

fact of pathology, which by itself would be enough to settle the question—the rare cases, namely, of metamorphopsia. It sometimes happens that a piece of the retina is detached by means of a wound, and that it afterwards grows on again in a wrong position, and vision is regained, but things are out of place. A case has just been reported before the Italian Ophthalmological Society, in which distorted vision occurred over the portion of the retina affected, the inversion being from right to left, but not also up and down (showing, therefore, in addition, that the retina can still perform its function when it is wrong side out). Such cases as this are also plainly incompatible with a projection theory. C. L. F.

BALTIMORE, MD.

#### MARSH GAS UNDER ICE.

PROF. REMSEN'S note under the above title in *SCIENCE* for January 24th, p. 133, is of more than local interest. So far as I am aware, the phenomenon of gas spurts through ice has not before been described. As early as the winter of 1878-'79 the writer observed, at West Summit, N. J., the ice on a bog covered with miniature craters and mounds of new ice. These ice accumulations took place about vents up through which came water and gas bubbles, the former charged with the brick-red ferruginous deposit at the bottom of the bog. Frequently the vent was along the side of a blade of bog grass. During the winter, the surface of the ice on the bog become very rough by the additions made in this way. The flocculated bog ore thus brought to the surface was, during times of rain and thaw, washed into the neighboring stream, so that the process tends to retard the growth of bog ore deposit. Similar outbursts may be observed during the winter where a coating of ice forms over a lawn which has been treated with ordinary manure in the autumn. Gas spurts break out after a period of continued cold, and the surface of the ice becomes discolored with the products urged up by the escaping gas. An instance of this action was to be seen on the grounds of the Museum of Comparative Zoölogy at Cambridge last winter. It would be of some importance in glaciology to ascertain what part this escape of gas plays

in the breaking-up of the ice on shallow ponds and lakes.

J. B. WOODWORTH.

CAMBRIDGE, MASS., January 27, 1896.

#### ETHNO-BOTANIC GARDENS.

THE purposes of a museum are twofold: First, it is to be a place of instruction where the general public can resort for information as to objects from distant or foreign lands; second, it is to be a place for scientific research. A museum fulfills its purpose best when both of these objects are kept in view. The collections should be so arranged as to teach the public by object lessons, and at the same time be adapted for scientific work. Most of our colleges have kept these objects prominent in the fore front, and many of them have arranged synoptical collections for the instruction and edification of visitors. Several of the larger institutions of learning, notably Harvard and the University of Pennsylvania, have buildings set aside for museum purposes, and it is, therefore, to them that we must turn when we desire to study the operation of museums with educational views and aims.

The University of Pennsylvania proposes to erect, in the near future, a series of museum buildings, which will bring the institution into closer touch with the general public, and at the same time give the students in the several departments a chance for original research work. It is intended by the University authorities to place the buildings in a public park to afford better light for exhibition purposes, and so as to display to better advantage the architecture of the structures. A separate building it is planned will be devoted to archæology and ethnology. Such a building is badly needed at present, for the anthropological collections in general have accumulated to such an extent as to crowd the space in the library now allotted to them.

The opportunity is presented when these buildings are erected to construct an ethno-botanic garden in connection with the public park. It is to the outlining of the purposes of such ethno-botanic gardens, in general, that this article is directed.

1. Only aboriginal American plants should find a place in such a garden. No plant can be found more graceful than maize, a grass asso-

ciated with the myths of the aboriginal races of America, and worthy to be our National emblem. This plant has been little thought of for decorative purposes in our gardens; yet, it is decidedly ornamental and worthy of esteem. The sunflower, too, ought to be grown. The Indian recognized its value, for the Moquis and Ava-Supais planted it for food, and used the ground seed mixed with corn meal as a dainty. Several travelers have described the plant as grown by the inhabitants of the far Southwest. Tobacco should not be forgotten. The European owes much to this weed, nor is he the only one who enjoys it, for the Redman from the earliest time smoked the pipe of peace and, as the wind wafted the smoke upward, offered significantly a prayer to the Great Spirit. The tomato with its crimson fruit, the pumpkin vine, the bean and the potato should find their place as vegetables of aboriginal use in some corner of the garden. The oak, yielding acorns; the willow, dye stuffs, can be placed to good advantage near the pond in which grow Wah-es-i-ping, *Sagittaria variabilis* Engelm; yellow lotus, *Nelumbium luteum* L.—both furnishing aboriginal root esculents; water cress, *Nasturtium*, a salad plant, and wild rice, *Zizania aquatica*, L.

A partial list will show the large number of 'Indian' plants which a gardener could use:

<i>Nymphæa odorata</i> , L.	<i>Physalis grandiflora</i> .
<i>Nuphar advena</i> , Ait.	<i>Diospyros virginiana</i> , L.
<i>Prunus virginiana</i> .	<i>Plantago major</i> , L.
<i>Fragaria</i> sp.	<i>Betula papyrifera</i> ,
<i>Amelanchier Canadensis</i> ,	Marsh.
Torr. & Gr.	<i>Thuja occidentalis</i> , L.
<i>Ribes hirtellum</i> , Mx.	<i>Pinus monophylla</i> , Torr.
<i>Larrea Mexicana</i> ,	& Frem.
Moric.	<i>Juglans nigra</i> , L.
<i>Apios tuberosa</i> , Ph.	<i>Acorus calamus</i> , L.
<i>Celastrus scandens</i> , L.	<i>Typha latifolia</i> , L.
<i>Cornus Canadensis</i> , L.	<i>Scirpus lacustris</i> , L.
<i>Chiogenes hispidula</i> ,	<i>Lilium superbum</i> , L.
Torr. & Gr.	<i>Oryzopsis membranacea</i> .
<i>Vaccinium</i> .	<i>Phragmites communis</i> ,
<i>Ledum palustre</i> , Ait.	Trin.
<i>Aralia nudicaulis</i> , L.	<i>Zea mays</i> , L.

2. The plants should be arranged with reference to the Indian tribes which used them. The plants of the Algonquins should stand

apart from those of the Iroquois; those of the Aztecs from those of the Pueblos. Such a geographical arrangement is most desirable for educational purposes.

3. An arrangement according to the uses of the plants ought also be made. The strictly agricultural plants, such as corn, beans, potatoes and pumpkins, ought to be sown in one bed, the fibre plants, like basswood, *Tilia Americana*, L.; spruce, *Picea*; sumach, *Rhus aromatica*; willow, *Salix lasiandra*, Benth; unicorn plant, *Martynia proboscidea*, Glox; tree yucca, *Yucca brevifolia*, Engelm; ash, *Fraxinus*, in another; the dye plants, as alder, *Alnus incana*, Willd; celandine, *Chelidonium majus*, L.; smart weed, *Polygonum Hydropiper*; poke, *Phytolacca decandra*, L., *Coptis trifolia*, Salisb., in another.

The myth plants and medicine plants also are important as showing the culture of the aborigines. They by no means should be excluded from the garden.

The educational purposes of such an ethnobotanic garden have so far been discussed. The question may arise: What is the scientific value of such a garden? It is this: Frequently in studying the articles manufactured from plants by the Indians, it is difficult to determine what plant was used in each particular case. A histologic study of the vegetal tissues will give sometimes a clue, and if the microscopic structure of the manufactured article be compared with the fresh plant an identification is in many cases possible. To cite a case, the writer was asked not long since to identify the plant forms found on certain Central American tablets.\* He was almost certain that the leaf found at the base of the cross, in the celebrated Tablet of the Cross, was that of the tobacco. The Herbarium specimens of the genus *Nicotiana* were examined, but showed very imperfectly the auricles at the base of the leaf which were so plainly marked in the conventionalized sculptured form. Had he had the plant growing somewhere, the identification could easily have been made, certain garden forms of tobacco, which he afterwards saw, showing the auriculate base clearly.

\*See a paper of mine on the subject, Plant Forms on Mexican and Central American Tablets. American Antiquarian, XVI., 299, September, 1894, in connection with the ¶ on the Tablet of the Cross.

There can be no doubt, therefore, that such an ethno-botanic garden would stimulate greatly the interest in aboriginal plants, and at the same time it would be of the greatest scientific value. Nothing of the kind has ever been attempted along the lines suggested above, and such a garden would soon become a Mecca for those who desire to write monographs upon our American plants and their uses among the aborigines.

J. W. HARSHBERGER.

UNIVERSITY OF PENNSYLVANIA.

#### SCIENTIFIC LITERATURE.

*Certain Sand Mounds of Florida:* By CLARENCE B. MOORE.

I have elsewhere\* called attention to the important work which Mr. Moore is doing toward the elucidation of the archaeology of Florida, a research to which he has given his personal attention for several years. The third memoir† on this subject contains the results of his field work from January 16th to June 16th, 1895.

Mr. Moore has now examined with great care nearly all the earthworks of the St. Johns and Ocklawaha valleys. Of this large number only two were erected after white contact. That is, in only two were found objects obtained from the whites and placed with the original interments in the mounds. In several instances glass beads and other manufactures of the whites were found on or near the surface of a mound, or with intrusive burials of recent times; and Mr. Moore shows how easily such recent things might be taken as evidence of recent origin of the mound in which they are found. It is only by such thorough work as Mr. Moore is doing that our American archaeology is advanced, and it is therefore with a feeling of satisfaction that we read the account of his careful field work and follow the true

archæologist from page to page as he patiently describes each mound and its contents, and notes the position of every skeleton and object described.

The author of these memoirs takes the field fully equipped for the thorough prosecution of this work, and employs from twenty to forty laborers under experienced guidance. He also prints and illustrates his papers in a handsome manner. The objects are well illustrated, nearly always of natural size, and, what is greatly to be commended, the artistic desire of the draughtsman to make them look a little better than the originals is not apparent here. The explorer in several instances states that he did not take to his collection in Philadelphia such and such potsherds or other fragmentary objects because he had many perfect specimens of the same type. This is to be regretted since every archæologist is not so fortunate as he, and the very potsherds which he discards would be treasured in many a museum, particularly as Mr. Moore's work in the field is so thorough that nothing is left for another in the same region. Even this regret is tempered when we know how liberal Mr. Moore has been in supplying several museums with representative collections from these Florida mounds.

It is yet too soon to draw conclusions as to the peopling of Florida or as to the time when these burial mounds were first formed. Wyman showed by his research that many of the shell mounds of the St. Johns were of great antiquity, and that there were certainly two and probably three phases in the life of the people who formed them. From Mr. Moore's explorations, it seems likely that the sand mounds—as old as many of them unquestionably are—belong to the later period of the shell mounds, and in a few instances come down to the time of European contact.

One of the questions not yet fully answered is that of the relation of the early people of Florida with other tribes. We know that among the most recent were the mixed people known as the Seminoles. We also know that Florida was inhabited in very early times, as shown by the discoveries of Pourtalés and later by Heilprin. We can now trace by the artifacts brought to light in the burial

\*The Harvard Graduate Magazine of June, 1895.

† *Certain Sand Mounds of Duval County, Florida*; two mounds on Murphy Island, Florida; and certain Sand Mounds of the Ocklawaha River, Florida. By Clarence B. Moore. *Journal of the Academy of Natural Sciences of Philadelphia*, Vol. X., 1895, 4to, 108 pages. 91 illustrations in the text; two maps; 16 plates of pottery and a frontispiece illustrating a large conical mound.