

THURSDAY, JANUARY 9, 1879

AMERICAN SURVEYS AND EXPLORATIONS

ATTENTION has frequently been called in these columns to the progress of American exploration. Only a few months ago¹ reference was made to the want of concert among the different surveying expeditions, to the consequent loss of labour and reduplication of work, and to the desirability of consolidating the whole exploratory service under one connected organisation. It is satisfactory to know that an important movement in this direction is now in progress, and that Congress has called in to its assistance the advice of the most eminent scientific authorities in the States.

Readers of NATURE may remember that a few years ago (1874) a discussion was raised in Congress as to the alleged repetition of the survey of the same area of territory by independent expeditions, and that a committee of inquiry was appointed to take evidence on the subject and report. The result of that inquiry was a recommendation that the Engineer Department should be restricted to such surveys as might be necessary for military purposes; but "that all other surveys for geographical, geological, topographic, and scientific purposes should be continued under the direction of the Department of the Interior." It was easy to see from the evidence given before this Committee that a good deal of personal feeling had been evoked by the conflict of interests among the various surveying corps. The Engineer Bureau, in particular, with its well organised military equipment and its just pride in the large amount of exploratory work it had accomplished, seemed to resent the existence of the civilian expeditions as an infringement of its own proper sphere of operations. We may suppose that it was proportionately chagrined by the decision of the Congress Committee.

There was thus no great love between the rival surveyors in the beginning, and heaven seems to have decreased it on better acquaintance. With their plotting and counter-plotting, of which there has, no doubt, been plenty, we have of course nothing to do. Last summer the subject came up again before Congress. Representative Hewitt moved a resolution there, referring the question of the Geological and Geographical Surveys of the Territories for consideration and report by the National Academy of Sciences. It was known that double surveying had been carried on to a large extent, notwithstanding the information elicited and recommendations given by the Congressional Committee of 1874. One officer, indeed, was alleged to have duplicated surveys to the extent of more than 100,000 square miles, at a cost to the public exchequer of nearly half a million of dollars. The object of the resolution in Congress is said to have been to consolidate the power of the military surveys; but certainly nothing could be more impartial and sweeping than the law passed last June. It was to the following effect:—"The National Academy of Sciences is hereby required, at their next meeting, to take into consideration the methods and expenses of conducting all surveys of a scientific character under the War or Interior Department, and the surveys of the Land Office, and to

¹ NATURE, vol. xviii. p. 634.

report to Congress, as soon thereafter as may be practicable, a plan for surveying and mapping the territories of the United States on such general system as will, in their judgment, secure the best results at the least possible cost; and also to recommend to Congress a suitable plan for the publication and distribution of the reports, maps, and documents, and other results of said surveys."

The Academy, in accordance with this requirement, appointed a committee to consider the question. The weight of authority of this Committee may be judged from the names of its members: O. C. Marsh, James D. Dana, William B. Rogers, J. S. Newberry, W. P. Trowbridge, Simon Newcomb, Alexander Agassiz. The finding arrived at by such a group of men must command respect all over the Union, as it will on this side of the Atlantic. At a meeting of the Academy held in New York on November 6th, the result of the deliberations of the Committee was presented in the shape of a formal report, which, being approved and adopted, was forwarded to the President of the Senate on the 26th of the same month.

In this Report the various surveys of the public domain are broadly grouped into two divisions: 1. Surveys of mensuration; and 2. Surveys of geology and economic resources of the soil. Each of these divisions is discussed somewhat in detail.

1. Under the first group are included no fewer than five different and independent organisations: 1. The Coast and Geodetic Survey. 2. The surveys carried on by the War Department to the west of the 100th meridian. 3 and 4. The topographical portion of the work carried on by the two surveys under the Interior Department. 5. The survey for land-parcelling under the Land Office. Between these various kindred works no concert or co-ordination of any kind exists. In the language of the Report, "their original determinations of position are independent, their systems of surveys discordant, their results show many contradictions, and involve unnecessary expenditure." On the one hand the geographical reconnaissances of the Engineers and the Interior Department are too sketchy to serve for the subdivision of public lands; on the other hand, the land-parcelling surveys are of correspondingly slight topographical or geographical value. The National Academy insists that as all these surveys must be based upon accurate determinations of position, they can never be effectively and economically conducted until they are united into one system conducted under the same head. On a review of the powers and capabilities of the different surveying staffs, the Academy has come to the conclusion that the Coast and Geodetic Survey is, practically, best prepared to undertake the charge of the unified system proposed to be established. It recommends that this survey be transferred from the Treasury to the Department of the Interior, and that, with its modified and extended functions, it should hereafter be known as the United States Coast and Interior Survey, with a Superintendent appointed by the President, and reporting directly to the Secretary of the Interior. The duties of this branch of the public service, besides those of the present Coast and Geodetic Survey, should include a rigid geodetic survey of the whole public domain; a topographical survey, including detailed topographical work, as well as

rapid reconnaissances like those now carried on by the War and Interior Departments; and, lastly, surveys for the parcelling of public land.

2. Having regard to the enormous area of territory yet to be explored and surveyed, its vast mineral wealth, its agricultural and pastoral resources, its stores of timber, its capabilities of soil, the Academy believes that the best interests of the country require that, for purposes of intelligent administration, a thorough knowledge must be obtained of the geological structure, natural resources, and products of these regions. It therefore recommends the establishment of an independent organisation, with a Director appointed by the President, to be placed under the Department of the Interior, and to be styled the United States Geological Survey. The duties of this Survey would include the investigation of the geological structure and of the economic resources of the public domain.

This consolidation of all the surveying work, sanctioned and paid for by Congress, would of course involve radical changes in some of the Departments. The Bureau of Engineers, in particular, would be required to give up all surveying work except what might be necessary for merely military purposes, and for such engineering operations as the rectification of rivers, irrigation and drainage, reclamation and protection of alluvial land. The various geographical and geological surveys west of the rooth meridian, now carried on by the War and Interior Departments, would be discontinued, though of course they would, in some cases, be resumed under the proposed new organisation:

Three distinct branches of the public service are thus proposed to be established for dealing with the public domain:—First, the United States Coast and Interior Survey, charged with the accurate mapping of the country; second, the United States Geological Survey, for the investigation of the geological structure and natural resources of the domain; third, the Land Office, having charge of the subdivision and sale of the public lands, and entitled, therefore, to call upon the Coast and Interior Survey for all necessary surveys and measurements, and upon the Geological Survey for all information as to the value and classification of lands.

Considerable liberty is proposed to be given to the chiefs of the two surveys as to the nature and extent of their publications. They are each to present an annual report of operations, and provision is to be made for the issue of such maps, charts, reports, discussions, treatises, and other documents as they may deem to be of value. Most liberal provision is likewise recommended to be made for the distribution of the reports of the Surveys. Besides the number of copies required by Congress for its own use, 3,000 copies are proposed to be published for scientific exchanges by the heads of the surveys and for sale. The special reports are to be issued in uniform quarto size, liberty being left to each director to choose such a form for his cartographic publications as shall combine the most effective style with the greatest economy. All specimens collected by the two surveys when no longer required for the investigations in progress are to be transferred to the National Museum.

Such in brief are the recommendations made by the National Academy in response to the requirement of

Congress. That they are eminently wise and thoroughly practicable must be freely admitted by all capable of forming an opinion on the subject. It is simply impossible that things can go on as they are. Each one of the Surveys now in progress has done good work; several of them most admirable work. But work as good could be got with less labour and at less cost. This cannot be effected without combination; and the Academy has pointed out with great clearness and judgment how the combination may be achieved. It is not to be expected that changes of this kind can be carried out without irritating some of the individuals whose position is thereby affected. But save the severance of the Bureau of Engineers from all control of the surveys there need be comparatively little disturbance of the work now going on. Dr. Hayden, who with his staff has done so much in recent years for American geology, would doubtless take a high command under the new system; and it may be hoped that his position will be so secured as to enable him to devote his whole time to the scientific work for which he has shown himself to be so admirably qualified. Mr. Powell and his colleagues might continue their interesting and important Colorado investigations. To Mr. Clarence King fresh fields of research lie open where he may win laurels as bright as those he now wears. To all these officers in so far as they have at present geographical and topographical work to carry on, the allocation of all such duties of mensuration to a special geodetic survey should be a welcome relief, as it will set them free for their own special investigations. The Academy in its Report contemplates the possibility of officers, both of the army and navy, being desirous to volunteer for employment in these surveys, and recommends that when their services are not otherwise required they should be permitted to take part in the general survey. In this way a connection with the engineers might be re-established, and we may be sure that every engineer officer of capacity would be welcome, and would take a good position under the Department of the Interior.

The Report of the Academy, on being presented to Congress, was, on the 2nd ultimo, referred to the Committee on Appropriations, and ordered to be printed. As Congress rises at the beginning of March, some action may be expected to be taken on the matter before that date. It will be a subject for sincere congratulation among all well-wishers of American science and general progress, should the decision be in the direction pointed out by the National Academy of Sciences.

ARCH. GEIKIE

KERNER'S "FLOWERS AND THEIR UNBIDDEN GUESTS"

Flowers and their Unbidden Guests. By Dr. A. Kerner. With a Prefatory Letter by C. Darwin, M.A., F.R.S. The translation revised and edited by W. Ogle, M.A., M.D. (London: C. Kegan Paul and Co., 1878.)

THIS charming book is the record of an extension, in a somewhat different direction, of the researches of Darwin, Hermann Müller, and others, on the assistance rendered by insects in the cross-fertilisation of flowers. Attention has hitherto been directed almost exclusively