beginners. A student with some knowledge of organic chemistry could use it as a text-book if it were possible for him to resolutely confine his attention to the 'coarse print.' But it is as a reference book for the student who wishes to refresh his memory not merely of one compound, but of the complete chemistry of a group of compounds, that the work is of peculiar value, and may be cordially recommended.

EDWARD RENOUF.

Optical Activity and Chemical Composition. By DR. H. LANDOLT, Professor of Chemistry in the University of Berlin. Translated, with the author's permission, by JOHN MCCRAE, Ph.D. Whittaker and Co., London, and the Macmillan Co., 66 Fifth Ave., New York. 1899. Small 8vo. Pp. 158. Price, $1.00.

This little book forms a translation of the eighth chapter of the first volume of Graham-Otto's 'Lehrbuch der Chemie' and is a smaller and condensed edition of the author's well-known 'Das optische Drehungsvermögen organischer Substanzen und dessen praktische Anwendungen,' published in 1898. The subject is treated under three heads: I. General Principles of Optical Activity; II. Connection between the Rotatory Power and the Chemical Composition of Carbon Compounds, and III. Connection between Degree of Rotation and Chemical Constitution. Under the first head are discussed such subjects as crystal rotation, liquid rotation, molecular rotation, measurement of rotation, specific rotation, variations of specific rotation with concentration and change of rotatory power of dissolved substances with time, multirotation. Under the second head are treated optical modifications, the investigations of Pasteur, the van't Hoff and Le Bel theory, calculation of the number of optically active isomers of a compound from the number of asymmetric carbon atoms which it contains, the formation and properties of racemic compounds, resolution of racemic substances into the antipodes, formation and properties of the active modifications, transformation of one antipode into the other, the configurationally inactive non-decomposable modifications and their differences from racemic inactive isomers. Under the third head are taken up isomeric compounds, including stereoisomers, homologous series, influence of the mode of linkage of the carbon atoms, summation of the rotatory actions of several asymmetric groups, optical superposition and the dependence of the rotatory power of an active atomic grouping on the masses of the four radicles united to the asymmetric carbon atom, the hypothesis of Guye.

The translation is well done and the subject is brought up to date by notes and additions by the translator. The subject is presented in a very attractive and readable form and the book can be heartily recommended to anyone, who desires to know the present state of our knowledge regarding the relation existing between optical activity and chemical composition; though for more detailed information Landolt's 'Das optische Drehungsvermögen organischer Substanzen und dessen praktische Anwendungen' must be used.

W. R. ORNDORFF.

SCIENTIFIC JOURNALS AND ARTICLES.

THE *Osprey* for April, a little belated, opens with the fourth part of 'Birds of the Road,' by Paul Bartsch. Wm. L. Wells describes the 'Nesting of some Rare Birds,' including the yellow rail and solitary sandpiper, and Theodore Gill presents the second part of 'William Swainson and his Times' which carries Swainson through his journey to Brazil. In editorial comments under 'Birds and Women' the situation is summed up in a few words "If the demand exists for anything, that demand will be supplied if it can be done with a profit." Under Notes is to be found an extraordinary account of 'How Two Lions stopped an African Railroad,' and other matters of interest.

A Bulletin of Mathematics and of the Physical and Natural Sciences, to be published semi-monthly in the interest of teachers in Italian schools, has been established by Professor Alberto Conti, of Bologne.

SOCIETIES AND ACADEMIES.

GEOLOGICAL SOCIETY OF WASHINGTON.

THE 101st meeting of the Society was held at the Cosmos Club April 11, 1900.

The following papers were presented on the regular program:

Physiographic Development of the Black Hills: By MR. N. H. DARTON.

The principal period of uplift of the Black Hills dome was in the earlier tertiary time. During the progress of this uplift the larger features of the present topography were developed. The main north and south divide lies west of the apparent center of the uplift as the dome now stands, the cause for which is not yet ascertained.

The area of deposition of the White River deposits of the late Oligocene extended far up the flanks and into the valleys of the Black Hills apparently completely filling many of the old depressions. Following White River deposition the Black Hills were lifted both as a whole and also with increased doming and the new drainage was in part revived and in part superimposed. In the superimposition of drainage on the east side of the Hills there is evidence of a general tilting to the northeast so that portions of the revived pre-Oligocene valleys now appear to be robbed by their neighbors to the north, the present channels offsetting at intervals in that direction across former divides. A period of early Pleistocene base-leveling is recognized which had much to do with readjusting the drainage on the east side of the Hills. It cut deeply into the White River deposits planing them off over wide areas and depositing a mantle of gravels on plains now adjoining the Hills at high levels, extending up the valley as benches and passing over many saddle-shaped divides. Leveling and mapping of their features are now in progress by Mr. Darton with a view to determining quantitatively the amounts of uplift at the several periods and their variations from place to place through the Hills.

River Terraces in Southwestern Colorado: By MR. A. C. SPENCER.

The rivers draining the San Juan mountains emerge from deep canyons in palæozoic and older rocks upon a comparatively low-lying region of younger rocks, comprising sandstones and shales. These softer rocks have been easily reduced by erosion and in the vicinity of the rivers terraces have been produced at altitudes up to 500 feet above the present channels.

The highest terraces may be correlated from the Animas River at Durango, westward to the Mancos River and McElmo Creek, and may be recognized in the lower valley of the San Miguel River. Similar terraces upon the Uncompahgre River near Montrose, and along the Gunnison and Grand rivers are also believed to correspond. These facts are taken to indicate the amount of recent erosion which the rivers have accomplished, and as evidence of regional uplift. There were several distinct upward movements, all prior to the glaciation of the San Juan mountains.

Some Coast Migrations in Southern California: By MR. BAILEY WILLIS.

THE 102d meeting was held at the Cosmos Club, May 2, 1900.

The following papers were presented on the regular program:

A Reconnaissance from Pyramid Harbor to Forty-mile River, Alaska: By MR. ALFRED H. BROOKS.

The route followed extends westward from Lynn Canal along the northern front of the St. Elias Range to the head of the White, Tanana and Nabesna rivers. At the Nabesna river it turned northward and, crossing the Tanana, extended on to Eagle City on the Yukon. The chief orographic features are the Coast Range of Lynn Canal which extends westward beyond Lake De Zar Diash, the St. Elias Range which forms the Coast Range westward from Cross Sound, the Nutzotin Mountains, which are a minor range running parallel to the St. Elias near the headwaters of the Tanana and White rivers, the Mentasta Mountains, which are a westward extension of the same range and connect them with the Alaskan Range. From the base of these mountains the Yukon Plateau extends northward, and is a dissected upland sloping gently to the west. The drainage of the region is taken by the Chilkat river to Lynn Canal, by the Alsek southward to the Pacific, and by the Tanana and White rivers which are tributaries of the Yukon. The oldest rocks of the region are the gneisses and crystalline schists forming a broad belt between the

Tanana and the Yukon. The next succeeding formations which overlie the gneisses unconformably are grouped together as the Older Sedimentary Series, and include the gold bearing horizons of the Fortymile region. It is probably of Silurian and pre-Silurian age. A second series of Paleozoic rocks are classed as the Younger Sedimentary Series. These are largely Devonian and Carboniferous as determined by fossil evidence. They include a broad belt which was traced westward from Lynn Canal to the Nabesna river. This younger series is cut by large masses of intrusive rocks. The largest belt of these intrusives is the Coast Range granite which extends westward to the White river.

Along the northern base of the St. Elias Range were found considerable areas of effusive rocks which have often been tilted, forming monoclinal uplifts dipping southward and faulted on the north side. These effusives, together with those of the Mount Wrangell group, are probably both Tertiary and recent. The Pleistocene is represented by sands, silts and gravels. The northern limit of glaciation is traced westward as far as the Nabesna river. During the maximum extension of the Cordilleran ice sheet the White River, Tanana, and Nabesna valleys were occupied by glaciers which extended far north of the general limit of glaciation. The white volcanic ash of the upper White river was traced westward as far as the Fortymile basin. It is plainly an æolian deposit.

The copper deposits are largely placer, and are of native copper. Small veins of native copper were found in dioritic rocks connecting white Carboniferous limestone, and also in the white limestone itself near the contact. The gangue mineral is calcite.

Reconnoissance along the Chandlar and Koyukuk Rivers, Alaska: By Mr. F. C. Schrader.

Geology of the Silver Peak District, Nevada: By Mr. W. W. Turner.

The Silver Peak District lies in western Nevada near the California line. The scenery is typical of the Great Basin; isolated ranges lying between broad valleys, most of which are sinks. In the lowest part of most of the valleys are playas, while between the ridges and the playas are detrital slopes of Pleistocene age, often of vast extent. The configuration of the country is in the main due to differential uplift and subsidence, and the valleys are thus chiefly of orographic origin. Such a series of displacements must have been accompanied by normal faulting, and scarps, originating in this way, are to be seen in the region. In general the main faults trend north and south and east and west.

Subsequent erosion has greatly modified the shapes of the ridges, and partly filled the valleys with detritus.

In Miocene time much of the Silver Peak Range, which attains an elevation of 9500 feet, did not exist. Over a portion of its present site was a broad basin occupied by Lake Esmeralda. The deposits of this lake underlie the valleys and form foothill areas and arch up over the central part of the Silver Peak Range, showing that these mountains are in part late Miocene or post-Miocene origin.

With the exception of certain gneisses of doubtful age the oldest rocks of this district are Lower Cambrian, the Middle Cambrian and Silurian being also represented. All of these paleozoic rocks are rich in fossils. The late Eocene or early Miocene beds of Lake Esmeralda contain an abundance of fossil fish, dicotyledonous and other leaves, silicified wood, and fresh-water mollusks. According to Professor Knowlton the dicotyledonous leaves are repesented by holly, oak, sumach, and bayberry, showing that the climate has undergone a great change since Miocene time. From a well watered region it has become an arid one in which there are no running streams.

Volcanic activity began in this region in early Paleozoic time but after these first rhyolitic flows the volcanic forces appear to have been inactive for a very long period. During and subsequent to the deposition of the lake beds rhyolitic and andesitic eruptions occurred in great volume, followed near the beginning of the Pleistocene by eruptions of pumice and basalt, one crater being clearly of Pleistocene age.

F. L. Ransome,
David White,
Secretaries.

BIOLOGICAL SOCIETY OF WASHINGTON.

THE evening of May 5th, that of the 324th regular meeting, was devoted to a joint meeting of the Chemical Society and Biological Society, the subject for discussion being the 'Chemical and Biological Properties of Protoplasm.' The discussion was introduced by O. Loew, H. N. Stokes, H. J. Webber and A. F. Woods, the first two speakers paying special attention to the chemical side of the question, the others taking the ground that chemical changes alone could not account for the vital phenomena exhibited.

H. J. WEBBER,
Secretary of Joint Meeting.

NEW YORK ACADEMY OF SCIENCES.

SECTION OF ANTHROPOLOGY AND PSYCHOLOGY.

THE regular meeting of the Section was held on April 23d. Dr. Livingston Farrand spoke on 'Recent Researches in Central Australia,' calling attention to certain points of particular significance in Messrs. Spencer and Gillen's book, 'The Native Tribes of Central Australia,' which appeared last year. Special emphasis was laid on the suggested origin of the religious side of totemism as indicated in the 'Intichinma' ceremonies of the Arunta tribe, which are directed apparently solely toward the end of increasing the supply of the totem animals and plants of the district, each totem group being charged with the treatment of its own totem object and its multiplication for the benefit of the other members of the tribe. The well-known prohibition against killing and eating the totem seems to hold in this region, but tradition and ceremony point to a time when this was not the case. This economic explanation of the custom is the first satisfactory one yet offered and is plausible for the tribes under discussion even though it may not hold for other parts of the world. The social aspect of totemism with its marriage regulations still remains a problem.

The second paper was presented by Dr. Franz Boas on the subject 'The Eskimos of Cumberland Sound.'

The material on which this paper was based was collected by Captain James Mutch. A full version was given of the myth of the creation of land and sea animals, and a description of the beliefs of the people in regard to souls and in regard to a series of heavens and underground worlds which are the abodes of the deceased. A number of taboos were described, and their explanation as given by the Eskimos was stated. They believe that the transgression of a taboo prescribed after the death of an animal causes the transgression to become fastened to the soul of the animal, which goes down to the mistress of the lower world, where the transgression makes the hands of the deity sore. This enrages her, and she causes famine and misfortunes of all kinds.

CHARLES H. JUDD,
Secretary.

THE ACADEMY OF SCIENCE OF ST. LOUIS.

AT the meeting of the Academy of Science of St. Louis on the evening of May 7, 1900, the following subjects were presented:

Mr. Charles Espenschied gave an interesting address on modern flour milling, tracing the history of the preparation of grain for human food, the developments since 1865, when it was discovered that 'middlings,' when properly cleaned, could be reground into the best of flour, and the introduction of chilled steel rolls to replace the older millstones, so that to-day a good mill separates practically all of the flour in a grain of wheat in its most perfect form and is almost automatic in operation. It was stated that while larger mills are in operation, the most economical mill in use at the present time is that having a daily capacity of about one thousand barrels of flour.

Dr. H. von Schrenk made some remarks concerning the propagation of fruit trees, particularly the apple, illustrating by a large series of specimens the methods of budding and root-grafting which are used for commercial purposes, and discussing at some length the question of the quality of the root system obtained for the new plant by the various modes of propagation.

Professor F. E. Nipher exhibited some photographic positives on glass, and spoke briefly on the relation between negative and positive in photographic plates, showing that there is a certain relation between intensity of actinic

light acting on the plate during exposure and during development, as a result of which a greatly over-exposed plate may be developed into a positive instead of a negative, by allowing access of a limited quantity of light during development, while a plate which has been very briefly exposed may in the same manner be developed into a positive by a proportionate increase in the light allowed to fall on it during development,—a neutral or zero point, in which the plate is completely fogged, being passed in each instance.

Mr. G. Pauls exhibited a number of beautiful caterpillars, the larvæ of *Euphydryas phaeton*, which does not appear to have been hitherto recorded as occurring in Missouri, although Scudder reports it from adjoining states. The food plant on which these were found was a species of *Gerardia*.

Dr. H. von Schrenk exhibited a burl on a branch of Mississippi scrub pine, caused by a rust fungus, *Peridermium cerebrum*, which was in excellent fruit.

Four persons were elected active members of the Academy.

William Trelease,
Recording Secretary.

TORREY BOTANICAL CLUB.

At the meeting on April 10th, the paper of the evening was by Professor F. E. Lloyd, 'Studies in the genus *Lycopodium*.' Professor Lloyd discussed the distinguishing characters of the North American species, with reference to habit, sporangial leaves and their arrangement, leaf-sections and other modifications. Two new species were recognized in this review of the genus. One group of species is remarkable for greater variation here than in Europe, producing five species here and one there; including here *L. inundatum*, *L. alopecuroides*, etc. The type-specimen of *L. pinnatum* of this group was exhibited. These species develop strong, starchy thickening of the growing end of the stem, toward the close of the season, serving as basis of growth the next spring. Professor Lloyd also restored the long-forgotten species *L. Sitchense*, which has five rows of leaves, but has been confused with the 4-rowed species *L. sabinaefolium*.

Dr. Underwood followed, remarking on the general distribution of *Lycopodium*, about 94 species, or perhaps, properly, about 120; of which 12 are North American; perhaps 21 are peculiar to the Andes, and with them grow many others, which extend into Mexico or Guiana; about 8 are peculiar to Madagascar, 4 to India, etc.; mostly in mountain regions. *L. cernuum* probably encircles the world in the tropics. The local distribution along Atlantic America is peculiar; *L. alopecuroides*, reported from New England, cannot be traced by accessible specimens north of Long Island. The sprawling and arching habit of this species, with spongy interior and caterpillar-like or fox-tail like exterior gives it a very peculiar effect. Dr. Underwood also described his discoveries of *L. porophilum*, in Kentucky, Wisconsin, Alabama, etc.

The Secretary raised the question of the distribution of *L. annotinum*. This species is present in the Adirondacks, Catskills and Palisades, and forms compact areas in the Pocono; but has been searched for westward in New York without success.

Dr. Britton spoke of the interest attaching to *L. porophilum* as growing on sandstone rocks. Plants on sandstone rocks which have been attributed to *L. Selago* should be re-examined with this in mind. Still another form on the sandstones of the Shawangunk also deserves further investigation. Miss Sanial reported collecting 5 species in or close to New York City.

Miscellaneous notes followed. Dr. Underwood reported word just received from a club member working in Jamaica who has already collected 200 species.

Dr. Britton referred to a Japanese Witch-hazel flowering April 1st at the Botanical Garden, *Hamamelis arborea*, with thorny, pinkish yellow flowers with dark central eye formed by the claret-colored calyx. It has been cultivated at Kew since 1875.

Dr. MacDougal reported a large number of pictures and documents relating to Dr. John Torrey which are accumulating preparatory to the proposed Torrey Day at the A. A. A. S. meeting, with letters to Torrey from Engelmann, Herbert Spencer, etc.

Edward S. Burgess,
Secretary.

SCIENCE CLUB OF THE UNIVERSITY OF WISCONSIN.

AT the last meeting of the Science Club of the University of Wisconsin, Mr. H. L. Russell favored the club with an exceedingly valuable and timely address on 'Some Recent Investigations relative to Communicable Diseases.' Mr. Russell can speak with authority upon this subject and his expression of opinion regarding the efficiency of methods for preventing the spread of diseases and for eradicating them has an especial interest at this time.

Beginning with a brief synopsis of the state of knowledge concerning the nature and life history of the malarial parasite, Mr. Russell discussed the recent researches as to the relation that mosquitoes hold in the propagation of malaria. The establishment of a definite host in which the sexual propagation of the organism of malaria occurs, and a thorough proof of the rôle that this suctorial insect plays in the dissemination of this disease is one of the most brilliant discoveries in biology in recent years.

The discoveries relating to the bubonic plague were then taken up. After discussion of the etiology of the disease and the method by which it is disseminated, the recent methods of treatment including the preventive and curative treatment were presented. It was pointed out that the United States should with a rigorous quarantine escape the bubonic plague since the period required for the organism of the plague to develop in a patient is less than the time required for vessels to reach our shores from infected oriental ports.

Following this a general discussion of the principles underlying the action of therapeutic and prophylactic treatments of different communicable diseases was given embracing the methods of vaccination that result in the production of active and passive immunity in the body of animals as well as of human beings.

WM. H. HOBBS.

DISCUSSION AND CORRESPONDENCE.

A NATIONAL LIBRARY AND MUSEUM OF THE HISTORY OF CHEMISTRY AND COGNATE ARTS AND SCIENCES.

IT is a matter for rejoicing that not only the principal American universities and various institutes, but also a number of professional colleges, among them those of medicine and pharmacy, have accumulated and are in the possession of more or less comprehensive libraries and museums and that they are aiming at their constant enlargement and completion. Such libraries and museums cannot fail to become more and more potent auxiliaries in the educational and literary objects of these institutions as well as an efficient factor for the advancement of American scholarship and culture.

Most of these libraries are of comparatively recent origin and generally embrace the pertinent scientific and professional literature of modern times but rarely contain any considerable amount of works of past centuries. Such older books are scarcely any longer in the book market and are rarely available except by chance as is particularly the case with works that specially relate to the remoter eras of the history of alchemy, of pharmacy, materia medica, spices, etc. Whoever has had experience in the fascinating study in these domains of historical research will be familiar with the difficulty of finding in any one of the great European libraries an approximately complete collection of the extant literature of all ages. There is quite a difference in this respect among the foremost libraries; they are mostly well provided with the general literature of the past, but are more or less deficient in this special domain of historical records. But in the multiplicity of the great book collections, particularly in Germany, libraries specially rich in ancient works relating to the history of materia medica, alchemy and pharmacy are sometimes located in close proximity and even in one city, like the comprehensive historical libraries of the German National Museum and that of the municipality at Nuremburg, the University and the city libraries at Leipsic and the various great libraries in Berlin, London and Paris. Shortcomings of this kind in the various European libraries are of less consequence to the student as the distances in Central Europe are not considerable and as books are distributed on loan by mail by most libraries.

It is, however, different in a younger civilization, and in a country of so vast an extent as the United States, where the prevailing multi-