zers, etc., and gives lists of the useful minerals of the United States, with localities, and concludes with extracts from the new tariff relating to import duties upon chemical products, metals, mineral products, etc. It will therefore be seen that the work is of practical value; and this fact is also indicated by the demand for it, which comes largely from miners and mine-owners, particularly from the west.

Bulletin no. 2 of the survey is also by Albert Williams, jun. Its title is, 'Gold and silver conversion-tables, giving the coining values of Troy ounces of fine metal, and the weights of fine metal represented by given sums of United States money.' It is a pamphlet of eight pages, and is of especial value to assayers and bullion-dealers.

The third annual report is printed, and waiting for a few of the illustrations. The fourth annual report, with the exception of the index, is in type. Both these reports will probably be issued early during the forthcoming year.

Dutton's 'Tertiary history of the Grand Cañon district, with atlas' (volume ii. of the Monographs of the survey) has been distributed to European institutions, and will now be distributed to American institutions.

Volume iii. of the Monographs, 'Geology of the Comstock lode and Washoe district,' with atlas, by George F. Becker, is being delivered to the survey by the government printer, and will soon be ready for distribution.

The Monographs of the survey are not for gratuitous distribution. They can only be distributed through a fair exchange for books needed in the library of the survey. Copies over and above the number needed for such exchange are for sale. The price of volume ii. is $10.12, and of volume iii., $11.

NOTES AND NEWS.

THOSE who are interested in our leading article this week will be pleased to learn, that, in his will, Barrande bequeathed his collections, library, and undistributed copies of his publications, to the museum at Prague. He further provided for the continuation of his work by a bequest of ten thousand florins to the museum, which, by its acceptance, pledges itself to fulfil his wishes. Drs. Krejči, Frič, Kořiska, Prachenský, and Bellot were appointed by him a commission to see that his designs are carried out; and Drs. Waagen and Novák, well-known paleontologists, designated to execute the work, — the former to complete the 'colonies,' gasteropods, and echinoderms; the latter, the bryozoans and corals.

The museum proposes to establish a Barrande fund for supporting further studies on the Silurian formation of Bohemia; and any gifts that may come from America for that purpose would, we are assured, be deemed particularly valuable. The editor of SCIENCE will be pleased to forward to the museum at Prague any contributions that American naturalists may desire to make, and to acknowledge the same in these columns.

— Sir Charles William Siemens died in London, Nov. 20. He was born at Leuthe, in Hanover, in 1823. From 1844 he resided in England. In 1858 he established, with his brother, the firm which has become famous through the telegraph-cables they have made. For ten years (1853-63) Dr. Siemens was engaged on the regenerative gas-furnace, and since that time his methods of manufacturing steel have met with the greatest success.

— Information has been received from Sunda Straits, giving details of the hydrographical and topographical changes due to the great Java earthquake. These seem to be less extensive than heretofore reported by the press. Commander P. F. Harrington, U.S.N., reports the hills and trees in the vicinity of St. Nicholas Point covered with ashes, but otherwise unchanged. The soundings here remain the same. The sea has rushed through the valleys of Thwartway Island, tearing away the vegetation, and leaving the low land bare; and, from a distance, these breaks in the forest give it the appearance of five islands, but there is no change in the shore-line or soundings. The same is true of Anjer, where the base of the lighthouse at Fourth Point, and the buoys of the submarine cable, are the only monuments of that populous town. The plains have been swept by the sea, and show only uprooted palms, and ghastly relics of the inhabitants. Krakatoa volcano appeared active; but on a nearer approach it was found that the appearance resulted from ashes, etc., falling down the precipitous cliffs, and carried off by the wind.

The north-western part of Krakatoa Island has disappeared. The immense mass which is missing seems to have formerly been the choked-up crater; and its material has probably modified the sea-bottom northward from its place. No bottom could be found in the vacant spot with twenty fathoms of line. Prior to the eruption, Verlaten and Lang islands were covered with verdure. Their contour has been but slightly changed, but they are covered with scoria. A small island has formed eastward from Verlaten. The Polish Hat has disappeared, and where it stood is more than twenty fathoms water. A new rock, about twenty feet in height, has risen in eight fathoms, near the southern point of Lang Island. The channel south from Bezee Island has been closed to navigation by reefs and islets not yet surveyed. From the northern end of the island a reef extends in a north-westerly direction, apparently connecting with other islands to the westward.

The whole coast of Java between Second and Fourth points has been swept clean by the sea, but there is no essential change in the shore-line and soundings. Masses of floating pumice are wedged in Lampong Bay, and interrupt communication with Telok Betong. The lighthouse at Java Head remains undisturbed, as does that at Flat Point. Other dangers may be developed on a careful survey, but the main gate of the Straits of Sunda seems unimpeded.

— Mr. W. F. Denning of Bristol, Eng., noting the fact that accounts of large meteors form a frequent subject of correspondence in the columns of scientific journals, but that it is not often the case that the

descriptions of these phenomena are sufficiently exact to be valuable for purposes of calculation, suggests, in a letter to the editor of *Nature*, the proper methods of useful observation of these bodies. Rough estimates of the direction and position of flight are of little utility; and the vague statements often made occasion an endless source of difficulty in the satisfactory reduction of results. The observers of large meteors should attend scrupulously to that most essential detail, the direction of flight, and express it by some method of uniformity. In place of the customary vague and variable methods of description of the apparent paths of these bodies, Mr. Denning suggests that observers uniformly give the right ascension and declination of the beginning and end points of the visible paths, — elements which admit of ready determination by projecting the observed flights upon a star-chart or celestial globe, and reading them off. This system would render the after-comparison of observations a work of greater facility and precision. Though the direction of flight is the all-important element to be determined by meteor-observers, some minor points — as the time of appearance, brightness, and approximate duration — should be recorded whenever feasible; also whether the body is accompanied by phosphoric streaks or spark-trains. If this were done more systematically, the observations of fireballs would acquire additional value, and quite possibly might develop some new facts either as to their appearance or origin.

— Mr. Thomas Gaffield read a paper on glass and glass-making, illustrated by specimens, at a meeting of the Society of arts of the Massachusetts institute of technology, Nov. 22.

— At the meeting of the Portland, Me., society of natural history, Nov. 19, the president, Dr. Wood, gave account of the unearthing of bones of some unknown animal from a peat-bed on Ragged Island, Casco Bay, by Capt. Thomas Skolfield in 1835. Eighty-five feet in length of vertebral bones were taken out and thrown away. The head and tail were not uncovered, and the animal was estimated to be a hundred and ten feet long. No ribs were found, and no marks of rib attachment appeared on any of the vertebrae, which were hard and smooth. Only four bones were saved: two were given to the Portland society, but were burned in 1854; the other two have been lost sight of, but were said to have been taken to the Philadelphia academy in 1836 or 1837, by a Mr. Coolidge. Of the two given to the society, the large one was unquestionably a vertebra: its length was from fourteen to sixteen inches; its diameter, nine or ten inches on the articular faces, and eight midway. The other bone was limpet-shaped, four or five inches in diameter and height. The shape and size of these bones are well remembered by members of the society, and Capt. Skolfield; and the story of the last is well vouched by many others.

Two unsuccessful attempts have been made by the society to unearth more bones. Another trial will be made next season.

— On the retirement of Mr. R. Hering from the presidency of the Engineers' club of Philadelphia, at the close of its fifth year, he gave a summary of recent progress (*Proc. eng. club Philad.*, iii.). The work of the late U. S. board appointed to test iron, steel, and other metals, was referred to; and it was stated that there was at least some possibility that its work may be in time resumed. The chief of ordnance recommends that an appropriation of ten thousand dollars be made by Congress for the purpose, as urged by the convention of the societies of civil, mechanical, and mining engineers. The differentiation of the profession into the several branches, — civil, mechanical, mining, — and the subdivision of these into specialties, were considered as marking the tendency of recent change. Inventions are coming forward with increasing number and rapidity, but it is becoming each day more evident that they are all the products of growth and of gradual development. No new thing comes into use at once fully perfected. Of accomplished work, the East-river bridge, with its span of 1,595 feet, suspended 135 feet above the water; our Kinzua viaduct at Bradford, 2,052 feet long, spanning a valley 302 feet below it; the Henderson bridge over the Ohio, of 525 feet span; and the great bridge to be built over the Firth of Forth, — are among the most marvellous. The great canals in progress, or proposed, — that in Florida, opening the Kickpochee Lake; the interoceanic canal through the Isthmus of Panama; the great Sirhund canal in India, 500 miles long; the Corinth canal in Greece; and the Manchester ship-canal, — are evidences that the days of canals are but just commencing. The United States boast to-day 116,000 miles of railroad, and are building over 30 miles per day, and earning $550 per mile. Locomotives for the Pennsylvania railroad are built weighing over 60 tons, and make 90 miles in 80 minutes. Electricity is a competitor, which, however, is not likely at once to displace steam on the rail. Heat and steam supplied from a central station, as at New York, where the New-York steam company are preparing to work 16,000-horse power of Babcock & Wilcox boilers, 2,000-horse power of which are constantly at work, is a promising illustration of advance. Electricity similarly distributed, — as by the Edison company and the Brush company, — and the telephone, are the latest of these achievements of the profession. Sanitary engineering, although the most essential of all, seems to be the last to come in, and is but now beginning to take its place.

— Since the article in this number on crystals in the bark of forest-trees was in page, the writer has seen a recent work, Anatomie der Baumrinden, Berlin, 1882, Dr. Joseph Moeller, in which the subject is fully treated and richly illustrated.

— Microscopists will regret to learn of the death of Mr. Robert B. Tolles at Boston, on the 17th, at the age of sixty-one. No one has done more than he to raise the standard of excellence of American objectives for the microscope; and his ingenuity in devising special methods to overcome particular difficulties is known to all who have tested his powers. He has been in feeble health for several years, but continued to work with astonishing vigor and pertinacity.