dii and *Selaginella rupestris,* but the general results in this respect were distinctly disappointing.

Experiences at the Biological Laboratory of the U. S. Bureau of Fisheries at Beaufort, N. C.: W. D. Hoyt.

An account was given of the excellent equipment of the station, and the facilities for research. The richness of the local fauna and the varied flora was noted. The locality abounds in epiphytic plants of numerous species. The speaker's investigations indicate a local algal flora that compares favorably with that of the New England and the Florida coast. Over 100 species have been found. The latitude of Beaufort appears to be the northern limit of certain southern species and the southern limit of some northern ones. The predominant flora varies greatly, according to the season, southern forms predominating in summer and northern forms in winter.

A coral reef about twenty-three miles off the coast and under a depth of 13 to 14 fathoms, extends about one mile in length and one half a mile in width. This is probably the most northern of the coral reefs. It supports a rich algal flora, consisting almost entirely of southern forms, and some of them new to North America.

Remarks on the Unusual Habitats of Certain Ferns in New Jersey: Miss Pauline Kaufmann.

Several species have been observed growing in habitats somewhat unusual for the species.

Observations in Western South Carolina, and on the Isle of Palms: Homer D. House.

On this island, which is off the coast of South Carolina, several species new to South Carolina, and a probably new species of *Helianthus,* were found.

Account of a Visit to the Experimental Garden of President Brainerd, at Middlebury, Vt.: Tracy E. Hazen.

A description was given of President Brainerd's experimental pedigreed cultures of violets. In addition to remarks concerning the Mendelian studies in *Viola,* attention was called to the fact that, contrary to the general notion, viable seeds were commonly found in the petaliferous flowers of the violet.

Discussion followed the remarks of each speaker.

C. Stuart Gager,
Secretary

DISCUSSION AND CORRESPONDENCE

SOME OBSERVATIONS ON MUSEUM ADMINISTRATION

The two articles which recently appeared in Science[1] by Drs. Dorsey and Boaz on museum administration have been of more than passing interest to those engaged in the collection and exhibition of natural history material. While Dr. Dorsey's article discussed the matter from a purely ethnological standpoint, that of Dr. Boaz is of such a scope as to include broadly all branches of museum installation. The following observations are based upon an experience of thirteen years in one of the smaller museums, where the attendance averages about 350,000 per year.

Dr. Boaz states that museums may serve three purposes, viz., healthy entertainment, instruction and the promotion of research. That a museum is for the purpose of providing instruction and of promoting research all museum men will agree, but there is great danger of dwelling too much upon the idea of entertainment. All museum men desire unquestionably that their museums should afford healthy entertainment, but the installations must not be prepared for this purpose. In the writer's opinion every exhibit should be prepared with some definite purpose in view; it must, indeed, be the embodiment of an idea which may be apprehended by the visitor.

It has not been the writer's experience that the public resents to any large degree an attempt at systematic instruction, or that it dislikes to give serious consideration to the exhibits. It has been frequently noted in the Chicago museums that visitors will study or look over every case in a given hall or gallery; the more commonplace exhibits will perhaps be passed over, but where it is apparent that some idea or fact of nature has been embodied in an exhibit, this exhibit will be carefully

[1] No. 641, April 12, 1907, and No. 650, June 14, 1907.

looked over and criticized. The writer does not believe that the majority of visitors to a museum are actuated by a mere search for entertainment. The public knows what the museum contains and it visits the institution because it desires to see the different kinds of animals, plants and minerals. If the visit was for the sake of mere entertainment, then surely the same people would scarcely visit the institution repeatedly.

Dr. Boaz asks the question, "What can be done for this class of visitors?" In answer to this I would call attention to the terse definition of Professor William H. Flower, who defines a museum as a place for the inculcation of ideas. We must not descend to the plane of the public's point of view and try to please it; we must, on the contrary, try to lift it up to higher planes of thought. Nature presents countless facts for our use and we have but to utilize them to find an inexhaustible mine of "healthy entertainment" at our command. The idea of making exhibits "popular" is receiving more attention of late than the subject demands. In the writer's opinion the popularity of an exhibit should not be the motive governing its construction. Each exhibit should crystallize about some central thought or fact, so presented, in either label or preparation, as to fix the thought in the mind of the visitor. There will be, unquestionably, a number of people who will fail to perceive this central idea, but I am positive that the majority of visitors will apprehend the lesson which the exhibit seeks to teach. The writer's experience has been that the museum visitors minutely inspect a group exhibit, searching for those little artistic touches which make the modern groups so interesting. To cite an example; we have in the Chicago Academy of Sciences a large group of Virginia deer, showing this species in a Wisconsin forest. It is called a "woodland courtship" on the label and presents two bucks fighting for the possession of the female. In the same exhibit are several chickadees, a red squirrel, a woodpecker and a porcupine, besides some snail shells near a pool of water. Several of these animals are hidden by foliage, but the sharp eyes of some visitor invariably spies them and such exclamations are heard as "Oh, see the squirrel!" "Look at the little bird hanging by his feet!" (referring to one of the chickadees) or, "See the woodpecker behind the tree!"

The public comes to the museum with several definite questions which it seeks to have answered. These are, what is the object? where did it come from? What is it good for? All of these questions may be answered by specially prepared exhibits and labels. It is astonishing to note with what avidity the museum visitor studies a group which has been prepared to illustrate some common aspect of nature. A year or more ago the Chicago Academy of Sciences began the preparation of a collection of Illinois birds mounted in small groups to show their nesting habits as well as their young. With each group a map was placed, showing the breeding, the winter and the migration range of each species. These cases are emphatically popular, although they were not prepared for entertainment but for study.

As a rule the large museum makes the very serious mistake of exhibiting too much material and the visitor is bewildered, tries to "do" the whole museum in one visit and leaves it with an aggravated case of brain fag. The writer has always contended that a natural-history museum should divide its collections into two parts, one of which is specially arranged for the museum visitor, while the other is especially prepared for the convenience of the serious student, who will be, as Dr. Boaz remarks, in the minority. The endless exhibition of species and genera is very tiresome to the museum visitor, to whom they all look alike. If, however, a selection be made to bring together a few of each family to show their interrelationship and their contrasts, then the visitor is interested. Such exhibits as the typical inhabitants of different countries, those peculiar to certain regions or those which have an economic value are always interesting to even the most casual visitor.

It is doubtless true, as Dr. Boaz states, that the label is quite secondary to the specimen, which is the essential thing. The visitor looks for the specimen first and then looks for

the label, and if the latter is not there, then the visitor, if he is from Chicago, will hunt up the first available attendant and ask what the name of the specimen is. This experience has been repeated a thousand times in the museum under the charge of the writer. This shows clearly that a good label is an important item. It has been stated by some museum men that the public will not read labels, but here again the writer's experience, both in his own institution and while visiting the museums in New York and Washington, is at variance with this statement, for of the visitors actually seen fully seventy per cent. read some of the labels. This presupposes, of course, that the labels are printed or are written in a legible manner.

For purposes of instruction it is obviously impossible to arrange large collections from all points of view, nor is this necessary, because the teacher will select from the exhibit material those sections which best illustrate the problem at hand. The possibilities of variation in systematic exhibition are endless and it requires an administrator with positive genius to successfully travel the middle road. The large museums, however, should aim to have systematic collections in all branches, sufficiently exhaustive to clearly indicate our present knowledge of the science. This does not mean, of course, that every known species and variety shall be exhibited, but that enough shall be available to the public to indicate the advance in each particular branch of science. The public expects this and should not meet with disappointment.

It is a mistake to prepare large exhibits primarily for the schools, because each school will use the collections for a different purpose and in a different manner and the selection of material must be left to the teacher. It is becoming apparent to some museum men that each school must possess its own small and selected museum with which to teach the principles of science, and the larger museum will be ultimately used as an adjunct to the school museum when the pupil is able to more easily grasp the significance of the larger exhibits. This plan is now being successfully carried out by several Chicago schools and these schools have also successfully demonstrated that concentration of thought can be secured in a large hall which is used by the public and which is as systematically arranged as it is possible to make a collection.[2]

It is probably true that the smaller museums are in closer touch with the schools and with the public than the larger museums are. This may be due to the fact that the collections are more concentrated and hence more available for systematic study. It has seemed to the writer that an expansion of the systems in use by the smaller museums would make the larger museums much more useful to the schools as well as to the general public. The writer can by no means agree with the statement made by Dr. Boaz that a thorough systematization of the large museum is impossible or that systematic museums must of necessity be small. A museum, large or small, without a thorough systematization would be an absolute failure and of little value for scientific study. There seems also, to the writer at least, too much concern about the seeming conflict between the interests of the public and of the scientist. There should be no conflict if once we divorce ourselves from the idea that we must of necessity try to please the public. Visitors will crowd the museum halls no matter what is exhibited or its manner of exhibition, and it lies with the museum administrator to arrange and install his collections for the best interests and for the advancement of science, for which reason alone the museum is in existence. The principal function of museums, large and small, is the acquisition and preservation for future study of such material as will throw light upon the great problems of life which confront us and which are engaging our attention. The exhibition of material is secondary to this great work. In the near future more of the larger museums will doubtless follow in the footsteps of the National Museum and select broad-minded men as curators of exhibits, leaving the specialists free to carry on their studies.

In conclusion the writer wishes to state as

[2] See the *Museums Journal* for August, 1905, p. 50.

his opinion that the public should be rigidly excluded from the study collections. These should, if possible, be kept away from the exhibition halls, but if this can not be done they should at least be kept from the public view. Drawers with glass tops, placed beneath the cases and accessible to the public are an abomination to the curators and a menace to the safety of the collections, besides serving no good purpose to the public, which is only bewildered by the multitude of similar forms.

The paper by Dr. Boaz opens up some perplexing but also interesting questions of museum administration and it would be of value to hear from others who are working along this line. Many of the problems touched upon will probably be discussed by the American Association of Museums at some of its future meetings, and the writer would suggest that the Chicago meeting in 1908 will be an opportune time to offer some of these problems for debate.

FRANK C. BAKER,
Curator
THE CHICAGO ACADEMY OF SCIENCES

THE PUBLICATION OF AGRICULTURAL RESEARCH

PROFESSOR WEBBER in a recent issue of SCIENCE[1] has crystallized a problem which has been prominent in the minds of experiment-station workers of the United States for the last decade or more, and which has been particularly accentuated by the recent expansion of technical work in the stations by virtue of the Adams Act.

Most active station workers feel the need of additional and better facilities for publication.

As Professor Webber indicates, the issuance of special technical series of bulletins has been a failure and has been almost entirely or altogether abandoned. The publication of a technical bulletin with another edition of the same number in popular abstract, tends to confusion. Some stations issue the more technical, less practical, bulletins in small editions and withhold them from general distribution. This course is objectionable, since the farmer feels slighted when he finds that certain bulletins have not been sent to him. To take the other horn of the dilemma and send all of this technical matter to the farmer, placing before him matter which will ultimately and in the hands of the proper persons be highly valuable, but which it is entirely impossible for him to use or even to judge properly, is certainly not a proper course.

Nor do any of these methods of bulletin publication of technical matter attain the desired end, viz., *to reach the largest number of interested people and to place the matter in permanent and easily accessible form.*

In general, the plan of Professor Webber must meet approval in that it provides a central unified publication center. Personally I believe that there should be one publication which might be known as the *Journal of American Agricultural Research,* a title which commends itself as being definitive and concise, and which is easily abbreviated to *J. A. A. R.* or *Jour. Amer. Agric. Res.,* an abbreviation which is not preempted in the large list used by the *Experiment Station Record.* While primarily intended for publication of the research of experiment-station workers, who should have the first right to immediate publication, the privileges might be extended to all other research concerning American agriculture.

This journal should be issued in numbers consecutively, as they come from the press and be paged consecutively as high at least as the ten-thousandth page. All citations by page will then be exact. The numbers should be of variable size to conform to the dimensions of the single articles contained therein, and such editorial staff and press facilities should be at command as to insure practically immediate publication of matter submitted to the editorial board by various station directors.

Frequent index numbers with extensive cross reference should be issued in order to keep the journal of ready reference utility. Such a journal used in conjunction with the *Experiment Station Record,* as at present conducted, would render all American agricultural research readily accessible.

[1] SCIENCE, Vol. XXVI., p. 509.