens and drawings of some of the more interesting species were shown, including three distinct honey bees.

V. K. Chesnut and Harry T. Marshall gave "Some Observations on 'Locoed' Sheep." Mr. Chesnut described the symptoms of locoed animals; tendency to stray, loss of appetite for ordinary food, evident hallucination, outbreaks of violence, wasting of flesh and, finally, death. He stated that animals that had acquired taste for the loco weed rarely, if ever, recovered, and that in parts of the west the loss of stock was very considerable. The property of 'locoing' animals had been ascribed to various plants of the genera *Astragalus, Aragallus* and *Datura.* Mr. Marshall gave the results of the examination of fourteen sheep, afflicted with the loco-disease, and selected from a number as showing typical symptoms. These sheep exhibited no special lesions such as might be considered characteristic of the complaint, but some of them were infested by various parasites. The speaker stated that while he believed in the existence of a loco-disease so far as these sheep were concerned, the actual observations showed that it had been preceded by other causes and that sheep enjoying full health had not been attacked.

Charles Hallock spoke of 'The Bison as a Factor in the Distribution of Aboriginal Population in Mid-Continental America,' stating that the introduction of the horse had enabled the Indians of the southwest to follow the bison northwards into the plains, while as the country in the eastern United States became settled the forest Indians were crowded westward into the same localities, following the bison as a source of food. F. A. Lucas.

ANTHROPOLOGICAL SOCIETY OF WASHINGTON.

The 351st meeting was held December 1. Dr. D. S. Lamb read a paper entitled 'Albinism and Melanism,' in which he carefully reviewed the contributions to the study of this subject. Dr. Lamb spoke of the wide distribution of albinism among human beings, its occurrence among animals and plants and of the experiments in the latter fields to produce albinism. Albinism, he stated, is congenital and inheritable. The theories on the cause of albinism were reviewed. The more important took civilization and the direct action of the nerves as causes. It was concluded that no satisfactory explanation of albinism and melanism has yet been advanced. In the discussion Dr. Hrdlicka showed photographs and samples of hair of the Hopi and Zuñi albinos and observed that there are more female than male albinos at Moki, that several are below the average intelligence and many were second child in order of birth. Dr. Hrdlicka expressed his belief in the causal relation of the nervous system to albinism. He related an extraordinary case where the wings of an albino jay bird which he cut off in Mexico had returned almost to their natural blue color when unpacked in New York. The president, Miss Alice C. Fletcher, said that housing among the different tribes accounted for differences of complexion and that albinism has been explained in this way. The secretary said that the purpose of the study of albinism and melanism from the anthropological side was to ascertain the causes of race coloration, which has been a fruitful subject for theorization. The discussion was taken part in by Mr. Hallock, Mrs. Lamb and Mrs. Seaman.

Colonel Paul E. Beckwith read a paper entitled 'The Rise and Decline of the Sword.' Colonel Beckwith pictured the conditions of the life of early times and showed that man

had to weapon himself for his protection. Prehistoric flint weapons which stand at the beginning of the sword were exhibited and traced along to the seft of Egypt, down through the various derivative forms in Africa, Europe and Asia in the different periods. Colonel Beckwith described the sword blade, the nomenclature of its parts and the reasons for the different forms, closing with remarks on the decline of the weapon incident to modern warfare.

The question of the preservation of the antiquities of the United States, which was laid over from a former meeting, was brought up by Dr. H. M. Baum, who urged action. Professor Holmes said that the Bureau of Ethnology has taken up the subject and that Mr. McGuire is engaged in examining the laws of various countries with a view to the preparation of an act for the United States. Dr. Baum suggested that a movement be put on foot to awaken public sentiment in the preservation of antiquities and to this end the society should petition and put the matter before congress. Dr. Lamb moved that a committee of five members be appointed to consider and report on the ways and means for the preservation of antiquities. The motion was seconded by Mrs. S. S. James, who spoke of the work in this line by the ladies of Colorado. The president thereupon appointed a committee consisting of W. H. Holmes, J. W. Fewkes, A. Hrdlicka, H. M. Baum and J. D. McGuire.

WALTER HOUGH,
Secretary.

BOTANICAL SOCIETY OF WASHINGTON.

THE sixteenth regular meeting of the Botanical Society of Washington was held at the Portner Hotel, December 5, 1903, with thirty-seven persons present.

The following program was presented:

1. *The Salt Content of Seabeach Soils:* T. H. KEARNEY.

Most writers upon the ecology of strand vegetation have implied, or even explicitly stated, their belief that the sands of the seabeach are impregnated with salt in amounts sufficient to determine the character of the plant growth. This hypothesis is not sustained by an examination of samples of dune and beach sand taken on the shore of Buzzards Bay, Massachusetts, near Norfolk, Virginia, and near Los Angeles, California. On the contrary, the amounts of soluble salt present, as determined by the electrolytical method used by the Bureau of Soils of the United States Department of Agriculture, is generally less than that found in most cultivated soils in the eastern (humid) part of the United States.

The greatest amount of salt detected in beach sand occurred in a sample taken at Los Angeles, California, which gave an electrical resistance (at 60° F.) of 158 ohms (equivalent to about 0.15 per cent. of salt to soil) for the first foot, and 180 ohms (equivalent to about 0.12 per cent.) for the second foot, an amount not greater than that sometimes occurring in cultivated land in the eastern United States. We are, therefore, constrained to attribute the xerophytic character of sand-strand vegetation to factors in the environment other than the presence in the soil of an excessive amount of soluble salt.

On the other hand, coast marshes that are regularly inundated by salt or brackish water possess a distinctly saline soil, and their vegetation may safely be termed halophytic, so far as halophytes may be regarded as forming an ecological class distinct from other xerophytes.

2. *The Influence of Climate and Soil on the Transmitting Power of Seeds:* WILL W. TRACY, SR. This paper will be published later in SCIENCE.
3. *The American Ginseng Industry:* F. V. COVILLE.

HERBERT J. WEBBER,
Corresponding Secretary.

TORREY BOTANICAL CLUB.

AT the regular meeting of the club held at the College of Pharmacy, December 8, 1903, the scientific program consisted of a paper by Mr. W. L. Horne on 'The Vegetation of Kadiak Island, Alaska.' The paper was illustrated by a large number of botanical specimens and by numerous photographs showing the topography of the island and the characteristics of the different plant formations. Kadiak Island is 58° north latitude and 155°

west longitude and is thirty miles from the mainland. It is twenty miles long by fifty wide and has a very irregular coast line. The surface is much diversified and broken. A fresh-water lake about twenty miles long is situated in the northwestern part of the island. It is connected with the sea by the Karluk River and furnishes an ideal breeding ground for the red salmon. One of the most important fishing stations and canning plants in the world is located near the mouth of this river. The winters are very long, beginning early in October, but they are not intensely cold. The lowest temperature during the two years of Mr. Horne's stay was —-10°. There is much mild weather and there are frequent thaws. The soil only freezes to a depth of from one to two feet, and the frost is out of the ground early in June. The highest summer temperature noted was 72°. The Chinese laborers in the canning factory make gardens where they cultivate successfully many of the more hardy vegetables.

The principal plant formations discussed were those of the low-lying bogs, the comparatively level grass lands, the higher lying peat bogs, and the alpine flora occupying the rocky hills. Marine plants are not particularly conspicuous, though many brown and red seaweeds occur. Two species of *Potamogeton* are found in the river at the point where the salt and fresh waters meet. Above this point it is comparatively free from vegetation. The country is well watered by small streams. These are often full of various green algæ and they are frequently dammed by dense growths of mosses. Some of the smaller slower brooks are completely blocked by dense growths of species of *Vaucheria,* which so retard the flow of the water as to form low wet bogs that are covered with a characteristic vegetation. The earliest plant to flower in the spring in these vaucheria bogs is the small *Claytonia asarifolia.* Other conspicuous spring plants are a species of *Rumex, Caltha palustris* and various species of the Cruciferæ. These bogs are showiest in midsummer when filled with *Polemonium acutifolium,* several species of *Epilobium* and a handsome *Mimulus. Epilobium luteum* in particular forms showy masses in the bogs and along the brooks. A large-flowered skunk cabbage also occurs in wet places, frequently marking the course of little brooks along the hillsides. *Carex cryptocarpa* forms a dense zone bordering portions of the river bank.

The drier and comparatively level grass lands are always completely covered by layers of mosses and lichens, so that they approach the condition of the tundras. The first spring flowers of the grass lands are the abundant pink blossoms of the little *Rubus stellatus,* which is also a conspicuous plant in the fall from the rich coloring of its leaves. The turf consists mostly of *Carex Gmelinii.* Scattered plants of species of *Poa* and *Festuca* are frequent, but the dominant grass is a species of *Calamagrostis.* A fragrant grass, a species of *Hierochloa* called locally 'vanilla grass,' occurs, but it is not abundant. Other conspicuous plants are *Trientalis Europea artica,* two species of violets, *Geranium erianthum,* also conspicuous in the fall from its red foliage, a yellow *Castilleia, Viburnum pauciflorum, Sanguisorba latifolia, Galium boreale* and a large showy *Lupinus.* The salmonberry, *Rubus spectabilis,* is frequent and bears a large, delicious, edible berry. In midsummer great patches of fireweed, *Chamænerion angustifolium,* suddenly burst into bloom, giving a most striking color effect. Later in the season *Solidago lepida* becomes conspicuous. *Lathyrus palustris* was the only plant observed having a vine-like habit.

The peat bogs occur at the foot of the hills. Among their characteristic plants are *Betula glandulosa,* a shrub reaching two feet in height; *Empetrum nigrum,* with black fruits that are called 'blackberries' and are eaten by the natives, and *Ledum palustre,* the leaves of which are used for a tea. *Vaccinium ovalifolium* grows along the upper edge of the grass lands. It furnishes an important economic fruit.

The alpine flora on the rocky hills consists of a mat-like growth of mosses, *Cladonias, Empetrum,* dwarf blueberries, etc. The first to bloom in the spring is *Mœrania alpina.* The fall foliage of this plant is very showy, forming intense red patches on the hillsides. Other

conspicuous plants are *Aragalus arctica, A. nigrescens, Chamæcestus procumbens, Drapensia Lapponica, Lloydia serotina, Campanula lasiocarpa, Arnica lassingi* and various dwarf arctic willows. *Vaccinium uliginosum* and *V. Vitis-Idæa* are abundant and their fruits are of great economic importance to the natives.

The paper brought out an interesting discussion lasting till the hour for adjournment.

F. S. EARLE,
Secretary.

RESEARCH CLUB OF THE UNIVERSITY OF MICHIGAN.

THE regular October meeting was held on the evening of the twenty-first. Dr. Raymond Pearl discussed the problem of the 'Relative Variability of Man and Woman,' and presented statistical evidence of two sorts, bearing on the subject. (1) It was shown that with respect to age at death from *fatal* congenital malformations woman was significantly more variable than man. The standard deviation in age at death for men was 2.104 years, while for women it was 2.699 years, giving a difference of .595 year with a probable error of $\pm$ .044. The mean age at death was not significantly different in the two sexes. Since there is a positive correlation between (*a*) the degree or intensity of malformations sufficiently great to cause death, and (*b*) the age at which death occurs, it was maintained that these results give evidence as to the relative variability of the sexes with reference to the degree or intensity of fatal malformations, and indicate a slightly, but significantly, greater variation in the female.

(2) It was shown from an analysis of Marchand's data on human brain-weights that with reference to this character the female was slightly more variable than the male.

These results are in accordance with Pearson's main conclusion from a study of the relative variability of the sexes with respect to a large number of physical characters.

Professor E. D. Campbell read a paper on 'The Diffusion of Sulphides through Steel.'

Ten years ago the author had determined the diffusion of sulphide of iron through steel, and later he found that to effect diffusion the sulphide must be an oxysulphide.

That steel should be permeable to liquids even when heated to 1,200° C. was considered so unlikely that Professor J. O. Arnold, of the University Technical College of Sheffield, England, repeated a portion of the work, and confirmed the results.

In September, 1902, H. Le Chatelier, of L'Ecole des Mines, Paris, with M. Ziegler published a paper in which they denied the permeability of iron, stating that the escape of the sulphide of iron was entirely by capillary action through the space between the steel plug and the sides of the hole containing the sulphide. Professor Campbell described a series of experiments in which the sulphide was contained in a long steel tube closed at one end with a tapered screw plug, and heated in such a way that it was impossible for sulphide to escape around the plug. When the steel tubes were heated above 1,200° C. a portion of the sulphide was found to have penetrated the solid walls of the steel tube, thus confirming the author's first contention, that steel when heated to about 1,200° C. is permeable to oxysulphide of iron without increase in the per cent. of sulphur in the steel.

The November meeting occurred on the eighteenth. Mr. G. O. Higley described 'A Method for Determining the Excretion of Carbon Dioxide from the Lungs.' The existing methods for measuring the amount of carbon dioxide in the expired air do not permit a study of the character of sudden changes such as occur at the beginning and at the end of vigorous muscular work, nor such changes as accompany the 'secondary rise' in the pulse rate as described by Bowen (memorial volume of contributions to medical research dedicated to Victor C. Vaughan, 1903). In Mr. Higley's method the expired air, after removal of moisture, is freed from carbon dioxide in an apparatus charged with soda lime, and suspended upon the arm of a balance. A long, light lever attached to the end of the beam greatly magnifies the movements of the beam, and writes the curve of carbon dioxide excretion upon the blackened paper of a kymograph drum. On the same drum may

be recorded the carotid pulse, the respiration, the time in seconds and the rate of muscular movements. Experiments made with this apparatus show that the curve of carbon dioxide excretion during work closely resembles that of the pulse, and that carbon dioxide is at least in part the cause of the secondary rise in the pulse rate observed by Bowen.

Dr. W. B. Pillsbury detailed some experiments on 'The Attention Wave as a Measure of Fatigue.' Not merely the daily rhythm of fatigue and practise of the typical morning and evening workers was reflected in the ratios of the period of visibility to the period of invisibility in the attention wave, but the degree of fatigue on days of severe work as compared with easy days had a corresponding variation in the fluctuation of attention. In the morning, practise shows itself in a continuous increase in efficiency through at least a considerable portion of the experiment; while in the evening there is a decreasing effectiveness almost from the beginning. As further substantiation of the theory that the attention wave is closely related to the Traube-Hering or Mayer vaso-motor waves, it was noted that both have the same daily rhythm of length.

Frederick C. Newcombe,
Secretary.

Discussion and Correspondence.

Morgan on Evolution and Adaptation.

To the Editor of Science: I have always supposed that what are generally called Lamarckian views of evolution were considered with less prejudice by biologists in the United States than in England or Europe, and that my own publications in support of such views were, therefore, likely to be known and read in America even if they were almost completely ignored by my own countrymen.

I find, however, that Dr. Thomas Hunt Morgan in his book 'Evolution and Adaptation,' which has just appeared, makes no mention whatever of my book 'Sexual Dimorphism in the Animal Kingdom, a Theory of the Origin of Secondary Sexual Characters,' which was published in London more than three years ago. Any biologist, American or other, has a perfect right to reject all my conclusions, but it seems to me that an author who devotes a great part of his book to the discussion of Darwin's theory of sexual selection and the evolution of secondary sexual characters, in entire ignorance of the facts and arguments which it cost me years of labor to collect and elaborate, lays himself open to the charge of writing without proper knowledge of the literature of his subject. I have published the results of experimental work apart from this, but the only reference Dr. Morgan makes to it is to a popular article in *Natural Science;* he has not apparently consulted the original memoirs.

Like other English writers it has been my ambition that my work should be known to the scientific public of the United States, which is not only very intelligent but free from prejudices which are stronger than reason in England. I am much disappointed to find that my chief contribution to the investigation of evolution is so little known to American evolutionists.

J. T. Cunningham.

Zoological Society,
3 Hanover Square, London, W.

Mutation and Selection.

In reading Professor Morgan's very interesting and valuable book, 'Evolution and Adaptation,' it is surprising to find that he apparently regards the theory of evolution by selection and DeVries's mutation theory as being to a degree in conflict.

The evolution which observation shows us has taken place is chiefly characterized by the fact that it has brought organisms into favorable relation with their environmental conditions. That this could have been secured by mutation unaided by selection seems altogether unlikely.

In the case of the leaf butterflies of the genus *Kallima* the theory of evolution by mutation alone must assume that the remarkable resemblance arose all at once by a single mutation, or that there were a series of mutations which for some unaccountable reason were of such a character as to make the resemblance to a leaf gradually grow more perfect, though no selective action of the environment controlled this improvement in pattern.