Lassen's Peak is composed of dacite. This rock Richthofen considered to be typical nevadite, but Mr. Diller's investigations confirm Mr. Iddings's view that it is dacite. Gray dacite is abundant about the southern base of the mountain, in smooth cliffs and ledges, and has a remarkably gneissic appearance. Red dacite forms the summit of the peak, and a large portion of the northern rim.

Basalt has, perhaps, the widest distribution of all the rocks found in the vicinity of Lassen's Peak, and it is, as a rule, the most recent of the flows. An older basalt has been found in the stratified tufa, which forms great belts along the western base of the mountain. Between Red Bluff and Mill-Creek valley, south of Lassen's Peak, a distance of forty-five miles, wherever the surface is not occupied by tufaceous deposits, the rocks are basaltic. Lassen's Peak is an ancient volcano, and has poured out a great variety of lavas which are arranged in a most favorable position for a study of their succession.

Rocks of Mount Shasta and vicinity. — During a part of February, Mr. Diller was busy with the microscopic study of the metamorphic and eruptive rocks collected by him last season, along the Sacramento River north of the mouth of Pit River, and on Mount Shasta. The metamorphic rocks referred to consist mainly of augitic gneisses; and the eruptive rocks of the same region are, in part, gabbros. Some of the latter present peculiarities that cannot be positively determined until some chemical examinations have been made. The specimens have therefore been submitted to Professor Clarke for chemical analysis.

Mr. Diller has examined some thirty thin sections of rocks from Mount Shasta, and finds that they are divisible into three groups; viz., hornblende andesite, hypersthene andesite, and basalt. The rocks of Shasta are quite similar to those of Lassen's Peak, with the exception that the basalts of the former are much richer in olivine, and contain less globulitic base.

Crater Mountain (or Shastina), on the north-west spur of Mount Shasta, is composed of hornblende andesite; and through this, on the western slope, there has burst a large stream of hypersthene andesite which stretches far to the westward, towards Sissen's ranch, in Strawberry valley, on the Sacramento.

RECENT PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Engineers' club, Philadelphia.

April 19. — Mr. S. N. Stewart described a cushioned pier and rolling trunnion drawbridge. With a working model, he showed that a six-pound draw could be turned by a pennyweight pressure or a breath, and claimed, that, with a leverage six times as great as that of the model, twenty pounds pressure would turn a hundred-ton draw. —— Mr. William P. Osler presented, for Mr. J. Godolphin Osborne, an account of the Pocahontas mine disaster. He showed how probable it was that gas would have been detected by the engineers had it existed, and explained the method of damming and flooding the mine with 17,500,000 gallons of water to extinguish it; the latter being accomplished in sixteen days, one day being lost in repair of a dam. The cause of the explosion is, as yet, unknown. —— Mr. E. S. Hutchinson supplemented the above by an account of his recent visit to the mine, confirming, as far as he had observed, Mr. Osborne's opinion of damage to the mine. Timbers were displaced, cars demolished, etc.; but there was no fall of roof, except in the fan-entry, where much slate had fallen, but where a week's work would repair damage. He attributed the safety of the roof to the fact that from 12″ to 18″ of coal had been left as an elastic support to the treacherous slate above. He considered the presence of five or six inches of fine, dry coal-dust on the floor a phenomenon of special interest, and, while withholding a positive opinion in view of pending investigations by a committee of the American society of mining-engineers, he referred to a number of authorities to show the important bearing dust-explosions have upon safety in mines, like this, apparently entirely free from firedamp. —— Mr. J. Foster Crowell announced that the new bridge of the Pennsylvania Schuylkill valley railroad, over the Schuylkill River at Manayunk, had just been completed, and noted, as a remarkable illustration of the vast strides made in American bridge-construction during the past few years, that so large and important structure as this is, being one-third of a mile in length and ninety feet high, can be reared and come into use without exciting special interest, or even deserving particular mention from an engineering point of view. —— The secretary read, from Mr. J. H. Murphy, a discussion of the switch formulae by Mr. John Marston. —— Mr. A. R. Roberts described a contrivance he had designed, by which a three-throw point switch can be operated from a single stand.

Linnaean society, New York.

April 18. — Mr. E. P. Bicknell read the third instalment of his paper, 'A study of the singing of our birds,' treating the Passeres to Astragalinus tristis in the same vein as the already published portions of this elaborate treatise. —— Mr. R. F. Pearsall called the attention of the society to the similarity of some of the notes of Parus atricapillus to those of Contopus virens, which accounted for the erroneous winter records of unseen individuals of the latter species. —— Mr. E. P. Bicknell related his spring observations for 1884 at Riverdale, N.Y., upon the first appearance of birds, flowers, etc. —— A communication from Judge Bicknell of New Albany, Ind., stated that the English sparrow flew from that city to the ripening grain-fields, and hence the reduction, by one-half, of the promised crop. Only a very slight indulgence in

tivorous diet by this bird was noted by this ...rous writer. —— Dr. C. S. Allen mentioned the exhibition of a carnivorous propensity in the common barnyard duck, which he had seen catch P. domesticus, hurry with the struggling bird to the duck-pond, drown and immediately devour the victim, usually swallowing it whole. —— Dr. Allen placed on record the finding, June 15, 1881, upon the Island of Grand Menan, by himself and the late Dr. Edward Southworth, of the nest with four eggs of Empidonax flaviventris, the yellow-bellied flycatcher, built in the moss upon the north side of an inclination, partly covered over by moss, grass, and twigs. It was lined with the fine tops of grasses, cow's hair, and fine rootlets, and located in a soft, swampy spot, where there were few large trees. The male bird was not seen; but the female was almost caught by the hand, so closely did she sit.

Boston society of natural history.

April 16. — In a paper on the relation of the 'Keweenawan series' to the 'eastern sandstone' in the vicinity of Torch Lake, Michigan, it was pointed out by M. E. Wadsworth that the Keweenawan series was first established by observations made at Douglass Houghton Falls, near Torch Lake. These observations were supposed to show that the eastern sandstone lay horizontally up to the falls, and contained the *débris* of the supposed old seashore cliff over which the stream now fell. In 1880, Wadsworth showed that the eastern sandstone, instead of being horizontal, gradually dipped, as the falls were approached, to the north-west, the dip increasing from five degrees up to twenty-five degrees at the falls. He then pointed out that this sandstone contained old basaltic lava-flows intercalated with it, which explained the origin of the basaltic *débris* previously found here, and showed that the Keweenawan series and eastern sandstone were the same formation. In the third annual report of the director of the U. S. geological survey, the correctness of these observations have been admitted, with the statement that at some distance below the falls the rocks were found to be covered, and that Wadsworth bridged in his imagination the gap between the sandstones dipping five degrees and those above having a steeper dip. The lower ones are said to be the true eastern sandstone, and those nearer the falls to belong to the Keweenawan series, while they were separated by a hypothetical seashore cliff inserted in the covered space. To this Wadsworth replied, that, by digging in the stream and on the banks of the ravine, he had actually traced (not imagined) the relations of these rocks, going from those dipping five degrees up to those dipping twenty-five degrees, and that they were seen to form a continuous superimposed series, no such cliff as imagined existing between them. Wadsworth had also shown, in 1880, that the eastern sandstone was exposed on the Hungarian River up to its junction with the Keweenawan series. On this stream the sandstone had a varying dip from ten to twenty degrees to the north-west; and, although sometimes dipping in all directions, the prevailing one was north-west. At the junction, the sandstone was baked and indurated by the first basaltic lava-flow of the Keweenawan series, which in its turn had been denuded, and its *débris* built into a conglomerate, forming the fifth fall of the river. In the above-mentioned report, doubt was thrown on these observations by the statement that the observed sandstone was a loose piece, or, if not, the basaltic rock surely was, and that the prevailing dip of the sandstone was to the south-east. Wadsworth replied, that the dips given in the report appeared to have been taken from the frost-dislocated rock on the sides of the stream, while his were taken in the bed of the stream, when the water was exceptionally low. He further stated that the sandstone at the junction was continuous with that seen below; that it extended across the stream and into the banks on both sides; while the baking and induration of it showed that it must have been overflowed by some heated rock. Again: the basaltic rock extended across the stream into both banks, and was found to underlie the conglomerate, and that he dug the *débris* of the former out of the overlying base of the latter. All this, he said, showed conclusively that these rocks were *in situ*, and proved that here the eastern sandstone and Keweenawan series were one and the same; also that this series could not be maintained, as first established. He further pointed out that the claim advanced by many geologists, that the eastern sandstone did not contain the *débris* of the porphyry conglomerates of the Keweenawan series, was entirely opposed to the views of the same observers, that the eastern sandstone was younger than that series, and made out of its *débris*.

Appalachian mountain club, Boston.

April 9. — A paper by Prof. W. W. Bailey, on the west Humboldt Mountains, Nevada, gave some experiences of the author while attached to the U. S. geological survey. He explored Wright's cañon, and noticed the extraordinary effect of diurnal evaporation, the streams entirely disappearing during the heat of the day. The flora of the Buena Vista and Coyote cañons, on the eastern side of the Sierra Nevada, was found to be very distinct from that of the western side of the range. —— Rev. Luther Farnham gave accounts of three visits to the White Mountains, in 1837, 1862, and 1883. —— Mr. R. B. Lawrence gave accounts of the explorations of the southern Alps of New Zealand by Messrs. Green, Haast, and Van Lendenfeld.

Academy of natural sciences, Philadelphia.

March 22. — Prof. Edward D. Cope presented the results of his study of material illustrating the various forms of mastodon. He believed he could distinguish nine species from American formations, while those of other countries would probably bring the number up to eighteen or twenty. There are probably two genera. The oldest American mastodon comes from the upper half of the miocene, an assertion that one had been found lower down being undoubtedly incorrect. The division of the genera into two groups, founded upon dental characters, was sug-

gested, — one, represented by the Mastodon ohioticus, being characterized by the absence of inferior incisors; and the other, to which might be referred the genus Tetracaulodon, having these teeth.

March 27. — Dr. Joseph Leidy called attention to a specimen of a lizard, apparently Eumeces chalcides, which is remarkable for the small size of its limbs. They are, indeed, so small as to be almost invisible, thus giving the creature the appearance of a little snake; yet each limb has five well-developed toes. The specimen was from Petchaburi, Siam, where the natives regard it as a snake, and, as is common in such cases, consider it venomous.

April 1. — Dr. Joseph Leidy called attention to a mass composed of the tubes of Serpula dianthus from Barnegat Bay. The accumulation of the material is so great as to almost form a reef extending out from the bay. The locality is a famous one for sheep's-head-fishing, the fishes probably finding their food-supply in the worms. It was suggested that other marine animals may congregate there for the same reason, so that the locality is probably one specially worthy of the attention of zoölogical students. —— Referring to some observations of Kerner respecting the thawing-out of chambers in ice by living plants in the Alps of Europe, Mr. T. Meehan confirmed them by some observations made during the last winter on Eranthis hyemalis. At the end of January the plant was in flower after a few warm days, when a driving snow-storm prostrated the little stems, and covered them nearly a foot deep, in which condition they remained till early in March. After they had been three weeks in this condition, the snow was carefully removed, when it was found that the stems had become perfectly erect, a little chamber in the snow having been thawed out about each flower-stem. There was, however, no other evidence of growth. The few buds which were unopened when the snow came, were still unopened when the snow thawed away, after five weeks imprisonment; and the idea conveyed was, that plants would retain life without growth for an indefinite time, when under a low temperature, such as a covering of ice or snow afforded.

April 15. — Dr. Charles S. Dolley of Johns Hopkins university spoke of a form of so-called parenchymatous or interstitial digestion described by Korotneff as occurring in Salpa and Anchinia. It had been asserted that a large amoeboid cell existing in the intestines of these animals takes up the nutritive particles and passes them on into the tissues, and that in other related forms a plasmodium performs the same function. Dr. Dolley had observed the appearance in the intestines of Salpa, which had been described by the Russian author, but he would suggest an entirely different interpretation thereof. In Salpa we find a large branchial sac, representing the true pharynx, at the posterior portion of which is the stomach. The endostyle, or thickened bottom of a fold or groove of the branchial sac, throws out a supply of mucus, which covers the surface like a curtain, and in which nutritive particles finding their way into the animal are embedded. The food is carried back by cilia, and the mucous sheet is wound up into a thread, which can be traced into the oesogus, and from there to the stomach. In Dr. Dolley's opinion, this mucous exudation is the amoeboid cell described by other observers, it having been found laden with nutriment in some three thousand sections of Salpa. When food is not present, the appearance indicated cannot be observed. —— Dr. N. A. Randolph described a test for the presence of small quantities of peptone in solution. If the acid nitrate of mercury (Millon's reagent) be added to a cold aqueous solution of potassium iodide, a red precipitate of mercuric iodide always appears. When, however, either peptone or the biliary salts are present in noteworthy amount, the precipitate of nascent mercuric iodide assumes the yellow phase. In order to render the test sensitive to the presence of minute quantities of the substances in question, he had found it necessary to limit the amount of potassium iodide employed. Thus, to each five cubic centimetres of suspected fluid, which must be cold and either neutral or faintly acid, are added two drops of a saturated solution of potassium iodide, the two liquids being well mixed. Four or five drops of Millon's reagent are now added, and the contents of the vessel well stirred or shaken. Under these circumstances, the presence of peptone in amounts of less than one part in five thousand is readily shown. By the exercise of great care in the performance of the test, he had been able to demonstrate the presence of peptone in a solution containing but one part of that body in seventeen thousand parts of water. The conditions interfering with this reaction are, alkalinity of the fluid examined; heat, which has the same influence upon the nascent mercuric iodide as have peptone and the biliary salts; and the presence of certain compounds, as potassium ferro-cyanide, which prevent the production of the mercuric iodide. The reaction described presents certain advantages from the fact that it is uninfluenced by the bodies usually found in the various organic fluids, although useless as an isolated test, inasmuch as it responds to two entirely different compounds, peptone and the biliary salts. —— Mr. Meehan referred to his former communications on the subject of the relation of heat to the sexes of flowers. He exhibited catkins and flowers of the European hazel (Corylus avellana) just matured, and which, for the first time in several years past, had perfected themselves contemporaneously. The past winter had been distinguished by a uniform low temperature the entire season. In other years a few warm days in winter would advance the male flowers so that they would mature weeks before the female flowers opened: hence the females were generally unfertilized, and there were few or no nuts. Under this law, it was evident, amentaceous plants could not abound to any great extent in countries or in localities favorable to bringing forward the male flowers before there was steady warmth enough to advance the female. He thought this was likely to be the reason why so many coniferous trees under culture in the vicinity of Philadelphia bore scarcely any fertile seed in their cones, — a fact which had often been remarked in connection especially with

the Norway spruce. The male flowers would mature before the female had advanced far enough to be receptive of the pollen. —— Mr. Meehan also stated that in his garden at Germantown, there were few trees that did not exude sap from wounds made in winter or early spring; but among them all, few bled, as it was termed by horticulturists, more profusely than Cladastris tinctoria. The icicles formed from this exuding sap afforded a good opportunity to frost the saccharine character of the liquid. During congelation by frost, all foreign substances were rejected, and, in the formation of the icicle, the sugar was pushed forward to the extreme point. The end of an icicle of a sugar-maple was its only sweet part, and this was very sweet from the accumulation of the saccharine matter. The end of the icicle from the Cladastris was also sweet, though less so than in any other sugar-bearing tree he had observed.

Philosophical society, Washington.

March 1. — Gen. R. D. Mussey read a paper on the application of physical methods to intellectual science, discussing the extent to which those methods which have been successfully employed in the investigation of the phenomena of nature are applicable to the sciences whose subject-matter is mental operations. —— Mr. I. C. Russell followed with a communication on deposits of volcanic dust in the Great Basin. The sediments of the great quaternary lake of western Nevada, named Lahontan by Mr. Clarence King, include as minor members certain strata of white, unconsolidated, dust-like material closely resembling diatomaceous earth. Microscopic examination shows them to consist of minute shards of glass, and indicates their volcanic origin. Similar strata occur in the deposits of the quaternary lake which occupied the Mono basin, adjacent to the Lahontan; but these are coarser, and include fragments with pumiceous structure. Fragments of pumice are likewise found on the surface of the land in the vicinity of Mono Lake, and the distribution of these indicates their origin in a chain of rhyolitic cones extending southward from Mono Lake. The sub-aerial deposits belong to eruptions which, though prehistoric, must be quite recent. The sub-aqueous deposits were derived from quaternary eruptions. Those of the Mono basin can be referred, without hesitation, to the Mono craters; and those of the Lahontan basin are provisionally referred to the same source. Up to the present time, no other rhyolitic volcanoes of quaternary age have been discovered in the vicinity. Dr. T. Antisell remarked that the source of the volcanic dust should not be sought in existing volcanoes on the land: he regarded pumice as the product of submarine eruption exclusively. —— Mr. L. F. Ward read a paper on some physical and economic features of the upper Missouri system, describing the ancient and modern flood-plains of the Missouri and the Yellowstone where they issue from the mountains, and discussing the method of their formation. These are susceptible of irrigation; but diversion of river-water for that purpose, and its distribution over the land, involve difficult problems in political economy. The matter is a proper subject for governmental control. Discussion followed, in the course of which Prof. C. V. Riley remarked that the final solution of the grasshopper problem lies in the cultivation of the northern plains.

March 15. — Mr. G. K. Gilbert spoke on the diversion of water-courses by the rotation of the earth, maintaining, that, under certain indicated conditions, the deflecting force generally admitted to result from terrestrial rotation should result in observable modifications of valley configuration. —— Mr. G. E. Curtis read a paper on the relations between northers and magnetic disturbances at Havana, discussing the coincidences which had been pointed out, and demonstrating their accidental nature.

NOTES AND NEWS.

BY invitation of the authorities of the Johns Hopkins university, Sir William Thomson will deliver, in October next, a course of eighteen lectures on molecular dynamics, before the physical section of the Johns Hopkins university, beginning on Wednesday, Oct. 1. These lectures are intended only for students who are interested in advanced work. Professors and students of physics are invited to attend; and arrangements will be made by which they may easily obtain temporary lodgings, provided an early intimation is received of their intention to come. A registration fee of five dollars will be required.

— The Montreal local executive committee of the British association for the advancement of science is prepared to enroll ladies and gentlemen, residents on the continent of America, as members of the association, on the following conditions: 1°. Life members for a single payment of fifty dollars; 2°. Annual members for a payment of ten dollars the first year, and five dollars each consecutive year thereafter; 3°. Associate members for a payment of five dollars. Associates are not eligible to hold office in, nor to serve on any committees of, the association; nor do they receive the annual reports. All other privileges of membership for the year are open to them. No person who is not a member is admitted to any of the meetings of the association. The privilege of reduced fares by the railway and steamboat lines is limited to the life, annual, and associate members. Applications for admission to membership may be addressed to Mr. J. D. Crawford, post-office box 147, Montreal.

— Bliss's classified index to the maps in Petermann's *Geographische mittheilungen*, from 1855 to 1881, has just been issued by Harvard college library in advance of its completion, in the *Bulletin* of the university. It occupies fifty-five small quarto pages, and will be found exceedingly helpful to those using that treasury of excellent charts. The principal division is, of course, geographical; but many titles are conveniently repeated under the miscellaneous head,