and drainage areas for the Rhone, Po, Danube, and Uruguay are taken from a paper by John Murray in the *Scottish Geographical Magazine* for February, 1887. The drainage area of the Nile was measured by planimeter from the best maps obtainable.

Discharge and Sediment of Large Rivers.

River.	Drainage Area, square miles.	Mean Annual Discharge, second-feet.	Sediment.				Authority.
			Total Annual Tons.	Ratio by Weight.	Height column 1 square mile base, feet.	Depth over Drainage Area, inches.	
Potomac	11,043	20,16	5,557,250	1:3575	4.0	.00433	
Mississippi [1]	1,214,000	610,000	406,250,000	1:1500	291 4	.00288	Humphreys and Abbot
Rio Grande [2]	30,000	1,700	3,830,000	1:291	2 8	.00110	U. S. Geological Survey
Uruguay	[3] 150,000	[3] 150,000	14,782,500	[5] 1:10,000	10.6	.00085	J. J. Revy
Rhone	[3] 34,800	[3] 65,850	[4] 36,000,000	1:1775	31.1	.01071	J. Barois
Po	[3] 27,100	[3] 62,200	[4] 67,000,000	1:900	59.0	.01139	"
Danube	[3] 320,300	[3] 315,2 0	[4] 108,00 ,000	1:2880	93.2	.00354	"
Nile	1,100,000	[7] 113,000	[4] 54,000,000	1:2050	38.8	.00042	"
Irrawaddy [6]	125,000	475,000	291,430,000	1:1610	209.0	.02005	R. Gordon

GLACIATION IN PENNSYLVANIA.

BY EDWARD H. WILLIAMS, JR., LEHIGH UNIVERSITY, SO. BETHLEHEM, PA.

Owing to the difference of opinion regarding glaciation in this vicinity, I have taken the subject for the out-door work of the post-graduates in the mining course, during the past few months, as their geological survey, and I make now a preliminary statement of what has been found, without theorizing upon it in any way, as the work is to be continued and extended to adjoining regions.

The Lehigh University is situated on the north slope of what is called The South Mountain, or the Durham and Reading Hills, immediately back of South Bethlehem, Pa. The crest of the same varies from 635 to over 900 feet above tide, at the point mentioned. This is above the reach of glacial deposits by floating ice. To the north lies the great valley bounded by the Blue Ridge, and just north of this is a lower ridge of Oriskany sandstone in a vertical position. The nearest portion of this sandstone is therefore beyond the Blue Ridge. As the rocks of this ridge are mainly barren, while the Oriskany sandstone carries the usual fossils, this formation was taken as a test-rock, owing to the fact that the rock called Potsdam sandstone sometimes weathers so as to greatly resemble rocks of other formations.

Professor Salisbury stated that he had found glaciated stones 500 feet above the Lehigh River, on the mountain back of the University, and adduced that fact to refute the statement of Professor Wright, that the ice failed to come as far south as Bethlehem. The height of the point noted was proof that the specimen had not been brought by water, and that the ice-sheet had extended across the great valley. From this was deduced the idea that there had been two periods of glaciation, and that the one marked by the terminal moraine north of us, was the later of the two.

[1] "Report upon the Physics and Hydraulics of the Mississippi River," by A. A. Humphreys and H. L. Abbot, Philadelphia, 1861, p. 149.

[2] "Eleventh Annual Report U. S. Geological Survey," Washington, 1891, Part II., p. 57.

[3] Scottish Geographical Magazine, February, 1887, p. 76.

[4] "Irrigation in Egypt," by J. Barois, translated by Major A. M. Miller, Washington, 1889, p. 18.

[5] "Hydraulics of Great Rivers," by J. J. Revy, New York, 1874, p. 135.

[6] "Report on the Irrawaddy River," by R. Gordon, Rangoon, 1880, Part III. p. 25.

[7] Special Consular Reports, House of Representatives, 51st Congress, 2d Session, Ex. Doc. 45, Part I., p. 259.

To the south of that part of the mountain back of the University, lies a land-locked valley, so that there was no drainage southward, except at high levels, during the time when the bowlder clay was deposited and therefore there would be no current to divert icebergs into that valley and cause a universal distribution of that clay, as there is to the north of the South Mountain.

The preliminary work shows that Oriskany pebbles and bowlders are found at all altitudes over this mountain, and the great majority of the smaller ones lie in a clay, which may be due to the decomposition of the gneiss of the mountain; but which exists on the top of the highest part of the ridge. These have been traced into the Saucon Valley to the south as far as a line running from Friedensville to the second railroad cut south of Bingen. South of that line we find the clays from the subjacent limestones generally free from foreign stones, as far south as Centre Valley, the southern part of the survey. North of that line we have found four lines of glaciated material. In the valleys these run across all the formations from gneiss to limestone, in lines generally parallel, and with a freedom of glaciated material except in the lowest parts, where ice may have been present. Oriskany bowlders are found of considerable size, and in some parts abundantly. Only one of these lines has been traced fully, and that runs from the north of Bingen and at an elevation of about 300 A. T., across the Saucon Creek and Valley, and, passing south of Seidersville, has been followed to the summit of a hill west of the latter place, and at an elevation of 720 A. T.

It is comparatively easy to trace these lines, as the farms are provided with wooden and wire fences, except where these lines exist, and there the fences are of stone heaps, and the soil is stony. Digging under these lines shows that they are resting on rock in some cases, and on soil in others.

It may be said that the ice went over the South Mountain. In this case there has since been a great disintegration of the gneiss, as the cuttings for the South Bethlehem reservoir show 25 feet of rotten rock in some places. It may be said that these are evidences of a older glaciation; but this older intrusion followed exactly the lines of the later one, as can be seen by running a line from the points in New Jersey noted by Professor Salisbury (Pattenburg, etc.) to Seidersville, Pa., so that the advocates of a single period can say that this was a sudden intrusion for a short period followed by rapid retreat for twenty miles.

This work is not sufficiently extended to furnish data for theorizing, and it will be extended in the future; but attention is called to the fact that here exists a good field for observation, as the rocks of the country (gneiss quartzite and limestone) cause intrusive rocks from the Blue Ridge to be very prominent.

INFLUENCE OF PARASITES ON OTHER INSECTS.

BY G. C. DAVIS, AGRICULTURAL COLLEGE, MICH.

From a philantrophic standpoint, it seems cruel to see one class of insects preying upon another. The eager female parasite is so vigilant in her search that one would think a subject of her search could not escape till it had reached maturity; yet strategy, mimicry, offensive odor, hairy and other coverings, and many other peculiar and interesting methods of protection help to shield and protect the invader from its insidious foe till out of danger. In watching the ups and downs of the two from year to year, about the only effect that is noticeable is that the parasite generally holds the balance of power, though usually the balance is well equipoised.

Viewed from an economic and practical side, the practice loses its cruel aspect and is encouraged and fostered in many ways, as it means an inexpensive control of many of our common pests. There is little doubt but parasites do much more good than we are wont to give them credit for. In a large share of the cases of parasitism, about so many individuals of a species are parasitized each season, and the number left remains too small to produce serious damage. On the other hand, if the species had no parasite to contend with, it would soon be numerous enough to be a dreaded pest.

Very often certain species do appear in greatly increased num-