leaves, tree trunks and other plant structures, all of living species, were deposited in the pools above and below the falls. Their high calcite content, 80 or more per cent., attest the clarity of the waters which formed them. The cascade deposits average even lower in detritus, the mosses having acted as a filter. The present muddiness of the streams after rains is believed to be the reason for the mosses having been reduced to meager patches. With the decline of the mosses, the streams have started eroding the travertine. The channels have been lowered from 10 to 25 feet below the highest travertine levels, and the falls have receded along narrow channels by as much as 100 feet. In one case, the outermost travertine wall is 130 feet high and 200 feet wide. No evidence of an earlier destructive stage has been found. The streams still deposit travertine, but without the mosses erosion outstrips retention.

The cascade deposits are distinctly stratified. Most of the dips are very steep, but some are as low as 40° down stream. Porous strata, one to two inches thick, with fossil moss normal to the strata, alternate with thinner, more compact layers with less distinct mossy structures. Parting surfaces between strata are generally lacking, but the stratiform structure is very distinct, resembling a coarse wavy gneiss. The lush growth of summer forms the porous layer. In the winter, the moss is matted down and almost buried in calcite. Winter yields the compact layer. The insoluble matter of the winter layer averages about twice the amount present in the summer layer, and its average grain is about twice as coarse as that of the summer layer. Quartz and feldspars are the main insoluble constituents. The strike of the strata is undulating with wide, gentle convexities facing downstream, and sharp narrow troughs pointing upstream. Each bulge down-stream was once a pulpit-like salient on the face of the falls, draped with moss and covered by falling water. The rapid growth of the moss sometimes formed overhangs, which became caves, and their counterpart can be seen where mosses cling to the top of the falls at the present time.

An abundance of concentrically stratified concretionary forms, encasing tree trunks and other plant structures, show that calcite did not replace plant materials. Hollow casts are the rule. Woody residues rarely remain. That these concretions are largely primary is shown by the travertine not reorganizing into concretionary forms around the large roots of trees that penetrate it. However, slender pipes of calcite commonly enclose thin rootlets which actively absorb water from the travertine.

Rise in temperature of the stream waters is the most plausible inorganic cause of precipitation of the travertine. In summer the streams are warmer than the springs which feed them. In winter the reverse is true at least part of the time. Variations in the partial CO_2 pressure of the atmosphere are believed to be unimportant as a cause of deposition. It is also difficult to see how photosynthesis would disturb the equilibrium of the CO_2 in the foamy waters of the falls. Since travertine gathers so extensively on dead plants, it is believed that decay may have been a factor in deposition. The possibility that unknown factors may be important is suggested by the high calcium content of one of the streams, (the only one analyzed) during the past winter. It held about twice as much calcium as is present in a saturated solution of the bicarbonate at a similar temperature and partial atmospheric pressure of CO_2. Sulfate and chloride were negligible. The excess of calcium suggests that it is partly in colloidal suspension or that some unsuspected factor influences its behavior.

The biological and chemical phases of the travertine problem are being studied by R. P. Carrol and W. F. Young, respectively. H. F. Hinkle and others are giving valuable assistance. Financial aid has been given by the Virginia Academy of Science.

Edward Steidtmann
Virginia Military Institute

LIFE HISTORY OF THE GOLD-BANDED SKIPPER (RHABDOIDES CELLUS)

The handsome gold-banded skipper (*Rhabdoides cellus*) is one of the rarer butterflies in the eastern states.

In the vicinity of Washington it first appears late in May, flies throughout June, attaining its maximum abundance shortly after the end of the third week, and disappears soon after the first of July. Occasional individuals probably appear throughout the summer, but the only records are July 20 and 30.

The food plant is the hog-peanut (*Falcata pitcheri*) on the larger leaflets of which the young larvae make characteristic limpet-like shelters, the last stage larvae simply rolling in the border of the leaf, and later fastening two leaflets together.

The eggs, which are deposited in little strings of usually from 2 to 4, sometimes of 5 or 6, rarely singly, closely resemble the eggs of *Thorybes,* but have from 15 to 21 (most commonly 17) ribs.

The caterpillars are apple green, lighter below, on the prolegs, and at the tip of the body, with a broad sulfur yellow dorsolateral line, a rose pink neck, and the head claret brown with two large chrome yellow spots.

The pupa, which is much like that of *Thorybes,* is covered with a thick whitish or light lavender gray bloom that entirely conceals the surface sculpture.

From a pupa formed on July 4 an adult emerged on July 20.

Of the early stages 160 eggs and 264 caterpillars representing all the stages have been collected, and a detailed report upon them is in course of preparation.

In their monograph on the North American Hesperioidea Lindsey, Bell and Williams say that this species resembles *Thorybes* closely in most of its characters, and this is certainly true of the early stages.

An individual that emerged from the pupa on July 20 represents an interesting and well-marked variety. It is exceedingly dark in color, and the usual gold band across the fore wings is replaced by a series of four spots, the first, adjoining the costal border, small, the second, crossing the cell, about half as broad as the usual band in the same place and much lighter than the first, the third, very small and bright golden, in the middle of the interspace between veins M_2 and M_1, and the fourth, nearly as large as the first, in the interspace below near its outer end. This may be known as var. *leilae*.

AUSTIN H. CLARK

U. S. NATIONAL MUSEUM

HOW SOME BIRDS SATISFY THIRST

To the list of birds mentioned by Mr. Allard[1] as eating snow in winter may be added the evening grosbeak, the white-breasted nuthatch and the red-breasted nuthatch. My friend, Liguori Gormley, tells me he has several times noticed these birds eating snow.

Winter birds, and indeed mammals also, seem to satisfy thirst in this way even when water is available. In this part of the Ottawa valley resident winter birds usually number about fifteen species, and excluding the aquatics—muskrat, mink and beaver—there are about eight kinds of mammals active in winter. Although the snow lies deep for four months and the ice is often more than two feet thick, there is always open water to be found at rapids and springs. Having in mind the concourse of animals and birds that gather to drink at water-holes in Africa, I have often been struck by the fact that in many years' observation, I have never seen in my district the track of a bird or of a terrestrial mammal coming to open water in winter.

CHARLES MACNAMARA

ARNPRIOR, ONTARIO, CANADA

[1] SCIENCE, 80: 2066, 116, August 3, 1934.

QUOTATIONS

PRESIDENT ROOSEVELT'S ADDRESS AT THE MAYO CLINIC

I HOPE that the people of Rochester will not feel limited in their pride of possession when the nation which I have the honor to represent claims the right to call Dr. Will and Dr. Charles by the good word "neighbor." You are beloved at home and abroad, and a world deeply in your debt gives you inadequate return in external honors and distinctions. But your true distinction is in the simple fact that you have put men's sense of brotherhood and interdependence into a setting and have given it a new meaning.

For fifty years you have given tireless, skillful and unselfish service here in this state and city. These fifty years, the span of your medical practice, have covered probably the most remarkable period in the history of science. You have seen practically all of modern medicine and surgery come into being. The rise of research, dating back to the days when you began your practice, has revolutionized the diagnosis, prevention and treatment of disease.

The development of the branches of this science has revolutionized not only the science of medicine but the entire field of effort that we sometimes call public welfare. You have seen surgical technique become one of the finest of all the arts of man. You have seen the development of the science of public health, which has brought the gospel of health to the school and clinic. You have seen the growth of hospitals, the creation of foundations for medical research and a revolution in the teaching of medicine. You have seen isolated clinics come to be part of great universities, an association resulting in the enrichment of both.

But despite the progress that you have seen and that you have helped to accomplish, the restless spirit of science prompts you to see new visions of achievement. As you have pointed out so often in your predictions of what humanity may expect from medical science in the future, progress is only at its beginning. In the further development of the curative art, in the discovery of new means for the prevention of disease, in the creation of methods by which all of the people may be made aware of the knowledge of hygiene and public health developed in the laboratory clinic, your vision offers promise of a greater nation and a happier people.

You have helped to give to the medical profession a unique place in the community and the nation. By reason of his special opportunities, the physician has the occasion to perform a service in his community far beyond the bounds of his own professional duty. His infinitely complex relationships with the people of the community enable him to lead them in standards of