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The writer identified it at this station February 19, 1908, and it became common that year before the end of March.

In southeastern Indiana this species has been recorded as a rare summer resident. I am unable to say positively whether it occurred on the farm where I lived during the decade ending with 1899, but it certainly was not common. It has increased in numbers steadily during the past six years or more and is now one of the most abundant, and certainly one of the most conspicuous birds of the vicinity. During a visit to the old farm in the latter part of June, 1909, mocking birds were seen in trees of ripening cherries more frequently than any other species. One pair was nesting in a grape arbor not more than ten yards from the door of the farm house and nearer than that to a much used walk. Another pair had a nest in the garden only a short distance from the first. Other nests were not located although there were more than two pairs of the birds in the immediate vicinity.

They were also seen at several places from one-half mile to three miles from the farm mentioned above.

A Boulder of Jasperite.

A. M. KIRSCH.

South Bend, Indiana, is a most interesting locality with reference to the glacial period in Geology. It is here that three great lobes of ice terminated, viz: the Lake Michigan Lobe, the Saginaw Lobe and the Erie Lobe; and for this reason, we find here rock material mingled from three very far removed localities.

The northern edge of the Erie Lobe piled up the moraines represented by the hills which run parallel with the St. Joseph River between South Bend and Mishawaka, and run almost in a straight line east and west. The material for this lobe was brought here from Ontario, Canada.

The Saginaw Lobe terminates north of the St. Joseph River, about two miles northeast of South Bend and one mile east of Notre Dame University. Its material was brought here from northeastern Michigan and vicinity.

The Lake Michigan Lobe piled up the hills lying to the west of the St. Joseph River. They may be seen best near Bertrand on the Indiana-Michigan line, some four miles northwest of Notre Dame; by remnants, these hills can be traced southwards as far as a point west of St. Mary's Academy, one mile west of the University.

Different kinds of soil may be found within a radius of a few miles of Notre Dame; in the same gravel-pit even, there may be found boulders or pebbles brought here from the north, northeast or northwest, and commingling of this material has given to this locality a soil which is a puzzle to the uninitiated. The flora and in particular the plant species

are largely determined by the soil on which they grow. Those species which we find here had a mighty struggle in adapting themselves to such strained conditions. It is no wonder, therefore, that the experienced botanist finds this locality full of contradictions. The fact is, our flora is not as yet completely adjusted to the soil. Dr. Edward L. Greene, a most experienced field botanist, spent three weeks here last May (1909), to solve some of the puzzles of the northern Indiana flora. He made some very interesting discoveries which he will, no doubt report in due time.

If I may be permitted a few personal observations in this matter, I may state that for twenty-five years during which I conducted classes of botany, most of the time, I had to offer explanations for the discrepancies in the descriptions of the species in Gray's Manual. Most of the species did not harmonize with the descriptions in the manual. A boulder of Jasperite, found here some years ago, explains to some extent the cause of this confusion. It was found here in Northern Indiana commingled with



material brought here from an entirely different region.

Jasperite is only obtained in Lake Superior region, and this piece from Indiana commingled with material from Ontario, Canada and from Michigan is a clue to the complex soil of northwestern Indiana.

Louis V. Pirsson, "Rocks and Minerals," Pp. 396, defines Jasperite as "a name given to...rocks which consist of layers of red chert (jasper) and hematite. They occur in the Lake Superior region. See page 297." And then he continues: "Jasper is a chemically precipitated opaline silica. In places, as in the Lake Superior region, the jaspers are strongly ferruginous and interlaminated with bands of hematite. They constitute rock-masses of considerable size, affording valuable deposits of iron ore. They are called Jasperite. The cherty (jasper) layers are colored bright red by the iron oxide." From the accompanying illustration, the difference between the two layers will be easily seen. We add here some of the physical properties of the specimen.

Size. The specimen is 24.1 centimeters long and 12 centimeters wide, with a circumference of 61 centimeters in the length and 42 centimeters in the breadth.

Shape. As seen from the illustration it is approximately oval, resembling somewhat an exaggerated oval pebble.

Hardness. Jasper has a hardness of 7. and Hematite one of 6., average 6.5.

Weight. In air it weighs 6 kilos and in water 4.4 kilos; hence its specific gravity is 3.75.

Erosion. The rounded form and absence of sharp corners shows that our specimen was transported from a distance; and this distance must have been considerable judging from the hardness of the rock. As this particular kind of rock is found only in its native locality about Lake Superior; and this specimen was found in northern Indiana, the obvious conclusion is that it was transported to the latter place by some agent. The natural transporting agents are air, water and ice. It must have been brought here by ice during the glacial period. Its present size and rounded shape resulted from erosion during the period of transportation. The absolute volume and shape may be inferred from its present condition; it evidently depends on its original size and shape, the distance it has travelled, the time of its journey, the material it encountered in its transit, and finally on the weathering it has undergone.

Weathering. The weathering, and especially the differential weathering is very apparent. The hard jasper stands out in well defined ridges, whilst the softer hematite is marked by deepened furrows. If we knew the relative amount of weathering of jasper and hematite in terms of time, we could calculate approximately the absolute time consumed in the weathering of this specimen. The difference between the ridges of jasper and furrows of hematite would form the basis for the calculation.

Original size. Judging from the hardness of the two minerals, we would infer that the original size of the specimen was not much greater than it is at present. Its companion mineral also much softer during its period of transportation and, therefore, could not reduce the specimen very much by friction and wear.

Average composition. The specific gravity of our specimen of Jasperite is 3.75, hematite has a specific gravity of 5.2 and jasper one of 2.6. Knowing these, we deduce the specific gravity for jasperite in the following manner. Adding the specific gravities of jasper and hematite and dividing by two we get the mean specific gravity for equal proportions. Now if we add 5.2 and 2.6, we get 7.8 and dividing this by two, we have 3.70, which is the specific gravity of jasper and hematite mixed in equal proportions. The specific gravity of our specimen is 3.75 and this minus 3.70 gives us a difference of only 0.05. This shows that our specimen is approximately a mixture of equal portions of jasper and hematite, with a slight increase of the hematite.

I shall add here a few notes on the two minerals of jasper and hematite. Jasper is a variety of quartz and is always amorphous, i. e., never

appearing in crystal forms as is very common with quartz or silica (SiO_2). It also contains some iron sesquioxide (Fe_2O_3) and vary frequently some clay, hence its hardness is slightly below that of pure quartz. Jasper is mostly yellow, but it is often found, as in our specimen, of a rich deep red color. This color, so emphatic in our specimen, is caused by heat and the presence of iron—the iron becoming anhydrous and causing the change in color. We learn, therefore, that molten hematite introduced into a quartzose rock, very likely a pure sandstone, and caused the silica to turn into red jasper.

Hematite, from the Greek *Haima*, meaning blood, is so named on account of the red color which this mineral presents especially when scratched. It is commonly called red oxide of iron (Fe_2O_3) in distinction from other common iron ores such as magnetite (Fe_3O_4) and limonite ($2\text{Fe}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$) which latter is often called brown oxide. From the formula of limonite it is seen that hematite is derived by dehydration which, as explained above, is caused by heat. A limonite clay mixed with sand or pure quartz will, therefore, turn into jasperite by the application of heat, and this is very likely the genesis of the jasperite of the Lake Superior region.

We may gather many interesting facts of the glacial geology of Northwestern Indiana from this piece of jasperite which explains some of the features of local geography and glacial geology.

Birds Found in Van Buren Co., Mich., from July 4 to August 13, 1909.

BROTHER ALPHONSUS, C. S. C.

July is the month when summer residents among the birds may be seen to best advantage. Most of the young birds are fledged and, with the old ones, form families, which feed together. Birds that have more than one brood are still in song and are, of course, conspicuous on that account. The song season for a number of species, such as the Warbling and Red-Eyed Vireos, Towhee, Scarlet Tanager, Indigo Bird, Song and Field Sparrows, lasts almost through the summer.

In this county the writer saw all but one of the ten species not seen by him in June in St. Joseph Co., Ind. The Rose-breasted Grosbeak was not seen here. The large lakes and swampy land around them, in Van Buren County, enabled the writer to find most of these birds. Seven species seen in St. Joseph County in June were not found here in July. These are: Bobolink, Cowbird, House Wren, Nighthawk, Swamp Sparrow, Loggerhead Shrike and Redstart.

It is interesting to note that a short distance from Bankson Lake, near Lawton, Mich., certain species of birds may be found which are not