as the final product. In the present paper it is shown that an intermediate addition product is formed, which then breaks down into silver chloride and the diacidanilide. The reaction is similar to many studied by Nef.

On the existence of two Orthophthalic Acids: By W. T. H. Howe. In this paper the cause of the difference in the melting point of orthophthalic acid as observed by a number of investigators is explained. The observations have been made probably with two different acids or mixtures of the two. Two have been isolated, which are alike in composition, molecular weight, and molecular refraction; but different in melting point, electrical conductivity, solubility, formation of salts with bases and reduction products. The author explains this case of isomerism by the difference in the arrangement of the double bonds of the Kekulé formula.

The Reduction of Permanganic Acid by Manganese Superoxide: By H. N. Morse, A. J. Hopkins and M. S. Walker. The reduction which takes place in solutions of potassium permanganate and permanganic acid is shown to be due to the action of manganese superoxide. If the solutions, after standing a short time, are thoroughly filtered, they can be kept unchanged.

This number contains also a review of recent improvements in chemical industries, with special reference to sulphur, pyrites, sulphuric, hydrochloric and nitric acids, and reviews of Ostwald's Klassiker; Review of American Chemical Research, A. A. Noyes; Organic Chemistry, R. L. Whiteley; The Chemistry of Pottery, K. Langenbeck.

J. Elliott Gilpin.

SOCIETIES AND ACADEMIES.

NEW YORK ACADEMY OF SCIENCES, MAY 18, 1896.

The Academy met with President Stevenson in the chair.

The Section of Geology and Mineralogy at once organized.

The first paper of the evening was by Mr. Heinrich Ries entitled 'Notes of a trip through the Marble Quarries of Western New England and Eastern New York.' Mr. Ries sketched out the geology and geographic distribution of limestone quarries along the Hudson and Lake Champlain Valleys passing north and the marble quarries in the Green Mountains and Berkshire hills coming south. His remarks were copiously illustrated by the lantern and by many beautiful specimens. The paper was discussed by Messrs. Martin, Dodge and Kemp, to whose remarks the speaker replied.

The second paper of the evening was by J. F. Kemp on 'The great Quartz Vein at Lantern Hill, near Mystic, Conn.' The speaker described the vein as about 400 feet in width and at least 1,200 feet in length. Its northern extremity forms the summit of Lantern Hill about 500 feet above sea level. This portion is of hard milky white quartz. The southern extension of the vein forms Long Hill. It is lower in altitude and largely composed of loose pulverulent quartz, which, however, perfectly preserves the comby structure of the quartz vein. It consists of innumerable interlocking masses of quartz crystals. It is but slightly iron stained in a few spots. It is so soft that it can be crumbled between the fingers and is easily dug with pick and shovel without any blasting. The vein strikes north about 15 degrees east and cuts squarely across the laminations of the gneiss. It is one of the largest quartz veins known in the East and is of very pure silica. Samples from the crumbly portion range from 98 to 99.4 SiO_2. A few rare scales of some micaceous or chloritic mineral are practically the only other ones present. Under the microscope the powdered quartz appears quite fresh and exercises a vigorous influence on polarized light. Some prism faces of quartz crystals show etched figures, but in general the evidence of corroding alkaline solutions is hard to find. The speaker was therefore led to refer the pulverulent character of the vein to the effects of a faulting or crushing movement, although he inferred on the spot the action of some corroding alkaline solution, presumably magnesian. The paper was discussed by Messrs. Dodge and Hovey.

The third paper of the evening was by J. F. Kemp and was entitled 'The Pre-Cambrian Topography of the Adirondacks.' The speaker

mentioned the curious outliers of Cambrian and Ordovician strata that have been discovered far up in the mountains from the main outcrops that skirt them. They lie in valleys in metamorphosed crystalline rocks, which valleys represent beyond question the old pre-Cambrian river valleys and which were filled with sediment by the encroaching sea of Cambrian and Ordovician time. Lake George is the largest example of this kind and contains remnants of Potsdam sandstone and Trenton limestone in its southern portion. The valley of Trout Brook, which lies just west of Rogers' Rock, at the north end of Lake George and that is separated from it by a high intervening ridge of gneiss, contains two outliers of Potsdam sandstone of a few acres in extent. In the valley of Putnam's Pond, in the western part of Ticonderoga township, there is another outlier of Potsdam sandstone. Both of these are shown on the map of Ticonderoga which accompanies the speaker's report to Prof. James Hall on this region, and which was published in 1895. Another isolated area of calciferous limestone is found on Schroon Lake, under Schroon Lake post office. It is a few acres in extent and the exposed rock is about 75 feet thick. It is about 350 feet above tide at its upper point. Down the lake and river valley it is nearly forty miles to the next Cambrian outcrop, which is below Hadley. The speaker also cited the little outlier of Trenton limestone near Wells, on the Sacondaga River, and the fact that the Cambrian and Ordovician sediments on the west side reach short distances into the areas of crystalline rocks and along the river valleys. He stated that all the outliers on the east side had a uniform northeasterly strike and a dip of 10 to 20 degrees to the northwest. He remarked that they occurred in the valleys of streams which are notably sluggish, explaining their slow movement by the fact that they flow in pre-Cambrian valleys, already nearly reduced to a base level. He referred their parallel strike and dip to the general warping of the surface in this region. Remarking the undoubted presence of faults in the later development of the topography he emphasized the evidence of this early erosion long before the time of fossiliferous sediments. He added that the old river valleys had in part been determined by the presence of crystalline limestones. The paper was discussed by Messrs. Dodge and Hovey.

The last paper of the evening was by L. M. Luquer and H. Ries, and described an area of Augen-gneiss near Bedford, N. Y. It was read by Mr. Luquer, and will appear in full in the Transactions .The gneiss appears to have been originally a granitic rock that has been extensively crushed and sheared out into the augen structure. The original quartz has been mostly comminuted, but the Carlsbad twins of orthoclase have remained as augen.

The paper was discussed by Dr. E. O. Hovey, who cited the case of the sheared Eisenach quartz-porphyry in which the feldspars have been crushed, but the quartzes have been drawn out.

Mr. G. F. Kunz mentioned the following items as the meeting closed:

A meteoric stone weighing 31 ounces was seen to fall by Mr. J. F. Black, April 9, 1896, at 6:15 P. M., on his farm 9 miles east and one north of Ottawa, Kansas. This meteorite contains iron particles throughout and is of the characteristic stony variety.

A remarkable nugget of native silver weigh ing 448 ounces troy, was lately found five miles from Globe City, Pinal county, Arizona. The mass is a water-worn nugget, slightly oval, very compact, and on its surface is bright silver-white, showing that it is made up of strings of crystallized silver, whereas the interior of the entire mass contains more or less cerargyrite. It has been presented to the Lea Collection of American Minerals of the United States National Museum.

New Zealand promises, mineralogically, to be a country of surprises, and many interesting things are gradually being brought to light by the agate hunters from Oberstein, Germany, who are visiting it. Recently they have discovered some immense masses of rolled, rutilated quartz, weighing from 10 to 30 pounds each. The masses are penetrated by crystals of rutile, red, brown and yellow, many inches in length and of the fineness of hair. Occasionally the rutiles occur very sparingly; then again they are in such profusion as to give the

entire mass the appearance of being a matted mass of hair. One mass of 30 pounds was entirely of this character. A fifteen-pound mass contained a dozen or more crystals of rutile 45 cm. in length and from one-half to two mm. in diameter. Magnificent crystals of amethyst have also been found, one of which is entirely of gem-cutting material and weighs 550 pennyweights or 27½ ounces troy. Topaz, blue and white is found in the same localities.

J. F. Kemp,
Secretary.

THE NEW YORK SECTION OF THE AMERICAN CHEMICAL SOCIETY.

The New York Section of the American Chemical Society held its usual monthly meeting in the chemical lecture room of the College of the City of New York on Friday evening, May 8th, with about fifty members present, Dr. Peter T. Austen presiding. In response to inquiries regarding the progress made by the committee appointed to canvass the matter of the organization of a chemical club, Prof. Austen stated that, in accordance with the instructions given, it had increased its numbers to fifteen and had held several meetings, to one of which the members of the New York sections of the American Chemical Society and of the Society of Chemical Industry, as well as manufacturers and gentlemen interested in the science and art of chemistry, business men and friends of chemistry were invited. The meeting was full and enthusiastic. The committee was instructed to increase its number to fifty or more and to push the organization of the club as rapidly as possible. It appears that there is not in existence in this or any foreign country any real chemical club, as differentiated from a chemical society. It is believed that the science and art of chemistry furnish so much that is characteristic that a chemical club may easily be made a unique organization.

Dr. A. R. Leeds, of Stevens Institute, read a paper on the 'Bacteria of Milk Sugar.' The author finds that the morphology, classification, physiology and botany of bacteria are so rudimentary and unsatisfactory that the most valuable methods of bacteriological investigation are still of a chemical nature, and the advances to be made in the near future are to be looked for mainly on the chemical sides of the subject.

The author was interested to note in the progress of his work that precipitated zinc hydroxide, which is generally considered amorphous or gelatinous, is really crystalline.

Dr. H. W. Wiley, of the United States Department of Agriculture in Washington, offered a paper entitled, 'Recent Advances in Milk Investigations.' It treated of the bacterial theory of milk decomposition, the composition of woman's milk as compared with cows milk and the relative value of the two for infant food, and of the commercial standards which should be fixed for the milks sent to the city markets.

Investigations of the composition of milk, in its relations to the welfare of the human race, are largely confined to the determination of its value as a nutrient. From an economic point of view, the content of fat and other food constituents is of paramount importance, while from a purely chemical point of view the most important are perhaps the composition of the different proteid bodies and the changes which they undergo, spontaneously or under the influence of bacterial life.

The author reviewed the works of Soldner regarding the proteid content of human milk, and quoted the figures given by that authority for the average composition of human milk as follows:

Proteids	1.52 per cent.
Fat	3.28 per cent.
Sugar	6.50 per cent.
Ash	0.27 per cent.
Citric acid	0.05 per cent.
Undetermined	0.78 per cent.
Total dry substance	12.40 per cent.

The undetermined substance, 0.78 per cent., are mostly nitrogenous bodies not generally found in cow's milk and for this reason cow's milk can never be so diluted or altered as to properly supply the natural nutriment of the infant.

The nitrogenous decomposition products of the blood, chief of which are urea, hypoxanthin, kreatinin, sulfocyanic acid and lecithin, are uniformly found in milk.

Mr. Marston Bogert, of Columbia University, read a paper on 'Normal Heptyl Sulphocyanid.' He offered a brief sketch of the series of alkyl

sulphocyanides, giving the results of the investigations of Liebig, Lowig, Cahours, Medlock, Henry, Pelouze, Schmidt, Reimer and Upperkamp. The last work on the series was done twenty-one years ago.

Normal heptyl sulphocyanid is a colorless, mobile liquid, having a slightly alliaceous but rather pleasant odor and a specific gravity of 0.931 at 15 degrees C.

Dr. Austen exhibited an apparatus for lecture demonstration of the properties of the heavier gases.

WM. MCMURTRIE,
Secretary pro tem.

CHEMICAL SOCIETY OF WASHINGTON.

THE eighty-seventh regular meeting was held Thursday, March 12, 1896, with the President, Dr. de Schweinitz, in the chair. There were 35 members present, and Dr. Andrew Stewart was elected to membership. Mr. F. P. Dewey read a paper on 'The Refining of Lixiviating Sulphides.' Dr. Dewey's paper reviewed the leaching process and the treatment of the sulphide precipitates produced. He described the sulphuric acid process of treating the sulphides, in which they are treated in strong sulphuric acid to convert the sulphides into sulphates, after which the charge is treated with water, the silver precipitated by copper and melted, and the copper sulphate crystallized.

Prof. H. W. Wiley and E. E. Ewell read a paper on 'The Determination of Lactose in Milks by Double Dilution and Polarization.' They called attention to the arbitrary correction proposed by Wiley in the determination of lactose in milk in a paper published in Vol. 6, page 289, of the *American Chemical Journal*. This arbitrary factor had been found too small, and the object of the present investigation was to eliminate it altogether, and to determine the degree of the correction to be made for the volume of the precipitate in each case by double dilution and polarization. The method was worked out carefully on whole milk, skimmed milk and cream, and it was found that the correction for the volume of the precipitate should be determined in each particular instance, as it varied from less than three cubic centimeters in skim milk to more than seventeen cubic centimeters in cream for 100 cubic centimeter flask. Citations were given to other papers in which objection was made to the optical method of determining lactose by reason of the fact that a dextrinoid body was sometimes found in milk, but the danger of error arising from this source is not great.

Prof. H. Carrington Bolton read a paper on 'Berthelot's Contributions to the History of Chemistry.' He reviewed his 'Collection des Alchimistes Grecs' (Paris, 1887; 3 Vols. 4to), and his 'La Chimie an Moyen Age' (Paris, 1893; 3 Vols. 4to), showing their scope, analyzing their contents, and indicating the important changes in chemical history resulting from Berthelot's studies. He also described briefly the character of the Greek papyri of Leyden, as well as the Arabic, Syriac and early Latin manuscripts. The origin of alchemical ideas concerning the transmutation of metals is attributed by Berthelot to attempts of Egyptian goldsmiths to make alloys which fraudulently imitated the precious metals. The Latin works said to be translated from the Arabic of Geber are shown to be fictitious, yet genuine writings of Geber are extant. The technology of the writers of the third to the twelfth century is disclosed in the volumes received.

The topic of discussion for the evening was 'Style in Chemical Books and Papers.' Dr. Wiley opened the discussion and was followed by Prof. Bolton, Prof. Seaman, Prof. Clarke, Prof. Munroe, Mr. Fireman and Dr. de Schweinitz.

A. C. PEALE,
Secretary.

BIOLOGICAL SOCIETY OF WASHINGTON, 261ST MEETING, SATURDAY, MAY 2.

L. O. HOWARD exhibited a picture of three young ladies, triplets, giving statistics on the subject of triplets and stating that it was very rare for all three to reach maturity. Frederick V. Coville exhibited a ball $3\frac{1}{2}$ inches in diameter, taken from the intestine of a horse. It was of a light brown color and felt-like consistency and was composed of the barbed hairs of the crimson clover, *Trifolium incarnatum*. When over-ripe crimson clover hay is fed to

horses the hairs, which up to the time of flowering are soft and flexible, but afterwards become stiff and needle-like, gather into balls, sometimes becoming large enough, as in the present instance, to clog the intestine and cause death through peritonitis or some related ailment.

Erwin F. Smith exhibited a photograph made from a poured gelatine plate, showing the bactericidal effect of direct sunlight. He stated that many parasitic bacteria are killed by light and remarked on the hygienic importance of flooding sick rooms and all living rooms with sunshine. This experiment was made with *Bacillus tracheiphilus*, the exposure being only three hours. The part of the gelatine plate which was covered from the light developed from 6,000 to 12,000 small colonies in each field of the microscope, so that the gelatine became grayish white. The part of the plate which was exposed to the direct rays of the sun, a middle star-shaped portion, was easily distinguishable from the rest of the plate on the second day, and appeared throughout the experiment (8 days) to be entirely free from colonies, but a careful microscopic examination at several different times showed that about one bacillus in a thousand had escaped. These are supposed to have been partially or wholly protected from the direct action of the light by germs lying above them. With longer exposures or thinner sowings all would undoubtedly have been destroyed.

D. LeRoy Topping stated that Mr. Pollard and himself had found *Ranunculus ficaria*, at the original locality on Rock Creek, below Pierce's Mill, where it had first been noticed twelve years before.

A. F. Woods showed a tomato plant which had been exposed to hydro-cyanic acid. The stems, petioles and midribs of the leaves were killed by the gas, but the softer tissues were not injured and were able to obtain all the water they required through the dead dissue.

L. H Dewey spoke of the tumbling mustard, *Sisymbrium altissimum*, stating that it had been introduced into North America from Europe during the past 20 years, and during the past 15 years it has developed into a very troublesome weed in Assiniboia and Manitoba, N. W. Canada. It combines the productiveness and hardiness of the mustard with the distributing habit of the tumbleweed and threatens to become a most dangerous weed in the northern plains where tumbleweed and mustard thrive at their best. Prof. James Fletcher, of Ottawa, Canada, carefully estimated the number of seeds borne by a single well developed tumbling mustard at 1,500,000. This plant has been reported from nine localities in Minnesota, Iowa, Missouri and South Dakota, and from ballast ground at Philadelphia, and freight yards at Weehawken, New Jersey.

T. W. Stanton presented a communication *on the Genus Remondia Gabb*, stating that this molluscan genus from the Lower Cretaceous of Arivechi, Sonora, Mexico, which has hitherto been placed in the *Trigonidæ*, belongs to the *Crassatellidæ* and includes the later described genus *Stearnsia* White, from the Cretaceous of Texas.

B. T. Galloway read a paper on *Recent Advances in our Knowledge of the Plant Cell* briefly reviewing the early discoveries and giving in some detail the most recent contributions to the subject. A paper by C. L. Pollard on *the Purple-Flowered Stemless Violets of the Atlantic Coast* was read, in the absence of Mr. Pollard, by David White. Seven species were enumerated in addition to the Linnæan *V. pedata*, the author stating that botanists have differed remarkably in their conceptions of specific relationships in this genus; yet while there is much individual variation, the species do not intergrade to the extent usually supposed. The *Viola dentata* of Birch, *V. septemloba* of Le Conte, and *V. ovata* of Nuttall, were restored to specific rank.

F. A. Lucas,
Secretary.

GEOLOGICAL SOCIETY OF WASHINGTON.

At the 49th meeting, held on May 13th, papers were presented as follows:

The Faunal Relations of the Eocene and Upper Cretaceous on the Pacific Coast: By T. W. Stanton. The Chico-Tejon series has been described as a continuous series, showing a gradual transition both faunally and stratigraphically from the Cretaceous into the Eocene, the close faunal connection being

found especially in the 'Martinez group' (an upper sub-division of the Chico), and in 'intermediate beds.' A study of the faunas and stratigraphy, especially in middle California, has proved that the intermediate beds and the upper part of the Martinez group are identical and that they form a lower zone of the Tejon, or Eocene. When the line between the two formations is thus located their faunas are but little more closely related than the Upper Cretaceous and Lower Eocene faunas of other parts of the world. With the exception of an Ammonite, of which a few specimens were reported from the Tejon in early collections, the few species that seem to be identical in the two formations are persistent types that have come down to the present day with little change.

The Structure and Age of the Cascade Range: By J. S. DILLER. The two sections of the Cascade Range afforded by the Klamath and Columbia Rivers expose volcanic rocks only and indicate that the range where most typically developed is composed essentially of lava from top to bottom. As far as yet known, it has no core of older metamorphic rocks on which the line of volcanoes developed.

He described the position and relations of the auriferous slate series.

At Ashland, in southern Oregon, the relations of the Cascade Range to the Klamaths is better exposed. They are separated by Rogue River Valley, which is cut chiefly in Cretaceous strata. Overlying these with apparent conformity, and dipping gently to the eastward beneath the Cascades are similar sedimentary rocks containing silicified wood, referred by Knowlton to a period certainly later than the Cretaceous. Above these and conformable with them on the western slope of the Cascades are numerous sheets of lava and tuff. One sheet of tuff near the base of the series contains Miocene leaves. Although the volcanic activity of the Cascade Range may have been initiated in earlier times, the period of greatest eruption and the upbuilding of the range occurred in the Neocene.

An Early Date for Glaciation in the Sierra Nevada: By WILLARD D. JOHNSON. The author described the occurrence of striated pebbles, of foreign material, in the extensive andesite-tuff flows, or volcanic mud flows of the Sierra, and gave reasons for regarding the striation of these included pebbles as probably glacial. He then called attention to a certain anomalous topography of the summit region of the range, and offered for it an interpretation which, together with the presence of the presumably glacial pebbles in the deeply canyoned lavas, appeared to warrant the inference that glaciation here had a beginning coincident with the erection of the Sierra Nevada into a high range.

W. F. MORSELL.
U. S. GEOL. SURVEY.

ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

May 5, 1896.—DR. F. P. HENRY made a communication on *Filaria sanguinis hominis nocturna* specimens of which had been obtained from the blood of a patient suffering from chyluria due to clogging of the lymphatics by the ova of the parasite. The various forms of the worm and their life history as given by Dr. Patrick Manson were dwelt on. The parasite secretes no toxine and its presence in man is usually not productive of bad effects. The speaker stated his belief that the excretory products of parasites are hurtful to man in proportion to the lowness of their organization. The nocturnal Filariæ appear in the superficial vessels about sunset and disappear about the time of rising. In patients induced to sleep during the day the periodicity is reversed. The only treatment is prophylactic as a drug which would kill the mature worm would, in all probability, be hurtful to the host by causing absesses around the dead product.

Dr. Leonard, in continuation, dwelt on the morphology of the worm, illustrating his remarks by means of fine micro-photographs of the specimens described by Dr. Henry.

May 12.—DR. CHARLES S. DOLLEY described a centrifugal apparatus for the quantitative determination of the food supply of oysters and other aquatic animals which he called a Planktonokrit. By means of its use he is enabled to make a large number of plankton estimates in a day and thus judge of the characters of given areas of water in connection with fish and oyster culture at different times of the day, states of the tide, varying depths, etc.

The method employed is that of the centrifuge, an apparatus which consists of a series of geared wheels driven by hand or belt, and so arranged as to cause an upright shaft to revolve up to a speed of 8,000 revolutions per minute, corresponding to 50 revolutions per minute of the crank or pulley wheel. To this upright shaft is fastened an attachment by means of which two funnel-shaped receptacles of one litre capacity each may be secured and made to revolve with the shaft. The main portion of each of these receptacles is constructed of spun copper, tinned. When caused to revolve for one or two minutes the entire content of suspended matter in the contained water is thrown to the bottom of tubes properly placed, from which the amount may be read off by means of a graduated scale.

EDW. J. NOLAN,
Recording Secretary.

NORTHWESTERN UNIVERSITY SCIENCE CLUB, MAY 1.

PROF. HOUGH in the chair and thirty-eight persons present. Prof. Crew and Mr. Basquin presented the topic, 'The Identity of Light and Electricity.' "Kelvin's prediction that the discharge of the Leyden jar was (under certain conditions) oscillatory and Maxwell's equations for the propagation of electro-magnetic disturbances were derived and explained. The subject was illustrated by Faraday's experiment showing rotation of plan of polarization in a magnetic field. The nature of wave motion was shown by the Melde experiment, Kundt's tube and Weber's wave trough. The equivalence of capacity and self induction was illustrated by Lodge's experiment showing resonance between ten Leyden jars. The Lecher modification of the Hertz experiment was shown in various forms, the nodes of the electric waves being detected by vacuum tubes and bridges."

A. R. CROOK,
Secretary.

EVANSTON, ILL.

THE ACADEMY OF SCIENCE OF ST. LOUIS.

AT the meeting of the Academy of Science of St. Louis of May 18, 1896, Professor C. M. Woodward presented a critical examination of some of the mathematical formulæ employed by Herbart to represent mental phenomena, in which these formulæ were criticised as inadequate. Though not considering any formulæ likely to be adequate, from the nature of the case, the speaker offered a substitute for the Herbart formulæ pertaining to the bringing into consciousness of a sublatent concept through the suggestion afforded by another concept similar in some respects while differing in others.

Dr. A. N. Ravold made a report on the use in St. Louis of diphtheria anti-toxine, prepared by the health department of the city. During the past winter 342 cases of diphtheria had been treated with this serum by 93 physicians. Doses of from 2.5 to 100 cc. had been administered. As a rule, the recovery was far slower when the quantity used was small than when a larger quantity was employed. Usually the serum was administered only once. In about half the cases a decided change for the better was noticeable within 24 hours, and these cases were practically cured within 48 hours, although attention was called to the fact that for some weeks the throat of a convalescent is a breeding place for the diphtheritic bacilli, the virulence of which did not seem to be diminished by the serum treatment. Of the cases reported on, 9.06 per cent. only died, and as a considerable number of cases were hopeless when treatment was administered, the patients dying within 24 hours thereafter, it was considered fair to deduct these deaths from the total, which reduced the mortality to 4.6 per cent. when the serum was administered in the earlier stages of the disease. The injurious consequences of administering the serum were fully considered, but held to be practically insignificant. It was also stated that when used on persons who had been exposed to, but had not manifested the disease, the serum proved an unfailing means of conferring immunity for a certain period of time. Among the advantages in the use of this serum was mentioned that of lessening the chances of secondary infection, so frequent after an attack of diphtheria.

A committee presented resolutions on the death of Dr. Charles O. Curtman, for many years a member of the Academy.

WM. TRELEASE,
Recording Secretary.