

beyond the elongating zone. Rheotropism is not a transitory phenomenon, but persists in the maturing plant. It is perhaps a response to pressure, though terrestrial roots are not known to be sensitive to pressure. Kiichi Miyake writes 'On the Starch in Evergreen Leaves and its Relation to Photosynthesis during the Winter.' The work was carried on at the Tokyo Imperial University and the conclusions reached have to do with conditions in Japan. The starch in evergreen leaves in general begins to decrease in November, reaching its minimum during January, and increasing again from the end of February. During the winter many evergreen leaves contain starch, and this starch, as experiments showed, is formed by photosynthesis in winter and its translocation occurs in the same season. This phenomenon is true of middle and southern Japan, but in northern Japan most evergreen leaves lose their starch in winter. The opening of the stomata in winter was also observed in some evergreen leaves in Tokyo. James B. Overton describes 'Parthenogenesis in *Thalictrum purpurascens*.' Embryos were produced parthenogenetically under all artificial conditions, and wild material showed the phenomenon to be general in nature. The cytoplasm of the early stages of the sac is closely packed about the egg, which later becomes surrounded by a modified zone which may affect the osmotic pressure and indicate a withdrawal of water, causing the egg to divide. No differences could be detected in the development and vigor of normal and parthenogenetic embryos, except that the latter is slower in starting. *Thalictrum* is the third genus of angiosperms in which parthenogenesis has been recorded, the others being *Antennaria*, described by Juel, and *Alchemilla*, described by Murbeck. R. G. Leavitt describes some subterranean plants of *Epiphegus*, which were dwarf specimens, buried one or two inches deep, but with flowers and fruit in all stages of development. D. G. Fairchild, in continuing his 'Notes of Travel,' describes the bright-colored autumn foliage of American trees in Europe, special mention being made of *Quercus rubra* and

*Acer dasycarpum*. T. D. A. Cockerell describes a new *Heliotropium* from New Mexico.

THE May number of *Popular Astronomy* has two brief articles by J. E. Gore, of England; the one on 'Immensity and Minuteness' brings out the vastness of the numbers dealt with in astronomy, and contrasts them with the minuteness of atoms as revealed by the microscope. He cites as illustrations that the distance of the nearest fixed star is 271,000 times the distance of the sun, and the fact that certain forms of infusoria are so minute that an individual specimen can lie between two divisions of an inch divided into 25,000 parts. Mr. Gore's second article gives his new method of computing the value of starlight in terms of moonlight. William L. Hornsby, for some years a resident of China, writes from Macao of 'The Chinese Calendar.' He finds that calendars in China date back to their earliest classic records, and traces the history of their calendars to modern times including extracts from those of the present day, which show a curious mixture of astrology, superstition and astronomy. Other popular articles are 'Shadows Cast by Starlight,' by Henry Morris Russell, and an account of the appearance of the 'The Stellar Floor' as seen through the clear steady atmosphere at Mt. Lorne Observatory, by Edgar L. Larkin; also a review of the Solar Observations of 1900, and a brief account by Dr. T. D. Anderson, the discoverer of Nova Persei, of his 'Searching for New Stars.'

#### SOCIETIES AND ACADEMIES.

##### SIXTH REGULAR MEETING OF THE BOTANICAL SOCIETY OF WASHINGTON.

THE sixth regular meeting of the Botanical Society of Washington was held at the Portner Hotel, March 29, 1902, with President A. F. Woods in the chair. At the conclusion of the business meeting, Mr. A. J. Pieters, chairman of the program for the evening, was called on to preside.

Professor A. S. Hitchcock discussed a peculiar specimen of short-leaf pine which he had observed. The tree had been girdled and had continued growing above the wound, so that

while the circumference below the girdled area was about  $24\frac{1}{4}$  inches, the tree above had expanded to a circumference of about 47 inches. The discussion developed the fact that this occurrence is not unusual in some kinds of trees when they have been girdled.

The main portion of the evening was devoted to a symposium on Cuban vegetation.

Mr. C. L. Pollard briefly suggested the ecological areas as he recognized them, illustrating his remarks by mounted specimens.

Mr. William Palmer, of the U. S. National Museum, gave an exhaustive account of the geological formations of the island and their effect on vegetation. Mr. Palmer also discussed at some length the influence annual fires have had on the vegetation.

By invitation, Dr. C. F. Millsbaugh, of the Field Columbian Museum, gave a short address on West Indian vegetation in general, pointing out the life zones and commenting on the zones of vegetation. A brief discussion followed on the character of the peculiar red soils common in most parts of Cuba. Mr. Woods pointed out that these soils are also common in Bermuda and that it is probable that in many cases such soils are subject to change of color after long cropping.

HERBERT J. WEBBER,  
*Corresponding Secretary.*

#### SEVENTH REGULAR MEETING OF THE BOTANICAL SOCIETY OF WASHINGTON.

THE seventh regular meeting of the Botanical Society of Washington was held at the Portner Hotel, April 26, 1902, with President A. F. Woods in the chair.

Mr. L. C. Corbett called attention to the use of ether in forcing dormant plants into flower. Experiments which have been conducted indicate that treatment with fumes of ether in tight receptacles covering the tops will succeed in bringing dormant plants into bloom in from twelve to fourteen days. Experiments thus far conducted have been mainly with the lilac.

Mr. A. F. Woods called attention to the fact that the treatment of seeds with ether hastens germination, and spoke briefly of experiments

conducted by himself which demonstrated this fact.

Mr. V. K. Chesnut reviewed a paper by Dr. Maurice Henseval entitled 'L'Abrine du Jéquirity,' published in *La Cellule*, Vol. 17, pp. 139-197, 1900. In this paper the author describes numerous accurately performed experiments upon the smaller animals with sterilized solutions containing a definite quantity of the toxalbumin *abrin*, extracted from the seeds of *Abrus precatorius*, showing in considerable detail its chemical, physical and physiological characteristics, especially in their relation to the destruction of abrin in the intestines and by leucocytes.

Dr. C. O. Townsend discussed a report by Professor Jones, of the Vermont Experiment Station, on the 'Use of Bodo and Pyrox,' two fungicides prepared by the Bowker Chemical Company. Bodo, it was stated, compares in general with Bordeaux mixture, while pyrox compares with a mixture of Bordeaux and Paris green, and is used as a fungicide and insecticide. In Professor Jones' experiments it was found that these preparations gave very satisfactory results. Dr. Townsend also mentioned experiments made by himself with bodo in which very satisfactory results were obtained. The conclusion seemed to be that while bodo may not be as effective as freshly prepared Bordeaux mixture, when properly made, it is probably better than improperly prepared Bordeaux.

Mr. M. A. Carleton called attention to two general laws regarding seed of wheats which have come to be generally understood. (1) That in case of spring wheats seed brought from the north ordinarily ripens earlier and gives better yields and quality than seed of the same variety brought from the South. (2) That in the case of winter wheats just the opposite is true, that is, that seed from the South gives the best results. This was stated as being a general law for winter crops. As a rule seed from the South in the case of winter crops ripens earlier and yields better than seed from the North. Mr. C. R. Ball called attention to the fact that varieties of cow-peas which in

the South produce running vines when transplanted to the North change to a bushy habit.

Mr. C. P. Hartley outlined some results obtained in growing corn from red-eared sports. In one case a pure red ear was found in a field of a white race which had been bred true to type for a number of years. Seed from this red ear was planted, and in the first generation about 45 per cent. of the progeny had red ears while the remaining 55 per cent. gave white ears. Some of the red ears were self-fertilized, and in the second generation grown from such self-fertilized seed 83 per cent. of red ears were produced. Another sport was described where in a race of pure bred white corn an ear was produced which was mainly red, but had a white spot at the base on which the kernels were white with very fine red stripes. The red grains from this ear when planted produced progeny in which 50 per cent. of the ears were red, while the kernels from the white spot gave progeny in which 50 per cent. of the ears had seed like that planted, with fine red stripes, and 50 per cent. had pure white ears.

Mr. H. J. Webber exhibited a plant of trailing arbutus (*Epigaea repens*), received from South Carolina, which produced double flowers. The doubling was caused by the stamens developing into petals, the expanded filaments being united into a tube similar to the corolla in which it was inserted. Mr. Webber also called attention to an experiment with cotton, showing the prepotency of pollen of different species. In the summer of 1900 flowers of Sea Island cotton were opened about 7 A.M. and abundantly pollinated with their own pollen, after which they were bagged. These same flowers were opened again about 11 A.M.—four hours later—and dusted abundantly with pollen of upland cotton. The seeds produced by such cross-pollinated flowers were planted the next year and gave over 50 per cent. of true hybrids, showing that pollen of upland cotton on Sea Island is sufficiently prepotent over the plant's own pollen to give a large percentage of hybrids even when applied four hours later. It was pointed out that results

similar to these were obtained by Darwin in experiments with different varieties of cabbage.

HERBERT J. WEBBER,  
*Corresponding Secretary.*

#### GEOLOGICAL SOCIETY OF WASHINGTON.

At the 131st meeting, held May 14, 1902, the following papers were presented by members of the Maryland Geological Survey: 'The Potomac Group in Maryland,' by W. B. Clark and A. Bibbins.

The Potomac group is composed of four distinct formations called from below upward the Patuxent, the Arundel, the Patapsco and the Raritan formations. These are separated by clearly defined unconformities. The two lower formations are provisionally assigned to the Jurassic because of the discovery by Professor Marsh of dinosaurian remains within the Arundel formation, the dicotyledonous plant remains being mainly confined to the Patapsco and Raritan formations. Only a few dicotyledons are known from the lower formations. By the gradual transgression of the formations northward the Raritan ultimately rests upon the Piedmont Plateau of New Jersey, while southward the transgression of the Tertiary gradually buries the higher formations, the Raritan disappearing near the latitude of Washington.

The character of the Potomac basin of deposition is shown by well borings which indicate a distinct rise in the level of the Potomac surface in the Delaware peninsula.

'The Correlation of the Coal Measures in Maryland,' by W. B. Clark and G. C. Martin.

The Maryland Coal Measures have hitherto been largely studied independently of the same deposits in adjacent regions in Pennsylvania and in West Virginia, and as a result an independent classification has gradually been developed. The authors find, however, that not only the stratigraphic sequence but the fossiliferous horizons are identical with those in the adjacent regions of Pennsylvania and West Virginia, and they consider that the same classification should obtain. In the case of the lower members of the Coal Meas-

ures continuity of strata can be established, while even in the independent synclinal trough of the Georges Creek basin there is found the same sequence of strata and fossils. Numerous detailed measured sections were described in substantiation of these conclusions.

'A Reconnaissance of Mt. Hood and Mt. Adams,' by H. F. Reid.

These mountains belong to the group of volcanic cones built up mainly in Tertiary times along the line of the Cascade Range. Though probably extinct, steam and gases still issue in small quantities from cracks near the summits. The mountains consist of massive lava and lapilli, the latter being more abundant on Mt. Hood and the former on Mt. Adams. Some of the later lava-flows are probably not more than a few hundred years old. A number of parasitic cones are found on the flanks of Mt. Adams, two, at least, with well-marked craters, while none occur on Mt. Hood. About one half of the original crater wall of Hood still remains, the southern half having disappeared. The summit of Adams is long and broad. The stratification seen in the cliffs on the sides of the mountain suggest that there were several craters which may have been active at the same time or successively.

Many interesting glaciers lie on the slopes of both mountains; but they do not descend into the valleys. In several cases the depressions outside the lateral moraines are apparently quite as deep as the bed of the glaciers, and the cañons formed below the ends of the ice are deeply eroded, in strong contrast to ice-covered parts of the mountains. The main erosion has been effected by water, and the ice and snow, by preventing the concentration of the water, have protected the underlying rock.

There is little indication of a much greater extension of the glaciers of Hood in former times, but on Adams glacial scratches abound in positions not now reached by the ice.

'Recent Work in the Piedmont Area of Northern Maryland,' by Edward B. Mathews.

Areal mapping of the Piedmont Plateau in northeastern Maryland has been carried on during the last three years by the speaker,

Miss F. Bascom and Mr. A. Johannsen. The formations present an intricate intermingling of igneous and metamorphic rocks comprising monzonites, gabbros, metarhyolites, and serpentines among the igneous rocks; and gneisses, quartz-schists, phyllites and slates among the metamorphosed sedimentary rocks.

The sequence of eruptions in the region is believed to include two periods, representing differentiated portions of an original magma of medium acidity. One formed the monzonites and was itself somewhat differentiated during the period of consolidation, monzonite; the second formed the gabbros, with the accompanying quartz-gabbros, norites and peridotites produced by secondary differentiation.

All of these have been intruded into the mica-gneiss which is either of early Paleozoic or pre-Cambrian age.

'The Miocene Formation of Maryland,' by G. B. Shattuck.

In the differentiation of the Chesapeake group, three well-defined formations are recognized, which are described from below upward under the names of Calvert, Choptank, and St. Mary's formations. An unconformity occurs between the Calvert and the Choptank. Well defined lithologic features mark the several formations, which have been mapped in great detail throughout southern and eastern Maryland. Each formation has its clearly defined fauna.

'The Pleistocene Problem in Maryland,' by G. B. Shattuck.

The gravel deposits of the North Atlantic Coastal Plain are divisible into five formations, which are known, beginning with the oldest, as the Lafayette, Sunderland, Wicomico, Talbot and Recent. The Lafayette has been doubtfully referred to the Pliocene; the Sunderland, Wicomico and Talbot are believed to be Pleistocene.

Each of these formations is developed in a distinct terrace which is separated from the adjacent terraces both above and below by well-defined scarps. These terraces lie one above the other, the oldest occupying the top of the series, and the youngest the bottom.

The agencies which have been instrumental

in cutting the scarps and depositing the materials of the various formations are marine, estuarian, fluvial and possibly subaerial.

The North Atlantic Coastal Plain underwent numerous changes in altitude while the various formations were building. They are briefly as follows:

1. Subsidence and deposition of the Lafayette.
2. Elevation and erosion of the Lafayette.
3. Subsidence and deposition of the Sunderland.
4. Elevation and erosion of the Sunderland.
5. Subsidence and deposition of the Wicomico.
6. Elevation and erosion of the Wicomico.
7. Subsidence and deposition of the Talbot.
8. Elevation and erosion of the Talbot.
9. Subsidence and deposition of the Recent.

The subsidence appears to be still in progress.

F. L. RANSOME,  
*Secretary.*

#### BIOLOGICAL SOCIETY AT WASHINGTON.

THE 365th regular meeting was held on Saturday evening, May 17.

Arthur H. Howell spoke on 'The Summer Birds of Mt. Mansfield, Vermont,' describing the fauna and flora of the region at some length, and stating that the flora in particular was characterized by the presence of a number of plants customarily found farther north. The paper was illustrated with lantern slides showing characteristic features of the region as well as some of the birds.

W. W. Cooke discussed 'Bird Migration Routes,' paying special attention to the theory that in crossing considerable bodies of water birds either followed along existing islands, or where islands or direct land connection had formerly existed. The speaker gave the results of long and careful observation of many migratory North American birds, and showed that in passing from our southern States to Yucatan and Central America, or in returning, the small birds passed directly over the Gulf of Mexico where there had never been land. Very few of our birds either wintered in Cuba or passed through it while migrating, while the popular idea that birds passed from North to South America along the Windward and Leeward Islands was entirely

incorrect. Neither, as far as could be ascertained, did birds follow certain routes, or 'lanes,' in their migrations, but covered a wide area. V. K. Chesnut exhibited a number of slides showing various poisonous plants of the west, giving their Indian names and uses. F. A. Lucas showed slides of the large Claosaurus skeleton at Yale, stating that it was the first complete Dinosaur skeleton mounted in this country.

F. A. LUCAS.

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

At a meeting on April 28 a paper entitled 'Two Experiments in Color Vision' was presented by Professor Robert MacDougall, and in his absence was read by title. He has found (1) that the subjective intensity and saturation of a given constant objective color increases with the retinal area illuminated by it. This increase is most marked in case of green, least marked in case of red. A similar phenomenon appears in the grays. The apparent difference in brightness between a patch of gray and a light or a dark background is increased by enlarging the patch. (2) A given area of illumination produces a stronger subjective effect when this area is divided and distributed over the retina than when it is compact. This is perhaps because the area of irradiation is increased by distributing the area of illumination.

Professor J. E. Lough reported some experiments on the memory of school children. He had tested 682 schoolgirls ranging in age from 9 to 15. The method employed was the same as that used by Lobsien in a similar investigation of the school children of Kiel. A list of ten words was read to the pupils who then wrote down as much of the list as they could remember. This was repeated with new classes of words until eight lists had been given. These experiments show: (1) That memory improves but slightly between the ages 9 and 15, being 62 per cent. at 9 and 64 per cent. at 13 and 15. This is in sharp contrast with the results obtained by Lobsien—38 per cent. at 9 and 75 per cent. at 13. (2) That the amount remembered depends upon

the class of words composing the list—names of colors having an average of 87 per cent., names of concrete things 75 per cent., words connected with tactile experiences 70 per cent., emotions 68 per cent., sounds 58 per cent., abstract words 50 per cent., numbers 45 per cent. (3) That the usual retardation at 12 with acceleration at 13 is shown in each class of words, with the exception of emotions, where there is a marked retardation at 13, with acceleration at 14. (4) That in each of the lower grades of school (4A-5B) the brighter pupils have the better memory, while in each of the higher grades (6A-7B) the duller pupils have the better memory.

In discussing this paper, it was remarked by Professor Thorndike that grammar school girls of 14 to 15 do not fairly represent all girls of that age, since the brighter individuals are apt to leave the grammar school before reaching 14 years.

Professor Cattell, in a paper on the 'Intensity of Light and the Error of Perception,' described experiments in which 211 shades of gray between white and black were sorted out into the order of brightness. The steps were smaller than can be perceived, and there was consequently an error of displacement, measuring the just observable difference. For the more accurate observers the error was six cards or about 0.03 of the range between white and black. Observers differ within the extremes of about 1:2. The just observable difference increases with the magnitude of the stimulus, but not in direct proportion as required by Weber's law. The increase is more nearly in proportion to the square root of the magnitude, which the speaker has found to hold in other cases and has elsewhere attempted to explain.

Professor E. L. Thorndike presented results bearing on the question of 'Sex Differences with Respect to Variability.' A large number of psychological tests of school children has afforded him the opportunity of comparing the variability of boys and girls, as classes, and, on the whole, there is practically no difference between them.

Dr. W. Borgoras reported some results of his recent observations, undertaken for the

Jesup North Pacific Expedition, in north-eastern Siberia, among the Chuckchi, Koryak and Kamchadal peoples. These he found to resemble each other strongly in the structure of their languages and in their folklore. What is especially interesting is the striking similarity, almost identity, between some of their traditions and some of those current among the North American Eskimos and the Indians of British Columbia. It is not, however, the Asiatics living nearest to Bering Strait, but more southerly tribes, that show most evidence of kinship with the Indians.

R. S. WOODWORTH,  
*Secretary.*

#### TORREY BOTANICAL CLUB.

At the meeting of April 30, held at the Botanical Garden, the first paper was by Dr. C. C. Curtis, on 'Some Features connected with Transpiration.'

Transpiration may be illustrated by a fluctuating curve. The maximum of the curve is found in the forenoon and corresponds to the periodicity in the stems. Transpiration can hardly be considered to be wholly a physical property. The volume of water given off by plants in the night is very considerable, and probably the stomata are never completely closed. It seems perfectly rational that the stomata are open, partly, in the dark, and that some transpiration takes place. During the early morning hours, the amount of water given off is much more than in the afternoon, as the stoma has become used to the light.

Another paper was by Professor F. E. Lloyd, on 'Compound Leaf Forms.' In many cases, when a leaf is lobed, or has one lobe, the leaf on the opposite side of the stem also has a lobe on the opposite side of the midrib. This may be seen in the bud as well as in full grown leaves; as in the pear, elm, etc.

The fourth paper was by Dr. H. M. Richards, on 'Turgor Changes in Injured Tissues.' It has been shown that the curved respiration in injured plant-tissues rises for a time and then falls off to the normal. The 'wound-fever,' or 'rise-in-temperature' curve is similar to that of respiration. Turgor changes apparently accompany these reactions towards

injury. The onion was used for experiment, and the wounded and uninjured bulbs were placed in a saturated atmosphere. The normal turgor pressure in terms of  $\text{KNO}_3$  solution is about 3.5 to 4 per cent.; after wounding this falls about 0.5 per cent. As the heating goes on, four or five days after the wounding, the turgor has increased again, and the wounded and unwounded onions are practically the same in this respect. Carrot, beet and radish were also used.

Dr. MacDougall exhibited plants of *Monotropsis odorata* sent by Professor Johnson, of Johns Hopkins. He also showed a basket made by the Pima Indians of Mexico, made of *Typha*, *Martynia* and *Salix*. He also exhibited the ayal or calabash fruit from Sonora, of the genus *Crescentia*, a fruit of economic importance.

Miss Angell, of Plainfield, New Jersey, exhibited living plants of *Viola Angellæ* in flower. When the plant is flowering the scapes exceed the leaves; but later in the season the leaves overtop the scapes.

S. H. BURNHAM,  
Secretary pro tem.

#### UNIVERSITY OF WISCONSIN SCIENCE CLUB.

At the monthly meeting of the club, held May 6, three papers were presented.

Professor Wm. H. Hobbs discussed the newly discovered Algoma meteorite. It was ploughed up in Ahnapee Township, Kewaunee County, Wisconsin, in 1887, and was recognized as a meteorite in March, 1902, when presented to the University of Wisconsin. It is an octahedral siderite weighing a little less than nine pounds. Its shape is that of an elliptical shield less than an inch in thickness. Its convex surface is fairly smooth, but exhibits strongly marked 'drift' markings consisting of radial striæ upon the front which proceed from a central flat boss to the periphery, slightly curving to form a lævo-rotatory spiral. Its concave surface is irregular and crusted. These facts indicate that the meteorite moved 'broadside on' through the atmosphere with its convex surface to the front. Casts of the meteorite in plaster may be obtained by museums and persons interested.

Professor C. S. Schlichter described the manner of flight through the atmosphere of a meteorite of the shape of the Algoma meteorite. A meteorite, discoidal in shape and possessing a rapid motion of rotation about its shortest axis, undergoes the following changes in its motion upon entering the atmosphere. The first effect of the impact is to give to the spinning body a motion of precession similar to that of a gyroscope. The next effect is the lessening of the angle of the cone described by the precessing axis, an effect entirely analogous to the 'sleeping' of a common top. In consequence of this the meteorite advances through the atmosphere with its flat side presented to the resisting medium.

Professor C. E. Mendenhall presented a paper entitled 'The Measurement of Radiant Heat.' The theory of the more important instruments for infra-red research—namely, the bolometer, thermopile, radiometer, radiomicrometer and pyrheliometer—was discussed, and examples of most of the instruments exhibited. The radiomicrometer, thermopile and pyrheliometer were shown in actual operation, and by means of the first named instrument arranged for projection the infra-red spectrum of a Nernst lamp was explored.

C. K. LEITH,  
Secretary.

#### DISCUSSION AND CORRESPONDENCE.

##### NORTHWESTERN AMERICA AND NORTHEASTERN ASIA.\* A CRITICISM.

THE current number (48, 1902, III., pp. 49-58) of Petermann's *Mitteilungen* contains an article of some length entitled 'Nordwest-Amerika und Nordost-Asien. Geographische Wechselbeziehung,' by Capt. Fr. Immanuel, which purports to be a brief summary of the most authentic information pertaining to the geography and mineral resources of the adjacent portions of the Asiatic and North American continents. Most of the article is devoted to Alaska, and to this part I desire to offer some criticism. Capt. Immanuel, in common with many compilers, has fallen into

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