acceptance in recent years, since the unanimity of these many witnesses and the cogency of these generalizations have been recognized.

GLACIERS AS CONSERVATIVE AGENTS.

LEST the opinion in favor of strong glacial erosion should go too far, it is well to give special attention to such articles as explain by other processes the particular relation of over-deepened main valleys and hanging side valleys, to which so much prominence has recently been given in this connection. Bouney, writing on 'Alpine Valleys in Relation to Glaciers' (*Quart. Journ. Geol. Soc.*, LVIII., 1902, 600–702), recognizes the prevalently discordant relation of trunk and branch valley in certain parts of the Alps, but concludes, on the basis of 'personal examination of every part of the Alps, of the Pyrenees, the Apennines, Scandinavia, Auvergne, and many other hill and mountain regions,' that cirques are mainly the work of water; and that in a system of valleys, denudation would, on the whole, be checked where glaciers occupied the higher tributaries, and intensified by the action of torrents in the principal valleys. Garwood, discussing the 'Origin of Some Hanging Valleys in the Alps and Himalayas' (*Ibid.*, 703–715), also concludes that glaciers protect their floors. He explains certain striking examples of discordance between trunk and branch valleys in the Alps as the result of the accelerated erosion of the trunk valley on account of the steepening of its stream by a tilting of the region, while the side valleys, at right angles to the direction of tilting are not cut down, because their streams are not tilted. Kilian presents some 'Notes pour servir à la géomorphologie des Alpes dauphinoises' (*La Géogràphie,* VI., 1902, 17–26), and insists that the hanging lateral valleys of that district have been protected by glaciers while the main valleys have been deepened by normal stream work. Lugéon adduces the occurrence of rock sills that rise across certain Alpine valley floors, notably a sill known as the Kirchet in the Aar valley above Meiringen, and a similar sill in the Rhone valley below Martigny, to prove that the ancient glaciers were not destructive agents; had they been, these sills ought to have been removed; their presence is a 'peremptory argument against the deepening of valleys by glaciers' ('Sur la fréquence dans les Alpes de gorges épigénétiques et sur l'existence de barres calcaires de quelques vallées suisses,' *Bull. labor. de géol.*, Univ. de Lausanne, No. 2, 1901, 34 pp., excellent plates). This author takes no account of the hanging lateral valleys which are so abundantly associated with the main valleys of the Aar and the Rhone, and therefore naturally enough gives much importance to the rock sills, which in the theory of strong glacial erosion are explained as residual hard-rock inequalities in a much-deepened valley floor.

The manifest difficulty in the way of explaining hanging lateral valleys by the conservative action of the glaciers that once occupied them is the necessity of assuming a systematic, and persistent termination of many independent glaciers at the mouths of lateral valleys, for a period long enough to allow the main stream to deepen its valley by hundreds and to widen it by thousands of feet. The difficulty in the way of accounting for over-deepened main valleys by tilting, as suggested by Garwood, is that in the plentiful examples of tilted and therefore dissected districts in non-glaciated regions, the side streams cut down the side valleys about as fast as the main stream cuts down the main valley, and by the time the main valley is well opened the side valleys enter it at grade, in most accordant fashion. W. M. DAVIS.

THE MISSOURI BOTANICAL GARDEN.

FROM advance sheets of the administrative report on the Missouri Botanical Garden, presented at the recent annual meeting of the Trustees, it appears that the gross revenue for the year was $124,431.89 and the total expenditure $119,893.84, of which $25,352.64 was spent for the maintenance of the garden proper and $8,186.46 for improvements and extensions in this department; $3,015.81 for the herbarium; $6,595.40 for the library; $5,086.67 for administrative expenses at the

garden; $1,075.81 for research; $2,874.78 for publication; $1,121.96 for the training of garden pupils (in addition to the allotment which those holding scholarships receive and which is offset by their services in the garden); $2,480.93 in carrying out bequests made by the founder of the garden; and the remainder for expenses connected with the administration and maintenance of revenue property.

In connection with a popular account of the garden, written by the director at the request of the editor of the *Popular Science Monthly* and published in the January number of that magazine, it is interesting to note that a net gain of 1584 species or varieties cultivated at the garden was made in 1902, bringing the total up to 11,551; 21,052 more persons visited the garden in 1902 than ever before recorded, bringing the total up to 112,314 for the year; the herbarium, which now includes 427,797 specimens valued at $64,169.55, was increased by the incorporation of 62,844 specimens; the library, which now includes 41,224 books and pamphlets valued at $67,506.30, was increased by the addition of 2,516 books and 2,696 pamphlets; and the current list of serial publications received at the library has been brought up to 1,160.

The effort which the administration of the garden is making to serve the three principal purposes of Henry Shaw in founding the garden, is evident from the expenditures above recorded for the maintenance of a beautiful and instructive garden; by the expenditure for the instruction of garden pupils and the support—within the provisions of Mr. Shaw's will—of the Henry Shaw School of Botany, of Washington University, in which, in addition to undergraduates, one candidate for the Master's degree and four for the Doctor's degree in botany are said to be registered; and by the expenditures for research and the publication of the results of research noted above, and the mention in the report of extensive field study undertaken by the director in connection with a revision of the Yuccas and related plants, published in the volume issued last summer.

SCIENTIFIC NOTES AND NEWS.

Dispatches from Edinburgh report that in furtherance of his educational scheme for Scotland Mr. Andrew Carnegie has decided to endow a trust for scientific research with a fund of $5,000,000.

A meeting of the executive committee of the Carnegie Institution was held at Washington on January 24. Appropriations were made exhausting the $200,000 allotted by the trustees for grants. All the research assistants have not, however, yet been appointed, and those who wish to be considered in this connection should apply in accordance with the notice published in the issue of Science for January 9.

Dr. W. A. Cannon, A.B. (Stanford University, 1899): A.M., 1900, Ph.D. (Columbia University, 1902), has been appointed resident investigator of the Desert Botanical Laboratory of the Carnegie Institution. Mr. Frederick V. Coville and Dr. D. T. MacDougal, of the advisory board of the laboratory, started on January 24 on a tour of inspection of the region west of the Pecos River in Texas, along the Mexican boundary, for the purpose of fixing upon a location for the laboratory.

King Oscar of Sweden and Norway has conferred the Norwegian medal 'for merit' on M. Berthelot, the eminent French chemist.

The Norman medal of the American Society of Civil Engineers has been awarded to Professor Gardner S. Williams, of Cornell University, for a paper entitled 'Experiments upon the Effect of Curvature on the Flow of Water in Pipes.'

The board of control of the Naval Institute has awarded the gold medal and prize to Professor P. R. Alger, U.S.N., for his essay on 'Gunnery in the Navy; Causes of its Inferiority and its Remedy.'

The Rumford Committee of the American Academy of Arts and Sciences has made the following grants in aid of investigations in light and heat: To Dr. Ralph S. Minor, of Little Falls, N. Y., $250 for a research on the dispersion and absorption of substances for ultra-violet radiation; to Dr. Sidney D.