by Jules Marcou (p. 122), published at Zurich in 1858. When it is remembered how the publication of American geological maps has increased in the past twenty-five years, the importance of this catalogue will be appreciated.

Bulletin No. 8, 'On enlargements of mineral fragments in certain rocks,' by Roland Duer Irving, is also in press. It will be illustrated with one woodcut plate, five chromolithograph plates, and four woodcuts.

Bulletin No. 7 begins the second volume. A number of other bulletins are in course of preparation, and will soon be sent to the printer. —— Monograph No. vii., 'Silver-lead deposits of Eureka, Nev.,' by Joseph Story Curtis, is all in type with the exception of the index. It has a hundred and ninety-three pages, and will be illustrated with sixteen plates and ten figures. —— Monograph No. viii., 'Paleontology of the Eureka district,' by Charles Doolittle Walcott, is also in press, and is being rapidly put into type.

RECENT PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Society of arts, Massachusetts institute of technology.

May 22. — A paper by Mr. J. M. Batchelder was read by the secretary on the electro-deposition of iridium on engraved copper plates. A process had been used by Mr. Batchelder over twenty years ago; but it did not seem to have become known, and was presented as comparatively new. The solution was prepared by fusing iridium and osmium with three times their weight of nitrate of potassium for about one hour at a bright-red heat. A fused mass was broken into small pieces, and treated with nitric acid, in a glass retort with a condenser. The osmium was separated out, and the iridium which remained was treated with chlorhydric acid, after removing the nitrate of potassium by crystallization. The solution contained about one-eighth of an ounce of iridium to a gallon of water, to which about one-quarter pound of sulphuric acid should be added. The plate is to be immersed, and connected with the battery, as usual, and, when removed, will be found coated with iridium, closely resembling the common steel plates. Such plates, coated with iridium, were very durable, and possessed many other advantages. A plate was shown which had been exposed twenty-seven years without protection; and its surface was still brilliant and uninjured. It is more easily wiped than a copper plate, the surface being, in this particular, about the same as a steel plate. —— Mr. S. H. Woodbridge read a paper on the heating and ventilation of the new Institute building, and the special principles involved. The building had not been planned with special reference to any accepted system of ventilation, and only the circumstance of hollow walls rendered the introduction of such a system possible. Some of the more prominent features of the heating and ventilation system adopted are: the reversal of the ordinary custom of subordinating ventilation to economy in heating; basing the quantity of air required on determined requirements rather than on cubic capacity simply; the use of large areas of air-passages, and low velocities; making the outlet areas smaller than the inlet areas, and some peculiar features of the flues; heating by large air volumes at low temperatures instead of by small volumes at high temperatures; some modifications in the construction of the fan, increasing the efficiency; the method of controlling the temperatures of the coils; the method of determining the rate of condensation, and the daily aggregate condensation as a means of critical study, and of determining the cost of the heating and ventilation; and placing the ventilation and the temperature of each room under control of the engineer. The building measures about 150 by 90 feet, is 75 feet high, and contains some forty rooms, from 3,000 to 60,000 cubic feet in capacity. In determining the requisite air-supply, regard was had to the maximum number of occupants, and the character of their work. Ordinary lecture-rooms receive 1,500 cubic feet per hour for each person; physical laboratories, where some gas-flames are used, get 2,000; ordinary chemical laboratories, 3,000; the organic chemical laboratory, 4,000; and libraries, 2,000. The total capacity of the rooms is about 741,000 cubic feet, and the mean total air-supply about 3,535,000 cubic feet per hour, corresponding, with a uniform distribution, to a change of the entire air every twelve minutes. In the chemical laboratories, however, the air is changed every six or seven minutes. There are 79 flues, three feet by one foot, with a total area of about 230 square feet; and nearly one-half of these had to be located in the outside walls, notwithstanding the objections to such an arrangement. The finish of the flues is rough brick. Each inlet flue connects with but a single room, and the inlet is at about the middle of the height. The outlets are at the top and bottom of the room; the former being used only in hot weather, while the latter are always open. There are three valves or dampers on the outlet flue, — one at the top, a check-valve at the bottom to prevent a reversal of the draught, and one at the top outlet of the room. The inlet flues also have three dampers. The flues terminate in a sub-basement four feet high, under the whole building, with a concrete floor. The air enters through large windows, and, after passing through the main coil, passes through the fan into the fan room, open on three sides, to the sub-basement. The fan is twelve feet in diameter, with twelve floats, and has a free delivery over its entire circumference. The power it requires is very small. Calculation showed that the cost of heating the new building would be much greater than that of heating the old, on account of thinner walls, and other sources of loss, besides the greater quantity of air supplied. The

matter of the heating had been put into the hands of Mr. F. Tudor. The main coil heats the air to 50° or 60° C., and a supplementary coil at the foot of each flue heats it as much higher as required. As the steam main is below the boiler level, and the return below the tank for condensed water, the arrangement of these coils was quite difficult. Mr. Tudor's fractional valve is applied to each coil, and so adjusted as to just fill the coil with steam; only the condensed water escaping at the lower end, and draining into a tank, from which it is raised by a Davidson pump. The boilers and engines are all in another building, some hundred and fifty feet away. The Davidson pump serves as a water-meter to register the quantity of water condensed in the coils. For this purpose a cylinder around which a piece of paper is wound is revolved by clock-work, and a pencil so connected with the pump piston that it is gradually moved in the direction of the axis of the cylinder by the action of the pump. The length of stroke and size of cylinder being known, an automatic record is thus obtained, showing the quantity of water condensed. It also affords a means of studying many other points, as it shows the time of letting on steam and shutting it off, of starting and stopping the fan, of opening the windows, etc. From the quantity of water condensed, the amount of coal which should be consumed in heating and ventilating the building may be calculated. With the aid of this automatic apparatus, Mr. Woodbridge had studied the matter of cost, and had discovered a considerable waste, though he had not yet been able to arrive at its cause. The results of the system are fully as satisfactory as were anticipated. Professor Nichols has studied the chemical composition of the air, and has found in the case of one room, after it had been fully occupied for one hour by eighty or ninety students, the following proportions of carbonic acid expressed in parts in 10,000, — Feb. 9, 4.3; March 5, 6.1; March 11, 4.5, — thus showing practically no contamination. In regard to moisture, Mr. Woodbridge thought a relative humidity of 40% at a temperature of 65° was sufficient, as with a low relative humidity it is much easier to keep the air sweet. As a whole, the work is highly satisfactory, not because perfect, but because in so many respects it meets the wants it undertook to satisfy.

New-York microscopical society.

May 2. — Mr. Charles H. Denison, in a paper on the gold sands of California, said that the coast of California from its northern to its southern boundary, for a length of nearly seven hundred miles, is strewn with magnetic iron sand, or comminuted magnetite, carrying gold and some other metals. He described the discovery of gold in these sands at Gold Bluff, where the indications are, that the spot was once the mouth of an immense river, now extinct. The process of mining for gold among these sands was described; but this process, said Mr. Denison, has not proved profitable. On the Klamath River the gold is associated with the same sand, and with platinum and iridosmene; while, on the great San Joaquin River, zircons and stream cinnabar are its additional associates. He mentioned, that, while the black sand is water-worn, the quartz is sharp and splintery, as if never subjected to the action of water. Nevertheless, beneath Table Mountain, where it was satisfactorily proved that it had been deposited by water, the gravel had the same sharp features.

NOTES AND NEWS.

IN order to allow an interchange of courtesies between the British and American associations, and enable the members of the two associations to attend both meetings, the meeting of the American association for the advancement of science, this year, will take place at a later date than usual.

The council of the British association has invited the fellows of the American association to join in the meeting at Montreal on the footing of honorary members; and the American association and the local committee of Philadelphia have invited the members of the British association, with their near relatives who may be with them, to take part in the Philadelphia meeting. Invitations have been sent to the leading scientific societies abroad, inviting them to send delegates to the Philadelphia meeting. The probabilities, therefore, are, that the Philadelphia meeting will be largely international in its character; and it is likely that steps will be taken to form an international scientific association. At the same time with the association meeting, the International electrical exhibition will be taking place in Philadelphia, and probably at the close of the week an electrical congress will be held. Other bodies will also be in session during the week, among them the Pennsylvania state agricultural society and the American institute of mining-engineers.

The local committee are actively engaged in perfecting their arrangements for the accommodation of the large number of persons which the unusual circumstances will call to Philadelphia; and, while the contemplated arrangements provide for two thousand members of the association, it is earnestly requested by the committee, that they be notified as early as possible of the intention of members and their families to be present. All members who intend to be at Philadelphia should therefore notify the local secretaries at an early day, and at the same time give their addresses where the 'Local circular' will reach them, if they are to be absent from their permanent homes during the summer. Definite information in relation to lodgings and transportation will be given in the 'Local circular,' with much other important information.

A series of receptions will be offered the association and its guests, including one at the Academy of music after the president's address, a reception at the Academy of fine arts, a garden party at Haverford college, and a microscopical exhibition at the Academy of natural sciences. The botanical section of the Academy of natural sciences will hold at the academy a special meeting for botanists. There will also be visits to the International electrical exhibition, the