independent students for the advancement of knowledge and the sympathetic study of man's instruments of musical expression. It is already clear that the problems are not so simple as would appear from the ordinary presentation of Helmholtz's theories; for the materials accumulated in the forty years since he wrote require an ampler framework.

CHARLES KARSON WEAD.

SCIENTIFIC JOURNALS AND ARTICLES.

THE February number (volume 12, number 5) of the *Bulletin of the American Mathematical Society* contains the following articles: Report of the Twelfth Annual Meeting of the American Mathematical Society, by F. N. Cole; 'Note on Certain Groups of Transformations of the Plane into Itself,' by Peter Field; Report of the Meran Meeting of the Deutsche Mathematiker-Vereinigung, by E. A. Miller and Elijah Swift; 'The Present and the Future of Mathematical Physics,' by Henri Poincaré (translated by J. W. Young); Shorter Notices (Königsberger's Jacobi Festschrift, by James Pierpont; Schlömilch's Uebungsbuch zum Studium der höheren Analysis, by James Pierpont; Hedrick-Goursat's Course in Mathematical Analysis, by Wm. F. Osgood; Willis's Elementary Modern Geometry, Part I., by Virgil Snyder; Classen's Zwölf Vorlesungen über die Natur des Lichtes, by E. B. Wilson); Notes; New Publications.

The March number of the *Bulletin* contains: Report of the December Meeting of the Chicago Section of the American Mathematical Society, by T. F. Holgate; 'The Groups Containing Thirteen Operators of Order Two,' by G. A. Miller; Review of Huntington's Types of Serial Order, by Oswald Veblen; Review of Fine's College Algebra, by E. V. Huntington; Review of Freund's Translation of Ball's History of Mathematics, by D. E. Smith; Shorter Notices (Abhandlungen zur Geschichte der mathematischen Wissenschaften, by D. E. Smith; Bucherer's Elemente der Vektor-Analysis, by E. B. Wilson; Annuaire du Bureau des Longitudes pour l'An 1906, by E. W. Brown; Jordan's Astronomical and Historical Chronology, by E. W. Brown); Notes; New Publications.

The Museums Journal of Great Britain for January has for its leading article a paper on 'The Relation of Provincial Museums to Local Institutions,' by John Minto. While the subject is one that appeals to foreign museums rather than to those of this country, yet the article itself is a most excellent essay on the objects of museums and fairly teems with good things. Most museum officials will appreciate such sayings as "Most of our museums, I regret to say, are lamentably deficient in storage accommodation." "Each group of objects (in a teaching collection) should have in view the teaching of some definite lesson." "There are many instances of museums which, having secured the services of local enthusiasts for a period of years * * * have on the severance of the connection fallen upon evil days," and (this should be in large type) "It will take years to do away with the idea of museums still entertained by many * * *, as storehouses of curiosities. * * *" The many notes show that, aside from the Manchester Museum, there seems to be a liberal and growing support of such institutions in England. As for the Manchester Museum, those who know the extent and high standard of its work will be surprised to learn from its report the mere pittance that it receives for its support. In discussing Dr. Holland's recent article on 'Museums and Outside Experts,' the comment is made: "Needless to say, all type-specimens should invariably be returned to the museum, but it is usual to allow the expert to retain a selection of duplicate specimens. In our opinion, however, nothing should be handed over to the expert until all the material has been returned by him to the museum."

A JOURNAL entitled *Annales de Paléontologie* has been established at Paris, under the editorship of M. Boule, professor in the Museum of Natural History.

SOCIETIES AND ACADEMIES.

THE NEW YORK ACADEMY OF SCIENCES. SECTION OF GEOLOGY AND MINERALOGY.

Meeting of October 9, 1905.—In the absence of Vice-President Hovey, President J. F.

Kemp called the meeting to order in the large lecture hall of the American Museum of Natural History and presented the speaker of the evening, Professor R. T. Hill, who gave an illustrated lecture on the Republic of Mexico, its physical and economical aspects.

Meeting of November 6, 1905.—Vice-President Hovey presiding.

Professor J. F. Kemp read a paper on 'An Interesting Discovery of Human Implements in an Abandoned River Channel in Southern Oregon,' which will be printed in SCIENCE.

Professor J. J. Stevenson, under the title of 'A Bit of Quaternary Geology,' described a small area in northwestern Vermont. His conclusions were that after withdrawal of the ice, clay was deposited along the streams to an altitude of about 750 feet above tide; that upon this sand, gravel and boulders accumulated to a thickness of about 450 feet. He traced the steps in reerosion of the channel ways as shown by the successive terraces. The area in question is the northward extension of Professor C. H. Hitchcock's third basin of Winooski River as defined in the 'Geology of Vermont.'

The third paper of the evening was by Dr. A. A. Julien, 'Notes on Glaciation of Manhattan Island.' The evidences of plucking action of the continental glacier upon the crystalline schists of the island consist partly of jagged broken surfaces beneath the till, with angular transported blocks in the moraine to the southeast; and partly of rounded but roughened hummocks, pitted apparently by a modification of semilunar cavities, such as have been discovered in perfect condition on scored surfaces of our limestone.

Channels and pipe-like troughs were also described and attributed to the action of subglacial running waters, probably once connected with waterfalls through crevasses in the great glacier. The allied feature of potholes, found just beyond the limits of the island, was then discussed, and another hypothesis advanced to account for their formation.

A sudden southward change in the direction of the glacial furrows over the island, their asymmetric form, and distinct southward curvature, were described as evidences of a decided slope of the general surface toward the south-southwest, at the time of its subsidence during the glacial movement. A topographical modification was also referred to, through the undercutting of joint planes facing the northeast.

Dr. George F. Kunz stated that during the spring of 1905 there had been shown to him some precious garnet, pyrope, in rounded irregular grains, transparent, measuring from two to five millimeters in diameter. That these had been found in the tunnel extension of the New York subway, about 1,200 feet south of Pier No. 1, North River, under New York harbor, at a depth of 110 feet below the bed of the bay. That upon visiting the locality he found that the entire walls of the tunnel had been covered with the iron arches, and it was impossible to see the rocks themselves, but that upon the dump heap he found a number of masses of serpentine weighing from two to one hundred pounds each. The serpentine was a rich yellow, a trifle darker than that found at Montville, N. J.. Cleavages of feldspar nearly a foot long, black tourmaline, almandite, garnet in grains and in crystals were noted, but no peridotite itself was seen. This was probably due to the fact that nearly all the material taken from the tunnel was removed by barges to the deep ocean and dumped. Dr. Kunz stated that it was most unfortunate that what was undoubtedly the evidence of a peridotite dike upon New York island should have been lost. A mass of the gneissoid wall, measuring six feet by ten and nearly covered by rich stilbite was noted. Mr. C. Wotherspoon, the engineer in charge of the night work, was most courteous in giving information and in collecting specimens.

Meeting of December 4, 1905.—Vice-President Hovey in the chair.

Dr. Kunz reported the death of Dr. Augustus C. Hamlin, of Bangor, Me. Voted that a committee be appointed to make a minute of Dr. Hamlin's death. Dr. Kunz appointed.

Dr. Geo. F. Kunz described the Modoc meteorite that detonated over Modoc, Scott County, Kansas, at 9:30 P. M., September 2,

1905. First a very sharp, loud report was heard, then followed a rumbling for thirty seconds, when a shower of over a dozen stones fell, weighing from one ounce to twelve pounds each. The stone is an almost white pulverulent mass with minute specks of native iron or troilite, with occasional white glassy cleavable feldspar inclusions.

Mr. J. Howard Wilson discussed 'Notes on the Glacial Geology of Nantucket and Cape Cod.' Mr. Wilson outlined the various retreatal phases of the Nantucket and Long Island glacial lobes, and discussed the history of Glacial Cape Cod Lake, in which were built the sand plains of Truro, Wellfleet and Eastham. The paper was illustrated by lantern views and maps.

The last paper was by Mr. Thomas T. Read, entitled, 'Gold Mining in the Southern Appalachians.' Mr. Read first pointed out that this region was one of the first to which the search for gold was directed after the discovery of the new world. After tracing the early development up to the present, the geologic structure of the region and the methods of occurrence of the ore were described. After touching on the methods of working and the present state of the industry a few remarks were made as to the probable future worth of the deposits.

A. W. GRABAU,
Secretary.

THE CHEMICAL SOCIETY OF WASHINGTON.

THE 164th regular meeting of the society was held on February 8, 1906.

Mr. L. S. Munson, of the Contracts Laboratory, U. S. Department of Agriculture, read a paper on 'Writing Inks,' giving in detail the results of work recently done by himself on thirty kinds of ink. Twenty-seven of these were iron-tannic (or gallic) acid inks, the remainder being logwood-bichromate inks. They were classed as writing, copying and combined copying and writing inks. They were tested by exposing to sunlight, and by treating with hypochlorites, alcohol, water, etc., stripes made upon white paper, so as to get an idea of their relative permanence. Only one third of the samples were found to be satisfactory for record inks, and the copies made from most of them were even less permanent, owing to the small amount of iron tannate taken up by the copying paper.

A paper on 'Typewriter Ribbons,' by Miss A. M. Doyle, of the same laboratory, was also presented. Forty-three kinds of ribbons, both new and worn-out, as well as of different colors, were studied. Tests were made of the ribbon fabric and of the ink itself, and the ribbons were rated according to the original writing, copies made from it, and their permanence when exposed to sunlight and the action of reagents. Inks containing the most lampblack are most permanent, though they give poor copies, as this is insoluble. The aniline dyes present soon fade. Variations in the excellence of the writing depend largely upon variations in the fabric.

Mr. F. C. Weber, of the Bureau of Chemistry, exhibited a Zeiss immersion refractometer and explained its varied applications. It can be used for the estimation of sugars, for testing alcoholic beverages, for detecting watered milk, methyl alcohol in ethyl alcohol, etc.

Mr. Rufus F. Herrick, a visiting member, exhibited an alcohol lamp with Welsbach mantle, and, in connection with it, enumerated some of the advantages of having tax-free denaturized alcohol.

Mr. Herrick was followed by Mr. Leonard V. Goebbels, of the Otto Gas Engine Company, who told of some tests in which denaturized alcohol was used in gasoline engines. It compares favorably with gasoline, as far as cost and efficiency were concerned, and is a much cleaner fuel to handle.

Dr. Harvey W. Wiley spoke in favor of denaturized alcohol, and said that, in his opinion, the cost and risk of removing the denaturizing substances are so great that it would practically never be attempted. Besides, the obvious advantages to manufacturers are so great that there is no good reason why the bill before Congress, authorizing the sale of tax-free denaturized alcohol, should not be passed.

Dr. C. E. Waters exhibited Bishop's form

of the Marsh apparatus, slightly modified for greater convenience. The original apparatus is described in the February number of the *Journal of the American Chemical Society*. By means of an improved method of distillation and concentration, and this apparatus, Bishop detected one part of arsenic in a billion parts of sulphuric acid.

C. E. Waters,
Secretary.

THE VERMONT BOTANICAL CLUB.

The eleventh annual meeting of the Vermont Botanical Club was held at the University of Vermont, January 17 and 18. Some twenty papers were presented, including 'Recollections of the Botanical Work of Joseph Torrey,' by Miss Mary Torrey; 'The Thorn-apples of Vermont,' by W. W. Eggleston; 'The Flora of Hawaii,' by Professor G. H. Perkins; 'The Finding of *Aspidium Filix-Mas* in Vermont,' by Miss N. Darling; 'Reminiscences,' by Cyrus G. Pringle; 'Variations Among Violets,' by Ezra Brainerd.

It was decided to begin the publication of an annual bulletin of which the first number will appear this spring. The next field meeting will occur about July first on Mt. Mansfield; the next annual winter meeting at St. Johnsbury. The officers were reelected as follows:

President—Ezra Brainerd, Middlebury College.
Vice-President—C. G. Pringle, University of Vermont.
Secretary—L. R. Jones, University of Vermont.
Treasurer—Mrs. N. F. Flynn, Burlington.
Executive Committee—Dr. H. H. Swift, Mrs. E. B. Davenport, Miss I. M. Paddock.

L. R. Jones,
Secretary.

DISCUSSION AND CORRESPONDENCE.

EYE ANOMALIES.

I have recently found that my eyes are abnormal in a way which is quite new to me, and which seems to be outside of the usual group of symptoms utilized by the physicians. The effect is interesting and I venture to ask whether any reader of Science can enlighten me. Both eyes are near-sighted but free from astigmatism.

1. In the first place I see double images with each eye. A black circle, about four centimeters in diameter, regarded from a distance of six meters with one eye, appears as two circles with their centers on a line about 45 degrees to the horizontal, intersecting so that the center of one lies nearly on the circumference of the other. The images are about equally strong, naturally quite black where they intersect and there seems to be a dot at the center of each. There is some vague color. With the left eye there is a tendency to repeat this phenomenon symmetrically; *i. e.*, the circles lie with their centers at an angle of 135 degrees to the horizontal, but they are much further apart, often tangent to each other. This eye is more near-sighted. Moreover, when the eye is under the influence of belladonna (or even at other times) there may be two or more pairs of images, a strong pair at 135 degrees outside each other, and a weaker pair at about 45 degrees tangent to these; or the figures may be even more complicated. All circles have central dots. With appropriate glasses the images of both eyes become nearly clear. No explanation which has occurred to me (reflection from non-centered systems, split-lens effect, polarization) exactly meets these cases.

2. A second phenomenon which may hold the key to the preceding is the following. If at night I look at a distant electric light (100 feet off, or more) with the left eye and without glasses I see the usual patch of light of the near-sighted eye. This patch, however, is not a uniformly bright disc about one degree in angular diameter, but contains an accurately drawn circle in black of a diameter somewhat less than one third that of the disc and placed a little above the center to the right. There is no appreciable color effect or successive annuli. The circles, though scarcely visible within fifty feet, from the light naturally increase in size with the distance of the source. There is no doubt that with an appropriate Wollaston prism (departing somewhat from the ophthalmometer) they could be used for the measurement of this distance. In explanation of these phenomena it seems to me that a globule of relatively low