

A number of years ago the German Astronomical Society inaugurated the plan of making fairly accurate determinations of the stars in the *Durchmusterung* of Arge-landler and that of Schönfeld. The sky was divided into bands or zones, every zone overlapping for comparison purposes on the zones north and south.

Mr. Skinner gave an account of the work on the zone — $13^{\circ} 50'$ to — $18^{\circ} 10'$ which had been assigned to the Naval Observatory, and which is now being observed there under his charge. Zero stars are distributed throughout the zone, the other stars being determined differentially with respect to them. Each star is to be determined at least twice. The work has now been going on for a year and a half. The zone has been observed in one position of the instrument, and 5,714 stars in the reversed position, the whole number of stars being more than 8,000. Probably the observing will be completed next winter and it will be about two years after that before the reductions are finished.

Dr. Veeder is doing excellent work collecting statistics with regard to auroras, magnetic storms and thunder storms, and endeavoring to derive general laws. It is to be hoped that many observers may be found who will furnish him the data he desires.

The problems regarding the spectrum of β Lyræ as brought to light by recent spectroscopic observations of this star at Pulkova, Potsdam and London were treated by Professor Frost.

Mr. A. S. Flint, of the Washburn observatory, presented some results of the researches with regard to stellar parallax undertaken by him with the Repsold meridian circle of that observatory by the method of Kapteyn. A list was made of stars having a proper motion of $1''$ or more. A large number of these stars Mr. Flint has observed for three epochs, and he proposes to continue until he shall secure five. As to the

method of observing a bright field was used and wire screens were employed so that all stars should appear in the telescope as approximately of the same brightness. The observations were begun 1893, October. The method of Kapteyn, which is differential, employing a preceding and following comparison star, is certainly excellent. Mr. Flint has obtained important results of a high order of accuracy.

ASAPH HALL, JR.

SECTION E. GEOLOGY AND GEOGRAPHY.

EIGHTEEN papers were presented to the section this year, but only thirteen were read in full, as the authors of the others were not present at the meeting. Major Jed. Hotchkiss, of Staunton, Va., the Vice-President, was absent from the early sessions of the section, so that his address was not delivered until Monday afternoon. He then gave a somewhat informal talk on the geological survey of Virginia, 1835–1841, and its influence on the history of science in this country. This survey was conducted by Professors W. B. and H. D. Rogers and was held by the speaker to have been the first important geological survey carried on in the United States. The work was carried on for five years at an expense of only \$100,000 and the results lie at the foundation of the progress made in geology since.

'The relations of primary and secondary structures in rocks' was the topic discussed by Professor C. R. Van Hise, of Madison, Wis. The paper inquired into the relations of cleavage and fissility to bedding, and showed that in homogeneous rocks the law of hydrostatic viscous flow applies, and therefore that the secondary structure cuts the primary. In heterogeneous rocks the beds are of varying strength, and the accommodations between them control the major movements, which are parallel to them. The secondary structure is produced

by shearing and is therefore parallel to the bedding, and this may be called parallel cleavage or parallel fissility. In heterogeneous rocks, however, at the crests and troughs the law of hydrostatic flow chiefly applies, while the law of shearing applies at the limbs. In passing from the limbs of the folds to the arches and troughs the two tendencies are both at work, and the phenomena are the resultants of both forces. The law of hydrostatic viscous flow becomes predominant as the arch or trough is neared; the law of shearing, as the limb is approached.

Professor B. K. Emerson, Amherst, Mass., delivered the substance of two papers on the Archæan and Cambrian rocks of the Green Mountain range in southern Massachusetts and on the geology of Worcester County, Mass., which embodied a preliminary account of the author's work on the region for the United States Geological Survey. The Green Mountains traverse western Massachusetts in a series of complex anticlines and synclines which are partly overturned and overthrust westward. Upon these in places there is unconformable conglomerate gneiss of Cambrian age. The author illustrated by means of the United States Geological Survey topographic maps the progress of the work in mapping the intricate crystalline rocks in the district.

'Gotham's Cave, or Fractured Rocks in Northern Vermont' was the title of a short paper by Professor C. H. Hitchcock, N. H., describing with the aid of sketch maps and sections a peculiar occurrence in the Green Mountain State.

'Recent discovery of the occurrence of marine cretaceous strata on Long Island.' In this paper Mr. Arthur Hollick, of Columbia College, said that the presence on Long Island of cretaceous strata belonging to the so-called non-marine division was amply demonstrated some years ago, but until the past year the evidence of the ex-

istence there of marine strata of this age was confined almost entirely to the alleged discovery of an *Exogyra* in an excavation for a well in Brooklyn. Last summer, while examining the north shore at Center Island, evidences of more strata were observed, and afterwards hardened fragments of marl containing *Gryphæa* and other cretaceous molluscs were found in the moraine near Ridgewood Reservoir, Brooklyn.

Dr. J. W. Spencer read a contribution on the 'Geological Canals between the Atlantic and Pacific Oceans.' He said that over the Isthmus of Tehuantepec, in Mexico, low planes now eroded mark a shallow strait of a few miles in width connecting the basin of the Mexican Gulf with that of the Pacific Ocean. This land is now raised about 1,000 feet above sea level. Through these straits there are two lower canals about 800 feet above tide, only a mile long and a quarter of a mile wide, whose floors are covered with gravels which are continuous with terraces upon the gulf side. The time of elevation is that of the recent terrace epoch; at any rate it was later than the Columbia period.

A second paper by Dr. Spencer dealt with the 'Recent Elevation of New England.' He holds that the high terraces in the valleys of New England are not those of rivers but of estuaries. These terraces occur on the north, east, south and west sides of the New England rivers from an elevation of at least 2,700 feet downward by level steps. From their features it is inferred that these steps represent changes in the base plane of erosion, or, in other words, successive uplifts in the most recent post-glacial times in amount approximately equal to the aggregate heights of the terraces. The elevation appears to have been greater in the mountain masses than nearer the sea.

'Geological Notes on the Isles of Shoals,' by Dr. H. C. Hovey, Newburyport, Mass. The author briefly described these islands,

which lie off the coast of Maine and New Hampshire. Statements made by reliable residents seem to show that some of the islands have risen six feet in the last fifty years, while the rest seem to be stationary. The general rock is gneissoid to schistose and varies in color from white to black. The islands are traversed by numerous dykes of basic rock. On Appledore Island there is a peculiar six-sided column of granitoid rock protruding through a schistose, biotite gneiss. The column is more than eleven feet in diameter and its original height must have been from 25 to 50 feet.

'The Great Falls of the Mohawk at Cohoes, N. Y.,' by W. H. C. Pynchon, Trinity College, Hartford, Conn. This paper described, by the aid of maps and stereopticon views, the gorge of the Mohawk and the falls. The author brought out the fact that the rocks, which are Hudson river shales, dip sharply down stream instead of up stream as is the case at many falls, notably Niagara. The gorge is shown to be a post-glacial cutting and the old valley still exists not far from the present one. The position of the strata facilitates the formation of innumerable pot holes of all sizes up to ten feet in diameter.

In a paper entitled 'Subdivisions of the Upper Silurian in Northeastern Iowa,' A. G. Wilson, of Hopkinton, Ia., gave lithological and palæontological characteristics on which he would propose to divide the Niagara strata there into five groups:

5. The building stone.
4. The upper coralline beds.
3. The *Pentamerus* beds.
2. The lower coralline beds.
1. The beds of passage from the Maquoketa shales.

Professor J. P. Smith, Stanford University, California, in a paper on the metamorphic series of the Shasta region of California, supplemented observations which the author detailed to the section at the

Brooklyn meeting. New finds in the Middle Trias shales make the age assigned to them more probable; certain strata which are of Upper Trias combine in the same beds fossils which are always in separate beds in the Alps and Himalayas. The discovery of an upper Karnic, or more probably Jurassic, fauna was announced.

In the absence of the author, Mr. Warren Upham's paper on a 'View of the Ice Age as Two Epochs, the Glacial and the Champlain,' was read in abstract at the request of some members of the section. The author divides the Glacial epoch of ice accumulation into four stages: 1, Culmination of the Lafayette epeirogenic uplift; 2, the Kansan stage, marking the farthest extent of the ice sheet; 3, the Helvetian or Aftonian stage, during which there was considerable recession of the ice-front; 4, the Iowan stage of renewed ice accumulation. The Champlain epoch of ice departure is divided into four more stages continuing the others: 5, the Champlain subsidence or Neudeckian stage—a time of widespread depression; 6, the Wisconsin stage—marked by moderate re-elevation of the land; 7, the Warren stage, of maximum extent of glacial Lake Warren, and 8, the Toronto stage, with slight glacial oscillations, but temperate climate at Toronto and Scarboro, Ontario.

'A re-survey of the whirlpool and vicinity of the Niagara river, with a demonstration of the true geology of the locality, illustrated by a new, large map.' In this paper Mr. George W. Holley presented some views regarding the origin and history of the gorge of the Niagara which were considerably at variance with those commonly accepted by geologists.

'Glacial phenomena between Lake Champlain, Lake George and the Hudson' was the title of a paper by Professor G. F. Wright, of Oberlin, Ohio, in which the author detailed the results of recent personal study of that region. He described the mo-

rainic lakes which existed at two or three points along the southern shore of Lake George and the end of Lake Champlain, the drainage of Lake George in both directions after the ice had left its basin, and the elevated gravel and sand terrace near Saratoga.

In a somewhat informal lecture Professor H. L. Fairchild, Rochester, N. Y., described some interesting features in the surface geology of the Genesee region, New York. The lecture was illustrated by numerous lantern slides, some of which were especially instructive as showing in an excellent manner the intimate structure of the gravel and sand beds. These are glacial till as well as stratified lacustrine deposits.

The papers read only by title were:

Terminology proposed for the description of the shell in Pelecypoda: by Professor A. Hyatt, Boston, Mass.

Russia in Europe: by Dr. Gardiner G. Hubbard, Washington, D. C.

Distribution of sharks in the Cretaceous: by C. R. Eastman, Cambridge, Mass.

The equatorial counter currents: by Professor W. M. Davis, Cambridge, Mass.

On Saturday, 31st August, the section joined in the general excursion to Amherst, Northampton and South Hadley. The interest for the section centered in Amherst, of course, and there, under the guidance of Professor B. K. Emerson, the members studied the famous collection of footprints and other impressions from the Connecticut trias made by President E. Hitchcock. These remain in the Appleton Cabinet just as they were left by President Hitchcock. In another building are the fine collections of minerals and rocks which have been gotten together by Professor Emerson since the fire occurred which destroyed the College collections some years ago.

Tuesday nine or ten members of the section availed themselves of the opportunity

offered to accompany Professor W. M. Davis to the region of trap and sandstone near Meriden, Conn., which he has studied so thoroughly, from which he has described overflow sheets of trap, beds of tuff with ejected blocks and extensive faults.

EDMUND OTIS HOVEY.

SECTION G. BOTANY.

The botanists were well represented at the recent meeting of the American Association for the Advancement of Science, held at Springfield, Mass. Interesting papers were presented at the meetings of the Botanical Society of America and the Botanical Club. In addition to these Affiliated Societies, Section G (Botany), of the Association proper, also had a full program.

The address of the Vice-President, Dr. J. C. Arthur, was delivered on Thursday afternoon, August 29, the subject being 'The Progress of Vegetable Physiology.' As the address appeared in full in SCIENCE, September 20th, it is not necessary to review it here. The papers read before Section G are briefly reviewed below:

1. *A Leaf Rot of Cabbage*, by H. L. RUSSELL, Madison, Wis. In the absence of the author this paper was read by Professor Barnes, of the University of Wisconsin. The disease seems to be associated with bacteria, although the author has not succeeded in isolating the organism. The axils of the lower leaves first show the disease. These points are usually filled with moisture, and the disease gains an entrance through rents caused by rapid growth of the tissue. Once within the tissues, the disease spreads rapidly through the fibro-vascular bundles; as a result, the functions of the plant are disturbed and the leaves wilt. The disease seems to be different from the one described by Garman, and may be checked by cutting off the affected leaves along the main stalk.

2. *Watermelon Wilt and other Wilt Dis-*