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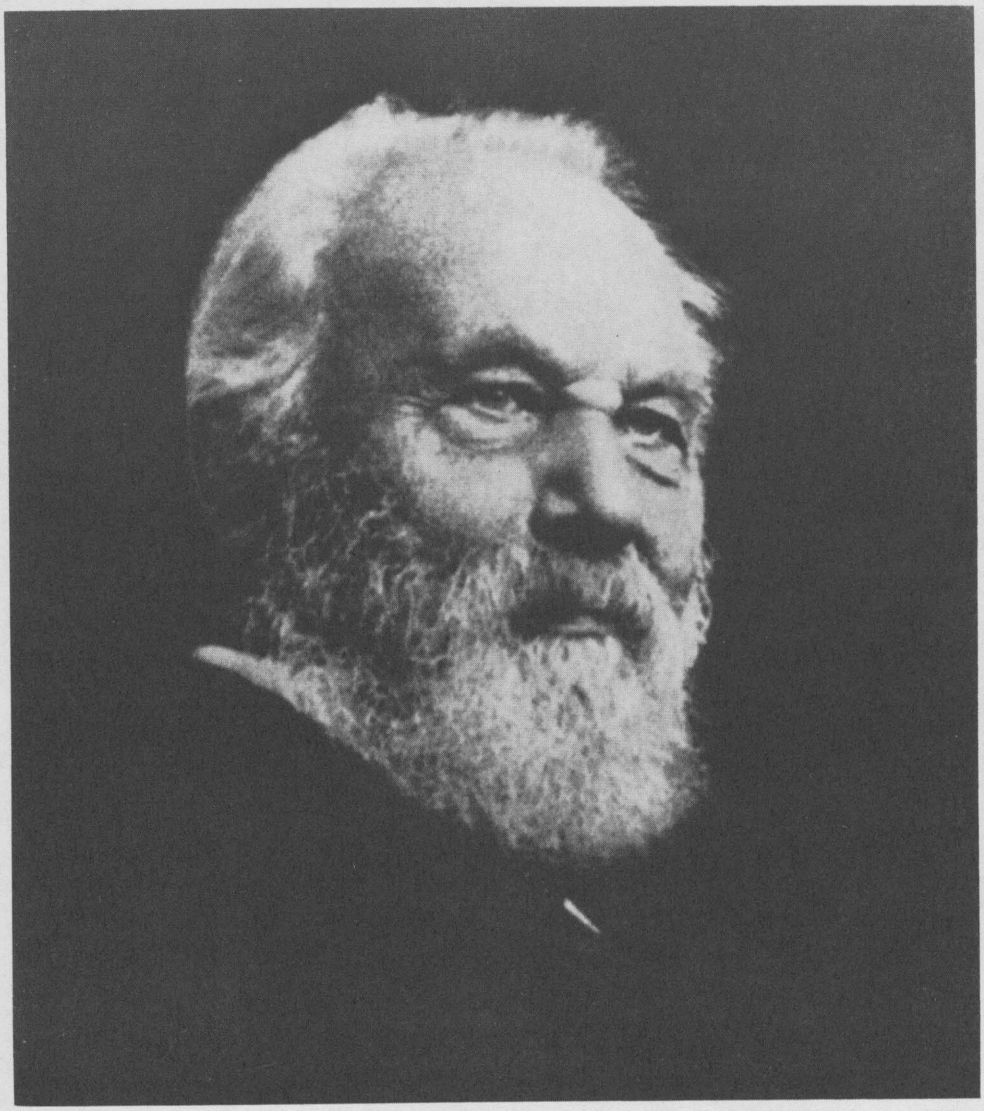
That Remarkable Man
CARL LUDWIG ROMINGER
State Geologist

By

Jean Davies Wright



Carl Ludwig Rominger
1820-1907

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I

1820-1854: BIRTH IN SCHNAITHEIM, WUERTTEMBERG, GERMANY -- EARLY YEARS -- UNIVERSITY OF TUEBINGEN -- HONORS AND AWARDS -- THE REVOLUTION OF 1848 -- ARRIVAL IN AMERICA -- FIRST MEDICAL PRACTICE

Precisely half an hour before midnight on New Year's Eve, 1820, a son was born to the schoolmaster of Schnaitheim in Wuerttemberg, Herr Ludwig Friedrich Rominger, and his wife Johanna. Already the parents of three little girls, they were pleased that this child was a boy. They would have been amazed had they known he would some day be famous in far-off America as the "State Geologist of Michigan." The name would have been unfamiliar for the new Territory of Michigan was largely uninhabited except for the Indians.

Carl Ludwig Rominger could not have chosen a birthplace that differed more from that wilderness than Schnaitheim. There was a story-book quality about the place. Encircled by hills, it had grown up on the Brenz River opposite the old four-towered castle. Beyond its buildings in every direction stretched the thick dark woods of the Swabian Alb.

In the early 1820's Schnaitheim had less than 1200 inhabitants living in perhaps 200 small houses. Its Protestant church and rectory were, as now, situated on a slight elevation at the north end of the village, its schoolhouse conveniently near the center (see figures 1-3).

The schoolmaster and his family lived on the second floor of this "Hohen Schule" to the left of the staircase leading up from the entrance hall, and it was here that Carl was born on December 31st, 1820. Two large classrooms were on the right side of the building, one above the other. Each classroom had two sections. During the summer months one section met in the morning from six to eight, the other from eight to ten, but in the chill days of winter the hours were eight to eleven and noon to two o'clock. This schedule was arranged so the pupils might be free for their chores. The older ones looked after the cattle, driving them up the hillsides to patches of meadow where free grazing was permitted; often in the warm months these children were away from home for days at a time.

Whereas Herr Rominger's salary as schoolmaster was meager, it was adequate because of frequent gifts from the parents of his pupils. These people were skilled in various trades and crafts. Some ran the flour mill, some were weavers, and others had small farms. Many worked in the pottery, for the clay from nearby pits produced excellent crockery. There were quarries nearby, too, where Carl as a child must have found his first fossils.

Excitement and glamor came to the whole countryside when the hunting castle was occupied. Built sometime between 1600 and 1700, its four corner towers added later, it was the seat of the Ducal forestry of the Duchy of Wuerttemberg. Here upon occasion came the Dukes including the King with their friends, to hunt in the great forests surrounding Schnaitheim and Heidenheim two miles to the south -- today a city of which Schnaitheim is a suburb.

Young Carl lived in this quaint old village until 1825 when Herr Rominger moved his family, increased by an infant daughter, to Waiblingen, not far from Stuttgart, where he had been engaged as Dean of the girls' school. Two years later, when Carl was little more than six, his mother died. The schoolmaster found it hard to care alone for his five children and the following January he married again. By the end of that year, 1828, his youngest girl had died and his new wife had presented him with a new daughter.

We know no more about this family until the spring of 1839. Then Carl, aged eighteen, was apprenticed to the pharmacist of Herrenberg, Friedrich Unckel, with whom he worked until the next October. A few weeks later, on November 9th, he matriculated at the University of Tuebingen as a medical student, commencing a lifelong practice of detailed notetaking.

He had not been there long before he fell under the spell of a geologist. Professor Friedrich August Quenstedt (see figure 7) was then thirty years of age and had been a member of the faculty for two years; his interest in the rock structure of the Jura Mountains was inspiring. During the next few years Carl Rominger managed to attend Quenstedt's lectures on mineralogy, crystallography, and other phases of geology, and often went with him up in the mountains, which were not far distant.

One such excursion -- an important one to them both -- is mentioned in a biographical sketch of Rominger published years later in Germany; translated, it follows:

> With Professor Quenstedt he took field trips in the Swabian Jura (Swabian Albs) and each time returned home laden with unusual things he had found. Both were enthusiasts. Once they were tramping together in the mountains and saw at the same time a rare specimen. Rominger, younger and quicker than his teacher, reached it first and went home jubilant with his prize. He was very proud of it, yet he soon presented it to his beloved teacher.

This friendship between the professor and his pupil remained a warm one until the former's death in 1889.

The fascination for geological matters, however, did not prevent Carl Rominger from attaining his original goal -- that of becoming a doctor of medicine. In 1842, then twenty-two years old, he received the medical faculty's academic prize for successful investigation of a difficult scientific problem he had undertaken during 1841-1842. On May 15th, 1843, he passed the first State medical examination in medicine and surgery, and two days later the oral examination for a medical doctor's degree.

These exams out of the way, he was able to attend Quenstedt's lectures on geography. He had been engaged as assistant in the Chemistry laboratory in February, 1843, for which he was paid 150 florins a year by the State, and he now belonged to the Guild of Mineralogists, Geologists and Paleontologists of which Quenstedt was a member.

Meanwhile he was spending considerable time at the Mayer home in Tuebingen. Carl Friedrich Hartmann Mayer, who had been Superior Court Judge in Waiblingen, had moved in 1842 to Tuebingen where he was again on the bench. Since he was a poet of distinction as well as a judge, his house was a gathering place for interesting and talented people. More than that, he had seven interesting, talented children. One of these, Friedericke -- known intimately as Rickele -- had known Carl Rominger in their Waiblingen school days. She was six years younger than he, and charming, and she provided him with a goal greater even than medicine or geology.

He still had the dissertation for his doctor's degree to submit. Its subject, strangely, had no connection with the field of medicine but, as its title shows, discussed the "Comparison of the Swiss Jura with the Wuerttemberg Alb."

In 1845 Carl Rominger received the Academic Prize given by the Faculty of Philosophy for another paper dealing with the prehistoric coast of the Sea of Lias in the area near Tuebingen. The next year, on the 23rd of January, 1846, he was presented with his diploma as Doctor of Medicine; his dissertation was published soon afterwards in Stuttgart -- a slim volume of just sixteen pages.

FIG. 1 -- Schnaitheim, as it appeared on February 12th, 1907. This photograph and the others of the village were sent by Mr. Eugen Straessle, to whom we are further indebted for his extensive research into the early history of the place. This view to the north shows that few new houses had been added by this date. The church, here provided with a spire, had previously been surmounted by a dome and was much lower. The sign on the schoolhouse reads "Gasthaus, Metzgerei, u. Weinhandlung zur Hohen Schule -- Johann Stahringer" -- the hotel, butcher shop, and wine store of Herr Stahringer.

By this time the young doctor had travelled over much of Germany, Switzerland, Bohemia, and the Tyrol, studying geology and collecting fossils. He hoped now to take a two-year journey through France and England to see in place the geologic structures and formations he had read about. Upon the recommendation of the medical faculty, in January, 1846, he was granted 500 florins for one year by the Ministry of the Interior, with the promise of a smaller amount for a second year upon receipt of a report on his work as well as his official request.

There had been much political agitation throughout Germany in the 1840's and by 1847 groups of young Democrats had formed in many of the universities.

FIG. 2 -- Schnaitheim, as it appeared on February 12th, 1907. This is the view looking east along Kapellstrasse (Chapel Street). Many of the old houses had a second story added to them by this time. The old "Hohe Schule" building is at the left. Mr. Straessle comments in his letter (translated from German): "The second little building is a small brew-house belonging to the Hohen Schule. At the corner of the house stands the 'Laternenputzer' (lamp-lighter). He was the man who lighted the lamps at evening and extinguished them in the morning, in a time when there were no automatically lighted gas-lights. He was responsible also for cleaning them as need be. He liked the place by the Hohen Schule, for he was allowed there to satisfy his thirst with no charge."

Carl Rominger belonged to one of the forbidden student organizations and he worried, of course, about the continuation of his government subsidy.

Suddenly Europe burst into flames. A revolution, begun in Sicily in January, 1848, spread rapidly to France where on February 24th Paris succumbed. When news of this reached Germany, rioting became general. The old ministries in Wuerttemberg, Baden, Bavaria, and four other small states in the southwest of Germany were overthrown.

The situation had become acute for young Carl. Some of his friends, fraternity brothers, were forced to leave the country and he decided, wisely, to go to

America. This meant leaving Rickele but he hoped only temporarily. After arranging for the care of his precious fossil collection and saying his sad farewells, he hurried away from all he held dear.

He left Bremen on a sailing-vessel in April, 1848, arriving in New York seven weeks later.

Life in the New World was very different from that he had always known, and so were his circumstances. He was almost penniless and without friends, and his knowledge of the English language was so limited that he had trouble understanding or being understood. He had a profession, however, and he was resourceful.

After making his way south through the eastern states, he crossed the Ohio river into Cincinnati. Here, attracted by the fossiliferous rocks on which the city was built, he stayed for a few months before moving on to Chillicothe, Ohio. This seemed a better place to settle and to begin practicing medicine among the German residents. He needed money and he needed it badly.

He must have prospered for in November, 1854, he returned to Germany to marry his Rickele.

II

1854-1860: MARRIAGE -- LIFE IN CHILLICOTHE, OHIO -- NEW HOME AND FRIENDS IN ANN ARBOR, MICHIGAN

The arrival of the bridegroom from America in early November caused a flurry of excitement in various parts of Wuerttemberg. This was especially true in Waiblingen, his old home, and in Tuebingen where, in the household of Judge Mayer, preparations for the wedding were well under way.

Among those who called there to meet the young man was Justinus Kerner, physician and poet of Weinsberg and a friend of the Judge's. He gave his impressions in a letter dated November 8th. The betrothed, he wrote, "is not exactly a beauty; he looks somewhat weather-beaten and leather-toned, while she, more beautiful than ever in her happiness, blossoms in the charm of her youth."

In a second and later letter he remarked: "The day after tomorrow is Rickele Mayer's wedding. . . . Everybody likes and enjoys her future husband; he is a sound and fit human being. If she is destined to go across the ocean,

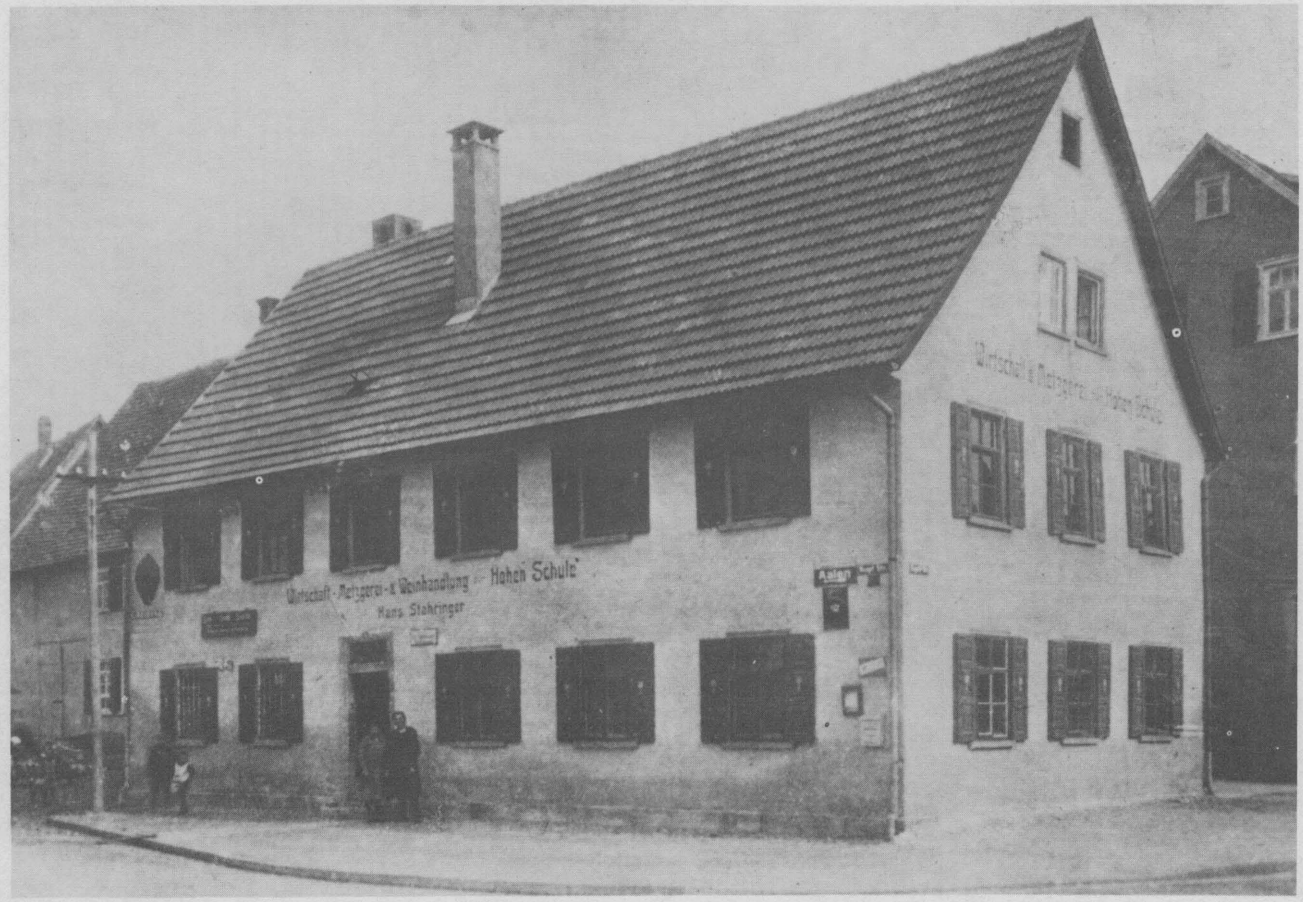


FIG. 3 -- Schnaitheim, about 1917. Progress had come to the village since 1907 (compare with figure 2); the lamppost was gone and a telephone pole had been added in front of the schoolhouse. Nevertheless, the building was still much like it was when Rominger was born there nearly a century before. From an elderly man who as a youth had worked under the father of Mr. A. A. Widmann, Mr. Straessle learned that the windows in the upper story were not originally divided into three parts. The Hohe Schule was renovated in 1824 and changed several times thereafter. In 1839, a home was built for the teacher, and his former quarters were divided between a third classroom and living space for the assistant teacher. In 1917, the sign says "Wirtschaft · Metzgerei · & Weinhandlung zur Hohen Schule -- Hans Stahringer"; it would appear that young Hans was carrying on the family business, only substituting a restaurant for the former (unprofitable ?) hotel part of the enterprise. Later, according to Mr. Straessle, the building received additional face-lifting through new first-floor shops. Soon, unfortunately, it may be wrecked to make way for a planned new road.

the going will be best with such a man."

It was truly a distinguished company of relatives and friends who gathered on November 30th, 1854, to witness the marriage ceremony. Emotion ran high;

FIG. 4 -- Hunting castle of the Duke on the Brenz River, Schnaitheim. During the hunting season, here assembled the Dukes, including the King.

joy was tinged with sadness because of the approaching separation. Six years had elapsed after the doctor's departure from Germany; even more time might pass before either of the young couple could return.

Among those present was Professor Quenstedt. He had sent as his wedding gift the beautiful ammonite he and his pupil had seen simultaneously one day while collecting together in the mountains and which had then so generously been given to him. Carl Rominger was touched to get it back and deemed it so precious that ever afterwards he kept it in a special place.

Most important of the wedding guests to the bride was her godfather, the distinguished Ludwig Uhland who ranked with Schiller as a popular poet. A life-long friend of her father's and without a child of his own, he was devoted to all the Mayer children -- most of all to Rickele.

At the banquet which followed the ceremony Professor Quenstedt proposed a toast to his former student, the bridegroom, after which Herr Uhland made a tender speech to his pupil, the bride. He said he must release her from his

FIG. 5 -- Archway leading to the churchyard, Schnaitheim. Through these portals passed young Carl Ludwig Rominger. The grille gates were added some years later.

FIG. 6 -- Hunting castle of the Duke, with its prominent four corner towers, on the opposite side of the Brenz River from the main part of Schnaitheim.

care because she was leaving for the far west with her husband; he was, however, turning her over to the much better care of the Heavenly Father.

Upon their departure for America on December fourth, Uhland dedicated a poem to the bridal couple which he entitled "On the Voyage." Translated, it reads:

> At midnight on the pathless far-stretched sea,
> When all lights longest on the ship are dimmed
> And when in Heaven nowhere shines a star,
> Then glows a little lamp still on the deck --
> A wick, secure against the stormy wind --
> And ever keeps the helmsman's needle bright
> That points his course infallibly for him.
> Yes, if we watch, through every darkness glows
> A light that quiet burns within the breast.

This poem, subsequently printed in the Anthology of 1860, had a wide circulation in Germany.

So, with the bride's household linens laid carefully in the great ark-shaped chest that had been in her family for generations, with letters and clippings to remind them of the wedding, and with many gifts including the treasured fossil packed against harm, they sailed for the United States and their home in Chillicothe, Ohio.

FIG. 7 -- Professor F. A. Quenstedt (1809-1889), of the University of Tuebingen. He is reported to have taught paleontology at the University for over fifty years, from 1837 until his death at age 80. He had a profound and permanent influence on the life of Carl Ludwig Rominger. This photograph and those of Barrande and Hall (which follow) were cherished possessions of Doctor Rominger.

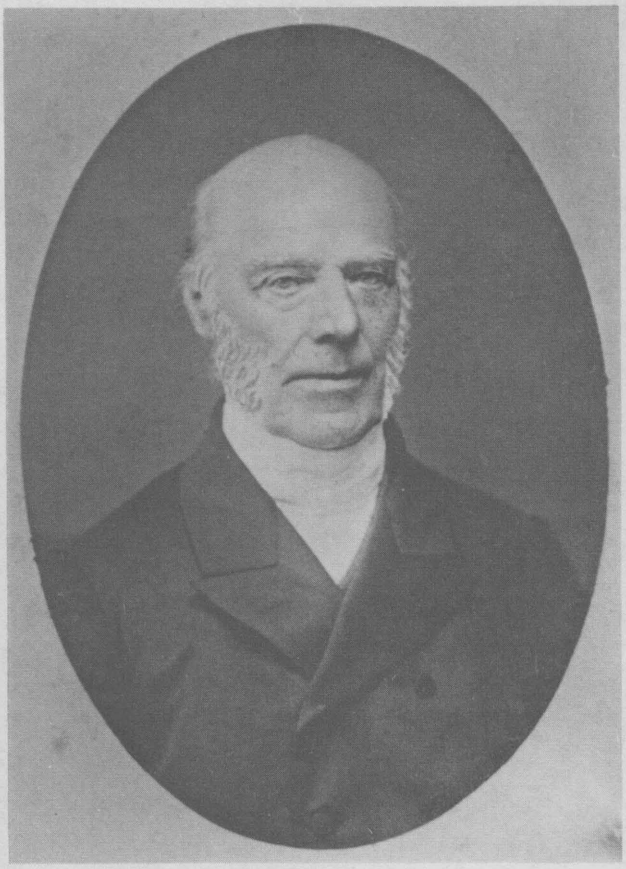


FIG. 8 -- Doctor Joachim Barrande (1799-1883). This photograph was taken when Barrande was 82, and a copy sent to Rominger. One may surmise that the masterful Barrande was secretly proud of the success coming to the younger paleontologist in America, remembering the time years before when he had provided him with a letter of introduction to James Hall.

The doctor had described that home to his fiancee in a letter the previous July. "It is a small brick house with a large room and hallway below and two rooms above," he had written [in German]. "The whole is so arranged that with little cost I can build onto it in the rear four additional rooms as soon as there is need for them. Attached, you find a small laboratory which can in a wink be turned into a kitchen, and at the rear of the place there is a spacious shed. The yard I have filled with several flower beds; around the whole property is a high wall so that we have a completely enclosed private Paradise.

"If we wish now in the customary way to begin housekeeping," he had continued, "then necessarily I must build at once. Another way, and in certain respects the most agreeable, would be this -- that we do not bother with cooking and eat in a very good hotel which is only three steps distant from us; that is a custom prevailing in this country. You would then take possession of the two upper floors for yourself and I would have my office beneath. We could then put to practical test the truth of the saying 'There is room in the smallest shelter for a happy loving couple.'

"But I leave to you everything about the house -- as you like it. Your wishes are mine. Take no notice at all of all my plans and give me candidly your own opinion. Moreover, ask me about everything that at the present moment I am forgetting to mention."

There is no record of her reply; the doctor did not save letters. It seems unlikely, though, that she would not have wanted a kitchen of her own, and home-cooked meals.

As for Chillicothe, it is situated on the west side of the Scioto River in southern Ohio, sheltered by hills. In 1854 it was a thriving community, with an important ship-building industry supplying the Chillicothe-New Orleans river trade, and with mills for the production of paper, flour, and cereal. In every way it differed from the old university town of Tuebingen.

Rickele undoubtedly found it hard to adjust to all the changes, and she must have been lonely after being part of the gay Mayer household. Not only there but in Switzerland, the home of her brother who had been exiled in 1848, she had many friends among the illustrious writers and scientists of the day. One of these was Louis Agassiz, renowned on both sides of the Atlantic, who had become Professor of Zoology at Harvard in 1848.

All we know of the young Romingers during the next six years when they lived in Chillicothe is that two children were born to them -- a daughter Julie on July 9th, 1857, and a son Ludwig, later called Louis, on June 30th, 1859.

They moved the next year to Ann Arbor, Michigan, where they soon made friends. Washtenaw County had a large German population, most of it living in Ann Arbor. Indeed it lived in a town within a town -- a community centered south of Huron Street and west of Main, where the German language was spoken, German music played by German bands, and the German customs continued. Many of these people including the Manns and the Allmendingers, the Eberbachs and the Hallers, like the Romingers had come from Wuerttemberg.

They bought a house at 315 South Fifth Avenue not far from the German Lutheran Church of which they became members. The one-story cottage was complete with doctor's office; although it was to change over the coming years to fit the family's needs, its atmosphere remained always warm and cordial.

There being no other German doctor in the whole of the county, Carl Rominger's practice thrived and grew, and his horse and buggy became a familiar sight in town and in the surrounding farm country.

On November 19th, 1860, Rickele finished a very long letter she had started and put aside in August. Writing to her family at home, she described Ann Arbor and told them about the two children. Excerpts from her letter follow:

> From the date line of this letter you can see that we left Chillicothe and the State of Ohio to come north. Whether we did right only time can tell because up to now our hopes have not quite materialized. However, according to all assurances things must still improve. In Chillicothe life no longer looked good, with continued unemployment and poverty, while in general people enjoyed better health so both the practice and income of the physician decreased.
>
> It is well known that Ann Arbor is a veritable garden where each home is located amidst the green of trees and flowers, a place to get used to easily. In addition to this there are many Swabians who, even if one does not exactly like all of them, arouse a feeling of being closer to the old home country. Among them are really nice people with whom we already enjoy good friendship. For example, there is Mr. Widemann from Stuttgart, a relative of mine, though neither he nor I know how we are related, at whose home we stayed four days after we occupied a room in a hotel for the first week and had to pay 21 dollars.
>
> But even more agreeable we find the Mann family from Stuttgart whose son runs the German Pharmacy and who has daily contact with Rominger. The old ones with their children were the first German settlers here in Ann Arbor about 35 years ago. At that time the little town had barely 200 inhabitants, and now 6000 of which one-third are Germans. They assisted many immigrants with money, living quarters, and good advice by which their start was made easier for them. Today the family enjoys the general esteem and love of both the Germans and the Americans. Last year the old ones celebrated their Golden Wedding Anniversary with the large circle of their children, grandchildren, and great-grandchildren and they are today still quite gay and vigorous. Mr. Mann is of your age, dear father, and still, as his hobby, does the heaviest work out in the fields, and even though he is stooped due to his age he still always looks healthy and robust. I also met old acquaintances in the person of dyer Rupf and his family from Tuebingen, the first acquaintances from the home town I have met since I am here in America. . . .
>
> As far as we ourselves are concerned, through our moving we have at least up to now the advantage that we all feel much better and are much healthier. The children look very different and this is particularly noticeable in Ludwig. . . he now makes efforts to talk. It is funny, for instance, when I come through the door with the milk that must be picked up by one of the old ones and he shouts to me "guten Abend!" with a curtsy. Or when the little fellow shouts "hurray for Lincoln!" which Julie learned before the presidential election and still uses sometimes today, and he joins her.
>
> Julie is quite fond of the large space around the house. She converses often with the pictures of her grandfathers and aunts. Then I must enumerate again the names of all the other aunts and uncles which by now she knows fairly well. . . .

> Since last summer there are again new photos of the children scattered around, meant for the two grandfathers. So far there has been no safe opportunity to send them off. If only they could travel over themselves and see their grandfathers and aunts in person and enjoy their love!
>
> Is Gustele still in the family home? or do you plan to light the Christmas tree this year in your own home? Most likely you will spend the holidays again in the beloved Herrenberg and I only wish that our letters would arrive in time for Christmas Eve so that you could think of us with love and without concern. . . .

The letter ends with tender messages to all her "dear ones near and far."

III

1860-1870: CARL ROMINGER AS PHYSICIAN, ASSISTANT CURATOR IN THE CABINET OF NATURAL HISTORY -- JAMES HALL -- EUROPEAN FOSSIL COLLECTION

From Dr. Carl Rominger's standpoint Ann Arbor was an ideal place to live. Besides providing him with congenial patients, transplanted like himself from Germany, the city offered him numerous opportunities to further his interest in geology. The topography of Washtenaw County was the result of the Pleistocene ice sheet which had left the huge glacial erratics seen on the Ann Arbor lawns, as well as countless smaller ones in Michigan. While many of these boulders were Precambrian granites and greenstones or other igneous and metamorphic rocks, some were Paleozoic limestones and dolomites containing fossils; all had been scraped from bedrock in the north.

Often when making calls in the country Dr. Rominger would stop to look at field stones and, recognizing bits of Silurian or Devonian fossils on their smooth surface, would take them along to examine later. It was not unusual for him to arrive home with his buggy loaded with stones which, after being cracked open with a hammer, might be found to contain fine fossils. Proof of this is a list of the brachiopods in his collection; it contained "numerous specimens, most from boulders found in the drift of Ann Arbor."

Far more important to him than these glacial boulders, however, was the University of Michigan, only a short walk from his house. In 1860 it had nine buildings, and a total of 526 students. And it had a museum. Known as the Cabinet of Natural History, this Museum was located in a remodeled dormitory room of old Mason Hall; it was presided over by Alexander Winchell, Professor

of Botany, Zoology and Geology.

Dr. Rominger was delighted to find he could help Professor Winchell with the museum work. This was doubly rewarding; the sum of $75 was appropriated by the Regents of the University in 1861 to pay him "for services rendered in the Museum."

Meanwhile he was carrying on a stimulating correspondence with one of America's foremost geologists, James Hall (see figure 9). They had met in 1849, according to Hall's biographer, John M. Clarke, who wrote that Rominger had gone then to Albany to call on Professor Hall, armed with a letter of introduction from one of Europe's foremost geologists, Joachim Barrande (see figure 8). Hall, in his thirties, was already Palaeontologist of the State of New York and had published the first impressive volume of his "Palaeontology of New York." He and young Carl Rominger, aged twenty-nine, had much in common -- the same profound love of fossils, the same keen mind, and the same driving energy.

They became lifelong friends and correspondents. Many of Dr. Rominger's letters to Hall are now at the New York State Library in Albany; unfortunately he kept none he received from anybody.

Dr. Rominger seems to have penned his letters with precision. Perhaps it was lack of time that accounts for the occasional lapse into the German word order, but that only adds to their charm. In a letter dated December 31st, 1862 -- his forty-second birthday, incidentally -- after a discussion of the internal structure of the brachiopods he was sending Hall, he wrote this sentence:

> In answer to your question if I would like to make next summer a geological excursion, I must tell you, that I could not spare under any circumstances, more than two weeks at a time, because it would injure so much my medical business, but for a week or two I am always ready to go with the greatest pleasure, let me hear a proposition as soon as you think it convenient.

His "medical business" did not prevent the pursuance of his paleontological research. Somehow he found time to write a short paper on the "True position of the so-called Waukesha Limestone of Wisconsin," which was published in the November, 1862, issue of the American Journal of Science. It was attributed, alas! to Dr. C. Rominga.

In June, 1863, he made a quick trip to southwestern Ontario to see some of the fossiliferous Middle Devonian outcrops. His notebook contains a sketch map showing Sarnia, Kettle Point, Widder -- a village then situated about a mile east of present-day Thedford -- and the "River aux Sables." The notes, pencilled in German, contain a long list of the fossils he collected there.

The Romingers' third child, Marie, was born on July 23rd, 1863. On that day, so the late Miss Lela Duff wrote in her history of Ann Arbor, the proud

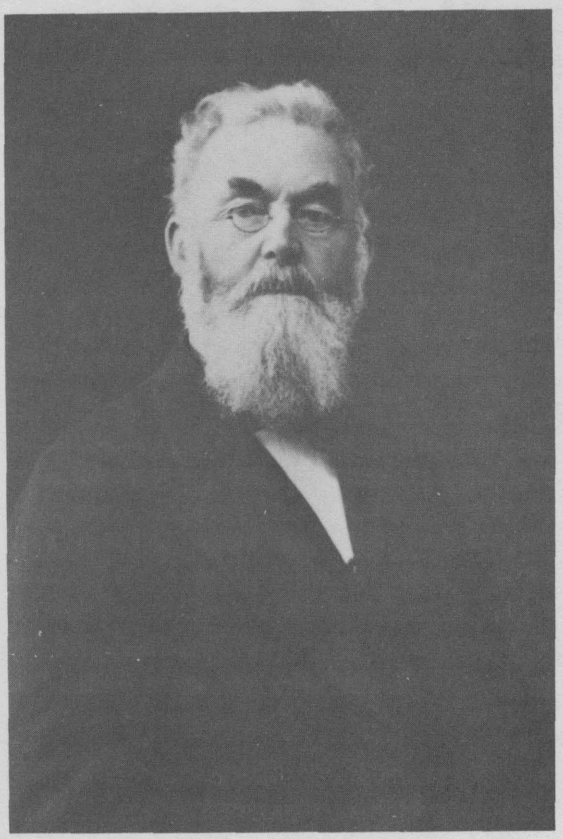


FIG. 9 -- Professor James B. Hall (1811-1898), the Father of American Paleontology. Rominger maintained correspondence and exchanged ideas with him through the many years of their acquaintance. The lasting friendship was based on mutual respect for their paleontological achievements.

father "planted an elm tree on the lawn extension, which grew with the house and outlived her."

Almost immediately after this he must have become a hazard in that house with its new baby and two other small children. A letter to Professor Hall dated September 9th, 1863, begins:

> Your friendly letter of the 5th Sept. I received yesterday. I am sorry to learn from it your long during illness by a sore ankle. Also I have been troubled since 7 weeks by the whooping cough and am not clear of it yet. Besides this detention I was so much professionally engaged that for three months I had no time to think of Paleontology. Since a few days times seem to have become a little more healthy and so I have determined to leave to morrow for Thunder-bay after my return I shall report you of what I have found and seen there. If possible I will this fall see yet the Eighteen mile creek localities. you would oblige me very much, by writing me some special directions, where to go and find the principal points of interest there. . . .

Dr. Rominger went the next day by boat from Detroit to the Alpena-Thunder Bay area in northern Michigan, and after making a study of its rocks and a collection of its fossils, returned home rather indirectly, by way of Middle Bass Island, Ohio, and nearby places. He reported on this excursion and other

matters of interest to Professor Hall in a very long letter written two days before Christmas:

> I have to ask your pardon for not having sooner answered your last letter, in which you was so kind to give me information of the 18 mile creek locality, and proposed to meet me at Buffalo. I regretted it very much, not to be able to do so, without a grosse neglect of my professional duties. Only at the end of October I could make a hurried visit at the place. For one which has not seen yet anything of the Hamilton group no better place could be selected, to show it to him in its full developement; in compairing afterwards, what I had seen, with your description in the geolog. of 4th distr. I admired the correcteness of your statements. . . . I was so fortunate to find all the principal fossils, but scarcely any thing new. . . .
> In a few weeks I expect to receive the remainder of my paleontological collection from Europe, which embraces in particular Cretaceous and Jurassic formations. It is my intention to sell a part of it. Please let me know if you would like to acquire a fine suit for the Albany museum. It contains in particular many fine Brachiopods. . . .

Apparently Hall did not want anything for, according to Dr. Kellum's history of The University of Michigan's Museum of Paleontology, the collection was moved into the Cabinet of Natural History in the fall of 1864. Negotiations for its purchase, begun then, lasted for twenty-four years.

Dr. Rominger was Assistant Curator of that small museum from 1864 to 1866. In 1865 his salary was "increased to $200 per annum," with an additional $300 appropriated "to make collections in Natural History, for the use of the Museum, in accordance with the plan proposed by Dr. Rominger in his paper, and to be approved by the President and Professor Winchell."

Dr. Rominger used this money well. He made twelve collections of fossils from Michigan, New York, Ontario, and Indiana -- 320 species of Ordovician, Silurian, Devonian, and Mississippian age.

On April 7th, 1866, Mrs. Rominger sailed for Europe with the three children for a visit to her family -- possibly the first since her marriage. After seeing them off in New York, Dr. Rominger went to Albany to talk fossils with James Hall for a few days before getting back to his patients.

It was an interesting and varied life he was leading. He had recently finished writing his second paper on geological matters -- a learned discussion of the fossil Chaetetes -- soon to be published. With a little planning he was able to take short trips to the famous localities of which he was hearing and reading so much, thereby adding to both his collection of fossils and his circle of friends.

Returning from an excursion to Ohio in May, 1867, he found a letter from James Hall. He answered it immediately, including this paragraph:

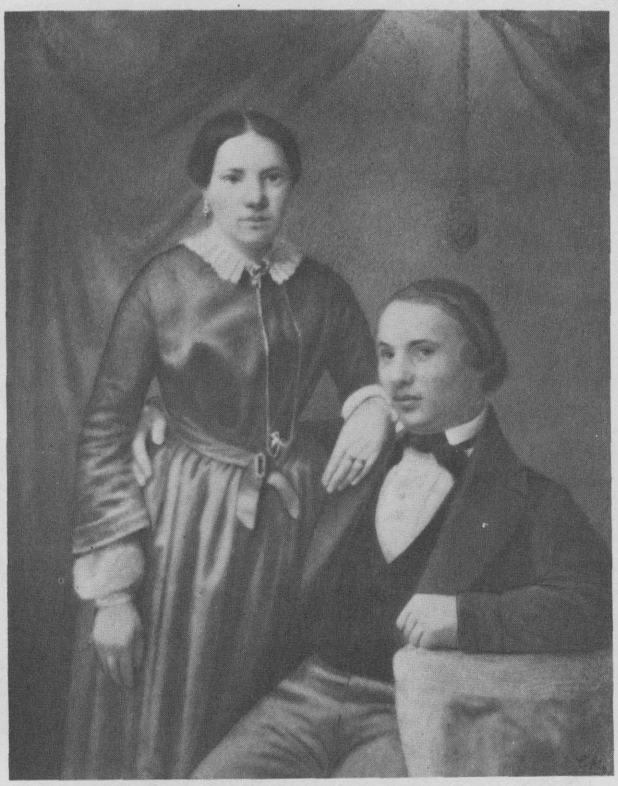


FIG. 10 -- Carl Ludwig and Friedericke Rominger sketched in 1854 in Tuebingen at the time of their marriage. Courtesy Mrs. Alice Rominger Covell.

Together with your letter I found a preliminary notice of the Iowa Geol. Survey in my box. One can see, in looking over it, with what a great importance the State Geologists of the west consider their merits of finding a few new species and how they take every oportunity to call one an other eminent paleontologists.

The notice enticed him, and in October, 1868, he went out to Iowa to collect some of the beautiful fossils being described from there, hoping, of course, to find "a few new species" himself. His own collection, in the University Museum though not yet paid for, was still of interest to Professor Hall. Witness the following letter:

Ann Arbor
23 Dezbr 1868

Dear Sir!

After receiving your letter inquiring about the price of my collection, I thought it fair, to make an other final proposition to the University of Michigan to purchase it and went for this purpose to Prof. Winchell. He asks me to wait until the next session of the regents of the University which must come of at the end of this month, and I promised him to do so. I will immediately write to you what they have determined after I know it.
My price for the collection is 1500 Dollars. You know yourself what labour and money it costs to gather a collection. My price is about 1/3 of my actual expenses. . . .

FIG. 11 -- Carl and Mrs. Rominger with their younger daughter, Marie, in 1865. Courtesy Miss Linda Eberbach.

At that meeting the Regents, noting that this collection was indeed an excellent one, resolved "that it is very desirable to secure the same for the University as soon as the state of our finances will permit." A year later it was decided to purchase "Dr. Rominger's Collection, at the price named, $1,500" -- the terms of payment to be agreed upon. It was years, however, before that finally happened.

The delay in being reimbursed must have been especially aggravating to the doctor because he was an astute business man. All the money he earned that was not needed for the expenses of his family or himself he put to work, buying mortgages or making loans at interest rates up to ten per cent, payable annually. The entries in his ledgers show his accounts to have been watched with care.

At about this time -- in 1870, according to Merrill (1908) -- through the recommendations of James Hall and other influential friends, Dr. Rominger was engaged as paleontologist by the Geological Survey of Michigan. Just what work this entailed is not clear; that it brought him great satisfaction is certain. He was entitled now to spend as much time on fossils as he could spare from his medical practice.

FIG. 12 -- Mrs. Rominger and the children in 1866. The children are Julie (9 July 1857 - 12 April 1921), Louis (30 June 1859 - 3 January 1936), and Marie (23 July 1863 - 7 August 1955). Courtesy Mrs. Alice Rominger Covell.

IV

1871 TO JULY 14: APPOINTMENT AS STATE GEOLOGIST OF MICHIGAN -- WORK IN UPPER PENINSULA ON PALEOZOIC FORMATIONS -- FAMILY REUNION ON MACKINAC ISLAND

At the time Carl Rominger became Assistant Curator in the University's museum, its Curator, Professor Alexander Winchell, was also the State Geologist of Michigan. He held that position until 1863 when, due to the Civil War, lack of funds caused the closing of the Geological Survey. In the spring of 1869 the Survey was reorganized. Winchell was again appointed its Director, and granted an annual appropriation of $8,000, half of which was to be used in Lower Michigan, half in the Upper Peninsula.

With the help of his brother -- N. H. Winchell -- a man named Wadsworth, and five other assistants, Winchell undertook to survey the Lower Peninsula. He assigned the work in the Upper Peninsula to two men -- Major T. B. Brooks, who was to examine its iron region, and John H. Forster its copper district. The latter was replaced the following year by Professor Raphael J. Pumpelly.

By February, 1871, the Board of the Geological Survey was dissatisfied with the way Professor Winchell was handling matters and in the course of several meetings requested that he change his procedure. This he refused to do and on March 21st, 1871, submitted his resignation.

The Board accepted it on April 17th, apparently without regret, and that same day Governor Baldwin appointed Dr. Rominger Director. Major Brooks and Professor Pumpelly were to continue their work in the iron and copper districts respectively, both of which were in the western half of the Upper Peninsula. Dr. Rominger was asked to investigate the Paleozoic formations; these rocks overlie the Precambrian in the eastern half of that peninsula and in the whole of Lower Michigan.

Dr. Rominger planned to begin his work in the Upper Peninsula since a complete report of that part of Michigan was wanted at the end of the year. His territory here had an area of more than 8,000 square miles, being about 175 miles from east to west, and 50 miles from north to south. He was not daunted by its scope for he had great strength and endurance, and unlimited enthusiasm. He realized that he would never have been selected for the position had he not had such excellent training in geology and paleontology at the University of Tuebingen, and he was rightfully pleased with the appointment. Besides being an honor, it was the fulfillment of a dream. Now he not only could but must devote himself wholly to geological matters.

He made arrangements for the care of his patients and assembled the things he would need in his field work. The list in one of his notebooks includes a hammer, tent, packing straps and mosquito bar, writing materials and camp equipment, an India rubber cloth, and five pounds of tea.

Perhaps because everything he saw that year was new to him, Dr. Rominger filled five notebooks during the summer season of 1871. The daily entries are written with efficiency, little time being wasted on punctuation, paragraphing, or capital letters; excerpts taken from them are unchanged. For the most part in English, they are interspersed with occasional German and French words and passages.

These notes contain vivid descriptions of the almost unsettled country over which he tramped, and of his experiences in a small sailboat on the unpredictable Great Lakes. But they contain much more -- a sense of the excitement he felt and the danger he at times encountered. Never again was he to write at such great length.

On the cover of the first of these pocket-size leather-bound notebooks he inscribed "Diary from Mai 2, 1871," and with no mention of the parting with his wife and children, began as follows:

> May 2. 1871. at noon left Detroit on lighthouse steamer on invitation of Mr. Lederle assistant of the Lighthouse superintendent
> arrival at Port Huron Mai 3 at noon weather stormy preventing us from running into Lake Huron until Friday 5 Mai weather still very windy after having advanced about 15 miles beyond Forestville we had to turn back and could only proceed northwards again Saturday May 6. at noon that day opposite Pt. of Barques 9 p. m. opposite Sturgeon point lighthouse. Sunday morning 6 oclock arrival at Presque Isle. has a spacious port with about 15 feet of water. the spurr on which both lighthouses are situated has an elevation of about 20 feet. consists superficially entirely of limestone pebbles with a few boulders of granites and Diorites . . . but everywhere about 3 feet under the detritus the rock beds are found. they belong to the Corniferous limestone . . . containing some fossils partially silicified. . . . Nr. of locality I specimens labelled accordingly. . . .

Since the accumulation of rock samples and fossils grew heavier after each interesting outcrop, numbered seriatum, Dr. Rominger re-packed and shipped them to Ann Arbor whenever possible.

The lighthouse steamer sailed from Presque Isle early in the afternoon of Monday, May 8th, and arrived that night at Scammons Harbor on the south side of Drummond Island. While tied up there, Dr. Rominger visited several nearby islands; though he found no fossils worth keeping, he saw "pine trees of good size some of them 3 and 4 feet in diameter."

Departing on Thursday afternoon, they sailed to Mackinaw, then on to Pine River. Here the next morning he "took posession of the boat paid 10 Doll.

charges on it and left for Manitou" Island which they reached in mid-afternoon. The geologist spent the next few days while the steamer was being unloaded investigating the island.

On May 16th they "departed under strong head wind at 7 oclock p. m. During the night rather unpleasant rolling of our vessel"; however, it was "fine sunny weather" when they "approached Mackinaw landing" the next morning. There he bought some articles for the repair of his boat and, returning to Scammons harbor, had the boat put in order. On Mackinac Island on the 20th, Dr. Rominger engaged two men,

> one woodsman with 50 Doll. pr month and one boatsman with 40 Doll. per month. the day was spent in fitting up the sails and other deficiencies of the boat wind westerly so as to make it impossible to sail in that direction. . . .

Still grounded the next day, Dr. Rominger saw the Island thoroughly -- its rock precipices, Sugar Loaf hill, the fort -- and "made extensive collections of all the fossils I could find." Then on Monday, the 22nd, at 8 o'clock in the morning they "sailed out from Mackinaw against the wind. about 12 oclock we arrived in a bay on the opposite mainland about 2 miles north of Pt St Ignatz. . . ."

Due to the weather they had to remain until Wednesday when, at six, they departed with a favorable wind and sailed along the northern shore of Lake Michigan, arriving at Point Epoufette that evening. The next day, according to this diary,

> in the afternoon at 3 oclock I sailed out towards point Patterson but after we had made about 4 miles the wind got contrary and a dense fog came over us so we turned back and with great trouble and danger we finally succeded in passing the strong breakers before the river where we lay over in safety.
>
> Freiday 26 Mai. early in the morning fogy at 6 oclock clearing up. not much wind at seven oclock in the morning going out again weather now sunny. lake quiet. after sailing about 5 miles in 3 hours suddenly a contrary wind and turbulent sea sprang up so that we had to run in for shelter in a Fisher hut. . . . the shore all the way up is very shoal and even for our boat not approcheable. . . .
>
> Saturday 27 Mai. at $3\frac{1}{2}$ a. m. we sailed with good wind from Fischery. . . passed Point Patterson. . . went on to Pt. Seul Choix where we arrived 9 antimerid. all the land along the shore is low with sandy banks. . . . at 12 oclock ready for departure. the rock exposures continue about 1 mile and $\frac{1}{2}$ then all the shore is again surrounded by Sand bluffs until Manistique river. we sailed there by good wind in 3 hours. . . camped on the west side of the river.
>
> Sunday 28. at six we started in north westerly direction on foot crossing secs. 12 and 2 in the diagonal line to the big bend of the creek where the water rushes with velocity over flat ledges of Niagara limestone. the land is all a low swamp with inferior pine and tamarak timber. we followed up the creek to its mouth into the lake and crossed it on logs. . . . the east side of Manistique

or properly called Indian lake up to about 1 mile this side of Smiths creek which enters the northern end is an outcrop of Niagara limestone. it is high land about 15 to 30 feet above the lake and overgrown with fine beach and maple trees a mile before reaching Indian creek the land suddenly becomes low a regular cedar swamp with some large Hemlocks and a few white pines on the more elevated portions the shore is sandy. and the land along the creek which we followed for about 3 miles is a almost impenetrable swamp. the swamp is only in a few places exhibiting some iron colored sand all the rest is white sand under the black vegetable crust. . . . the road up to Indian lake leads through wet swamp land which one can only cross by walking on rails. I made arrangements with the managers of the saw mill to carry our bagage up the river until the obstructions by saw logs are overcome and from there to continue the travel by a canoe up the branches of Manistique river. . . .

Monday 29 mai. left Manistique saw mills transporting our bagage by wagon to the mouth of Indian river into Manistique. here we took Canoe and paddled up the river . . . about half a mile below the entrance of Ind. river there are rapids in the Manistique with rock ledges of the Niagara group exposed. the river is at least 150 feet wide and deep, with tolerably rapid current and forming innumerable meanders. . . . without exactly knowing the spot where we landed we encamped and got through the night almost killed by musquitos.

Tuesday Mai 30 we set out again at 6. . . about 4 oclock we arrived at the fork of this branch river in two arms and encamped on the land tongue between the two rivers both rivers are as large yet as Huron river at Ann Arbor. . . .

Wednesday 31 Mai. a terrible night it was. miriads of mosquitos tormented one in an unsupportable manner I could not sleep at all and had to defend myself continuously from their furious attacks without success. at 3 oclock in the morning we broke up encampement left part of our things with the canoe and started northwards on a lumber road along the principal easterly branch of the fork we proceeded through Pine lands mostly burnt out. . . I did not meet with enough good bog iron ore to bring home a cabinet specimen of it. . . . arrived at yesterdays camp at 3 oclock or $3\frac{1}{2}$ we took the boat down river again and in $5\frac{1}{2}$ hours arrived at the principal stream of Manistique river having encamped about halfway down and being terribly treated by mosquitos

Thursday Juni 1 left camp $\frac{1}{2}$ passed 4 a. m. and entered Manistique river at $6\frac{1}{2}$ a. m. after having encamped half way down the side stream terrible musquito plague

....

Freiday 2 Juni Did not sleep at all passed night so furious were the attacks of the musquitos hands eyes ears all swollen and no possibility of a seconds rest millions surrounding one in spite of fire and smoke. at 6 oclock we went back from the river bank which is about 15 feet high sandy and descended somewhat into a marshy cedar swamp. . . . I went through this almost impassable swamp to sec. 36 but could not detect a trace of bog iron ore deposits and so returned to camp at 2 oclock and departed immediately after arrival northwards along the river. . . .

From the succeeding entries in the diary it is apparent that during the next days Dr. Rominger continued to search for bog iron, and the mosquitoes to torment him and his men. On the 5th they arrived at the Manistique saw mills

where he "wrote to the Governor and home, asking their appearance at Mackinaw the 4th of Juli and sending word to the student that I will expect him in 10 or 12 days at Escanaba."

They sailed from there at four-thirty Wednesday morning, June 7th, observing the shore closely as far as Point aux Barques; this point, located about ten miles south of Manistique, must not be confused with the point of the same name on Lake Huron. As it rained very hard that afternoon, Dr. Rominger and his men "took refuge in a house near shore" and spent the night.

Thursday morning the weather was "cold but fair"; they sailed shortly after seven, stopping at each promontory they passed to examine the rocks and collect fossils. Then they headed for the place Dr. Rominger had picked for their night's camp; a surprise was waiting for him:

> met Watsworth at our camping ground already encamped. his boat bears the inscript. Mich. Geol. Survey and is probably the boat belonging to me while mine of poorer quality is substituted. he also professes to have the tent belonging to the Survey not with him. . . .

The next day, June 9th, they entered the Sturgeon river. Dr. Rominger set out on foot alone to see the river's three rapids at ten, fourteen, and twenty-seven miles from its mouth up its tortuous course. He got as far as the first rapids that afternoon and encamped. Saturday morning, after a rainy night without benefit of tent, he went on for a while, then decided not to continue to the upper rapids and turned back, returning that evening to the mouth of the river.

> Sunday 11 Juni. contrary wind did not allow me to go out of the river and I had to remain all day
>
> Monday 12. Sailed out from Sturgeon river 5 oclock. . . . encamped in the bay opposite and south of Escanaba right a side of the perpendicular rock escarpement of 30 feet high^{+} and an extent of about $1\frac{1}{2}$ miles. in the evening a heavy storm suddenly came on and we had trouble to save the boat and contents from destruction. the storm lasted all night and Tuesday the 13 forenoon before the wind abated. . . .

Dr. Rominger had not wasted that time. He had examined the rocks along shore in both directions from camp and, finding slabs with Chaetetes in which he was greatly interested, took numerous specimens; contrary to later paleontologists, he considered it a bryozoan, not a coral.

On Wednesday, June 14th, he and his men sailed up Little Bay de Noc and entered White Fish River. About three miles from its mouth, in a steady downpour, they took refuge in an abandoned saw mill. It cleared overnight and

> Thursday 15 Juni started up the river with 4 days provisions left the boat in the river below the dam. . . .

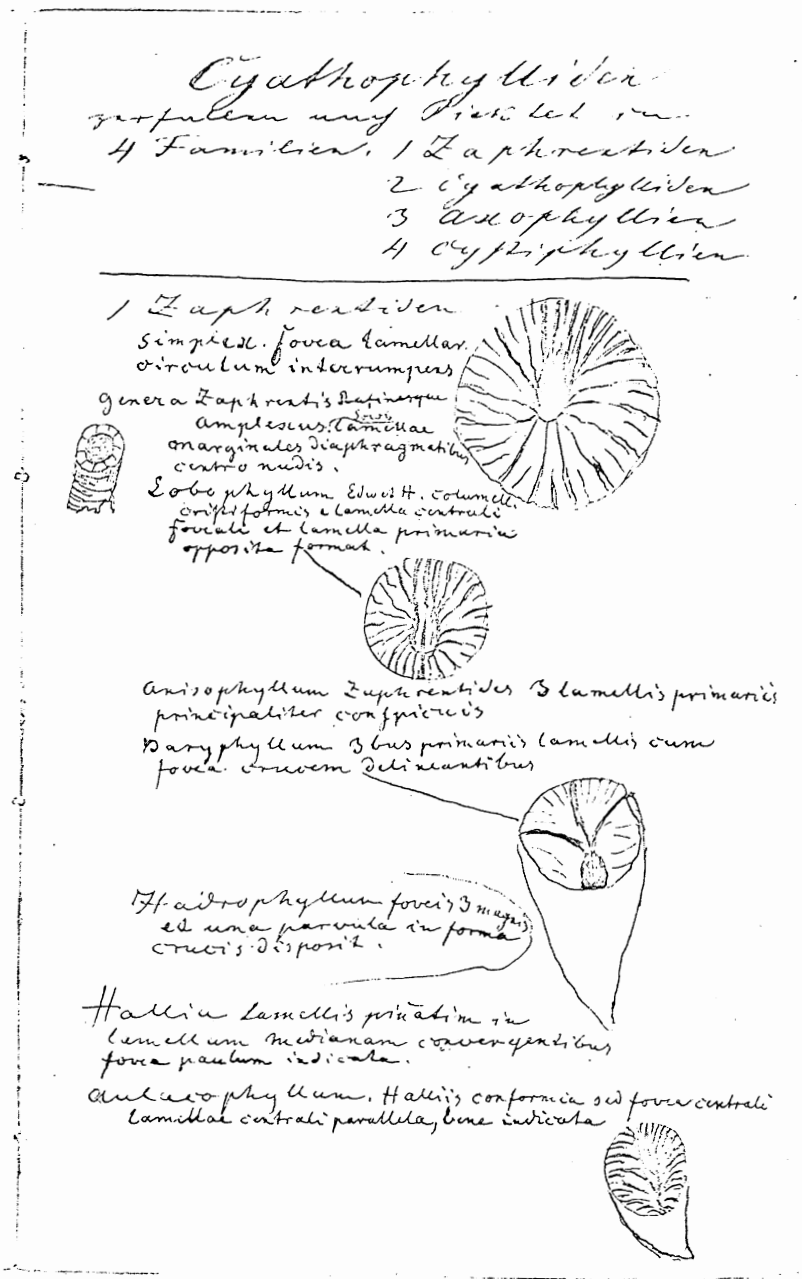


FIG. 13 -- Sketches and observations on corals from one of Rominger's many notebooks. The Michigan Historical Collections of The University of Michigan.

and departed to investigate the back woods; the weather was clear but nippy.

> Freiday 16 Jun. this morning at 5 oclock I was surprised to see all objects covered with Ice crystalls the sun soon melted them away but I noticed some previous days that frosts at this season are here very common. the young tops of fern leafes ectr. I found in exposed places invariably frost bitten. . . .

From then until sometime Sunday he tramped over hilly land and through swamps, or paddled up the river and back in his boat, writing pages of technical descriptions about what he saw. He then "proceded by land to Escanaba sending the man with the boat ahead" -- the distance by land, he added, was "about 14 or 15 miles." The man with the boat had all the rock specimens collected since the preceding Thursday.

Dr. Rominger got back to Escanaba at "5 oclock in the evening the boat had not arrived that evening and nothing is to be seen of it yet," he reported. "Mr. Marck [the student] which I expected to find here has not arrived nor any letters. . . ."

Monday his luck was better. The President of the Escanaba and Negaunee Railroad gave him a pass and he was able to make arrangements for another boat on which he later would descend the Escanaba River. That done, he took the train to Marquette to meet Major Brooks. Again his plans miscarried for on

> Tuesday 20 Juni. 8 a. m. returned to Negonee having failed to meet Mr. Brooks in Marquette as I expected. . . .

At Smith's mine, apparently not far from Negaunee but 44 miles from Escanaba, the man was waiting for him with the second boat. Together they transported it six miles overland to the main branch of the river by means of a wagon and team of horses; nothing is said of its size or character.

> Wednesday 21. started down the Escanaba river about 5 oclock over brisk rapids and granit rocks for the first mile then the river enters a level country. . . timber pine most burnt out and mixed hardwood and cedar. after about 5 miles run the north eastern branch of the river enters constant rapids sometimes large granitic blocks in the river bed. about 6 miles from our starting point there are for the first time numerous limestone fragments mixed with the gravel exposed in the bank. it is an earthy arenaceous limestone in slabs of yellowish color which contain a lingula Rock specimens from that locality are marked 41. . . .

Dr. Rominger must have been writing constantly as his boatman guided the boat downstream on the ever-changing river. "Water at times running at a moderate rate at times in rushing velocity over gravel beds," he noted, and, miles farther, "the river runs in rapids over flat ledges of rock. . . the creek from the west flows in a very rapid course and rapids continue. . . again the rocks disappear and river flows quietly for about a mile then a series of very strong rapids begins."

It was much the same the next day. "Rapid run of the river," he wrote, and later: "we now approach big falls where the water rushes about 5 feet perpendicular over ledges. . . about $1\frac{1}{2}$ mile below the falls the strata continue to be about the same and so down to other still more considerable Falls then a descent of about 8 feet is made in which 7 specimens of rock are collected. . .

the river now runs for more than a mile with great rapidity through a narrow channel lined on both sides with rock walls 15 to 20 feet high. . . ."

All this time Dr. Rominger was making collections of rocks and fossils, with the boat's load growing steadily heavier.

> Freiday 23. . . the creek runs in rapids over rock ledges no exposures in the banks for $\frac{1}{2}$ mile below the entrance of the creek and slow run of the water then rapids again large rock beds in the river then falls of 3 feet. . . .

Some distance further downstream the rocks in the riverbank were excitingly fossiliferous. "I found there a whole Isoteles gigas in the stratum at the river's edge," Dr. Rominger wrote with understandable pleasure, and continued: "in the same horizon are numerous good specimens of orthis, Rhynchonella."

With the trip almost over, on Saturday afternoon he was rewarded by finding "a very large head portion of an Isoteles which must have been 4 inches wide." "At 4 in the evening," he wrote shortly afterwards, "I arrived at the mouth of the river making the way to it with great difficulty because the otherwise large river is in its rapid descent so low as to be entirely unfit for navigation even in the smallest flat bottom boat."

> Sunday 25 at Escanaba received letters from home arranging the packing up of the large stores of collected specimens.
>
> Monday 26 et Thuesday 27. engaged with packing my collections expenses for boxes and wrapping paper 3 Dollars. Paid to McCarty 2 Doll. Hotel bill for the two men 12 Doll. Hotel bill for me 8. 50 met with Mr. T. B. Brooks and arranged with him as last fall work a trip down the Menominee river meeting him at Marquette.
>
> Wednesday 28 Strong blow could not get out of port delivery of 6 Boxes of specimens to the Railroad Co. for transportation. Boxes Nro. 2 to 7. Thermometer in the morning hours 50. at noon 56. during sunshine. in the evening again only 50 degr.
>
> in the morning of the 29. at $\frac{1}{2}$ passed 5 it was 42^{0}. about 7 oclock we sailed out towards the bluff about a mile back in the bay from the lighthouse the Cincinnati shales et limestones as already described in coming up the bay [Big Bay de Noc] are there exposed in a bluff about 15 or 18 feet high. . . having passed the lighthouse burnt bluff presents its bold Niagara rock towards us. At 1 oclock we arrived there. . . .
>
> Freyday 30 Juni. contrarious wind cannot sail out during forenoon some little rain. very bad weather during afternoon and night.
>
> Saturday 1 Juli Wind does not allow going out ascended the bluff again. . . . in the evening at 4 oclock we sailed down the bay first with contrary wind afterwards with good wind, arriving at Point de Tour there was such a tremendous sea that we could not land so we had to proceed and after spending half the night with sailing till the wind dyed away we anchored and early in the morning got under way again so that

> Sunday morning the 2 Juli we was at Point of Barques taking breakfeast. . . . at seven a. m. we got under sail again pointing for Mackinaw. a little after 12 we arrived at Seul Choix where I received all the mail sent to me since my departure. . . .
>
> Monday 3 Juli. . . the wind was against me so I had to wait until 3 oclock when I started but with little success. we reached the shore about 6 miles from Seul Choix and encamped at the mouth of a creek. . . .
>
> Thuesday 4 Juli no wind, fogy we took the ore and rowed on towards Scotts point. . . . we passed Mille Coquins and Biddles Point sailing for Epouffetes harbor where we encamped at a fishing station. . . .
>
> Wednesday 5 Juli sailed out at ½ passed 5 a. m. had for a good while rain and no wind. then we had for a short intervall good wind which soon dyed away and we laid almost still arriving at Point de Chenes after 12 oclock. at ½ passed one we got a slight brise which allowed us to sail. at ½ passed 2 we were at the east end of St. Helena Island. . . the wind dyed away again and we had to row all the way to point St. Ignatz where we stopped on account of rain. . . .

Since Dr. Rominger's family was joining him at Mackinac, these delays must have been hard for him to take. The weather was still miserable on Thursday, the sixth:

> Continuous rain with southeast wind hindering us from going out. finally hired a experienced boat man to bring us to Mackinak my man failing to undertake it. we savely arrived in the noon time. provisions was all damaged by the rain so I had to throw away part of them. paid of the hired man and dismissed him from further service, 60 Dollars for 1 month and 17 days. the same day my family and mr. Mark arrived at Mackinaw.

How fast the German must have flowed as the Romingers told each other all that had happened since the second of May! The next day they took an "excursion around the Island" but, alas!

> the boat leaks very bad and is from everybody pronounced as rotten and dangerous so I sold it to Mr. Bromilow et Bates for the sum of 30 Dollars and bought a new boat of a little larger size for 225 Dollars.
>
> Saturday the 8. I had to unpack and dry all my specimens which was wet through. Necessarily there was to some degree an intermingling of specimens from different localities. it is therefore by unpacking necessary to preserve carefully the numbers on the specimens or other kinds of labels. Some are not labelled because they were all from one locality and easy recognizable. I expected my woodsman back in the evening but the vessel which had to bring him did not touch the place so I will be under the necessity to send for him in some other way not yet determined upon.

Although Sunday, July ninth, was his oldest girl Julie's fourteenth birthday, Dr. Rominger did not mention it in his diary. Surely all three children would have wanted a party; Louis was just twelve and Marie not quite eight. After writing a few sentences about the geological structures of the Island and describing some fossils he found, the little book was put away until Friday, July 14th.

On that day, the family reunion over, he started off to finish his field work. He had three strenuous months ahead.

V

1871, JULY 14 - SEPT. 14: ALONG LAKE SUPERIOR SHORE TO MARQUETTE -- STORMY WEATHER

With the men he had engaged to help him and with the student, Mr. Mark, Dr. Rominger sailed slowly to the east along the southern shore of the Upper Peninsula, around Drummond Island, then northward towards the Soo. He filled pages of his diary with descriptions of what he saw, collecting wherever possible. As he wrote on July 29th:

> we spent Thursday and Freiday exclusively in investigation and collection of a large number of fossils and finding the place so enormously rich. . . we remained Saturday to increase the collection and pack the stores of fossils we had accumulated. . . .

St. Joseph's Island, Encampement d'Ours, and Sugar Island had been examined by Tuesday, August 8th, when

> Mark left for Marquette loaned him 20 Dollars paid his hotel bill Paid Gibbins 57.70 cts. received from Governor 300 Doll. paid for boxes and hard bread 2 Doll.

The next day he "sent boy home with Steamer Arctic" and "left about 8 oclock for little lake 20 miles southwest on the Mackinak State road"; Gibbins, his woodsman, was with him. They passed through an area of burned timber and farms,

> then begins some woodland which is however also burnt out to the greatest extent through it the State road is cut on a straight line running nearly south until the distance of 11 miles or so from town then one stands in a chaotic wilderness there is said to be an Indian trail but in these burnt woods no one but the very distinguished backwoods man can distinguish it.

This was one of many areas burned during that hot dry summer of 1871, "the year of fires." The woods were like tinder by fall.

Dr. Rominger's entry of August 9th continues:

> the whole traversed district is covered by the red stratified clay which has in some places a blue color or in some places becomes more sandy and whitish. the elevated plain over which the road runs is in part swamp land but the swamp

> is dryed out now so that we were suffering considerable for want of water which we finally succeeded in finding by leaving the principal direction and going westward to a branch of Carp river where after following the dry bed we finally found a ditch with some cool water. also there the red stratified clay forms the surface. we arrived in camp about 4 oclock. Gibbins was half sick but I hope we will be able to proceed to morrow.

Gibbins recovered enough to permit a start the next morning "through burnt wood lands without any trail. about one and ½ miles off in that direction we struck upon a ridge with hard timber," and

> . . . we toiled our way through for several miles but finally returned because there is almost an impossibility to go through all this fallen timber without the least indication of a trail also all the Survey marks are destroyed by the fire so that I could not positively make out where I was. In the evening we returned to our yesterdays camping ground struck the creek to low down but followed it up to the old place. there are some beaver works along this creek but the upper part of it is perfectly dry where we encamped is the first drop of water in a kind of a pot hole. of bog iron as far as we went there was nothing to be seen. . . . several fresh cut saplings was laying around, so fresh that the leaves had not dried up yet this hot day.
>
> Freiday 11. returned to St. Mary found our road back to the State road with difficulty. . . . when we returned the clerks of the Postmaster had taken the boat from its anchoring place and badly used it so as to get every thing wet and the ropes and sails entangled. Paid hotel bill 2 Doll. for me and Gibbins
>
> Saturday 12 packed and shipped 8 boxes and 1 Fish barrel for provisions expended 8 Doll.
> hired an expert Indian Voyageur for 60 Doll a month to begin tomorrow the 13 Aug. boots for wood traveling 3 Doll. Hotel 1. 50 2 meals dto 1 Doll. Sugar 3. ham 1. 50 hard bread 5 loafs of bread 30

On Sunday they "sailed out at 8 oclock with fair wind" to investigate the Lake Superior shore of the Upper Peninsula, camping that night "at an old saw mill at the mouth of a small river this side of the Ind. reservation" identified later by Dr. Rominger as "Pendels saw mills." It was well they were in some sort of shelter for "through the night a heavy thunder storm with rain came on."

Monday they "proceeded along the coast," beyond Salt Point and Naomikong Point towards the Tahquamenon river. On Tuesday he "felt sick the night probably a consequence of Diet fault we had too many berries and milk. proceeded to Taquemena river." The entrance to the river was "lined with low swampy shores" and "the river is large and navigable for a Mackinak boat up to the first falls or rapids. we rowed up to the bend of the river where it turns from a westerly course into a northerly close above an island in the river and at the mouth of a clear spring like creek" they camped.

At last one learns the type of boat Dr. Rominger was using. A "Mackinac boat" has been described as an over-size canoe -- flat-bottomed, with pointed ends, propelled either by rowing or with a sail. Schoolcraft used one of these

boats in the 1820's for his expeditions on Lake Superior; Douglass Houghton and his men were in one when they were lost in the storm.

To return to Dr. Rominger's expedition:

> Wednesday 16 Aug. through the passed night heavy thunder and rainstorm morning bright we started about 7 [on foot] in southwest direction. . . and came out on the river in Town 47. R. 8 corner of Sect. 14 et 21. . . . water is in spite of the swamps very rare all the little branches of the creeks are at this season dry and the swamp land is also destitute of water enough only for a drink. . . .

Not all the ground was swampy, however; "there are among some good hardwood timber in this place a number of good thick white pine trees 3 and 4 feet in diameter also very big hemlocks and during the whole space we travelled over the large size of birch trees was remarkable I saw some over 4 feet in diameter. also beech wood was of fine growth."

The next morning they built a raft and "floated down the river" for two days -- not very successfully as there was little current and the river so low it was hard to tell which was the main stream and which the branches. Late Thursday they "entered a wrong branch where we encamped time being to late to return."

Sometime Friday they reached the falls which Dr. Rominger described as "perpendicular about 30 or 40 feet over sandstone ledges of a soft kind. . . the bluffs on both sides of the river at the falls are about 100 feet high." They "encamped about a mile east of the falls on a high maple ridge and proceeded Saturday 19 Aug. towards camp. . . . our provisions was at an end and we travelled over high hard wood timber land all the way to our boat following an angular line marked on the map."

> Sunday 20 Aug. rained very hard all night feel sick from diarrhoea and determined to make exceptionally a resting day, and to investigate the environs of the falls. . . .

On Monday they "went down the river by paddling" and "about six in the evening we arrived again at the mouth of the river where we encamped aside of the Surveying party consisting of 12 men." Dr. Rominger learned much from the surveyor and was able to get from him some badly needed supplies:

> Thuesday Aug 22 received 79# hard bread. 18# pork. 2½# tea. 10# of sugar at Taquamena river from Mr. Mason's Surveying party. paid subsequently 15 Dollars. about 9 oclock after a thunder storm with rain we sailed with fair wind towards Whitefish pt. but intending to stop at Mr. Masons place 4 miles this side of the point and not having to expect a shelter for the boat anywhere else we sailed into the mouth of Betzie river 7 miles from Taquamena and 9 miles from the point. it is there a secure harbor in the river but the entrance is difficult being all surrounded by sand bars. I walked along the sand beach up to Masons. . . . From there I walked up to the lighthouse where Mr Ashman the Lighthouse keeper cordially received me. . . . I saw for the first time extensive cranberry marshes from which the lighthouse keeper yearly collects

several 100 bushels of cranberries. it is a beautifull sight the berries are almost ripe on the delicate slender stems. . . .

Mr. Tipple whose son lives at the point informed me of the occurrence of considerable bog iron ore south of the Two-hearted river. . . . my men I left at the Betzie river encamped they will come up to the point tomorrow and we will proceed to the spot accompanied by Mr. Tipples son. . . .

Wednesday 23 Aug. sailed 9 oclock from the lighthouse accompanied by Mr. Tipples son. after having travelled about 8 miles the wind changed against us and with beating and rowing finally we succeeded in arriving at the mouth of two hearted river at night about 10 oclock but could not enter the river on account of its shallow entrance so we anchored outside but soon such a northwest wind and tremendous high sea sprang up that to save the boat and ourselves we had to go under sail again backwards to the Whitefish point where we arrived 6 oclock in the morning. both of the men got seasick and the half breed at once proved himself a terrible coward in whom I so lost all confidence considering such dangerous situations.

the coast all along offers to my boat no shelter and so nolens volens I have patiently to wait for favorable wind and opportunities to land. the whole coast is a dreary sand beach without any prospect of giving any further information of the geological structure below the surface.

Thursday 24 Aug. heavy west southwest wind sunny day. wind continues all day. along the shore I find with the pebbles some silicified fossils particularly Favosites which appear to be devonian forms. . . .
Bought of Mr. Ashman for 6 Dollars one barrel of Cranberries to be sent to Ann Arbor under my address 1 October or about that time.

Freiday 25 Aug. North west wind continues. no chance to get of. . . . At 5 in the evening the Steamer Arctic came along and we asked him for a tow to two heart river which was granted gratuitously. after sun down we arrived about 8 or 9 miles opposite the place and let go but having at first no wind to go with we only arrived late in the night at the rivers mouth. in the morning we forced an entrance into the very shallow mouth of the river which becomes deeper a $\frac{1}{4}$ of a mile upwards.

Saturday 26. at noon we were ready to start on a foot expedition to the bog iron districts. . . . we take the shore for about 5 or six miles and then intend to go southwest. we camped. . . on the lake shore. . . .

Sunday 27 Aug. sun rises bright at 5 oclock. windy all night. . . . the way leads through an elevated plain spreading out behind the bluffs. . . . a clear little creek murmurs down from the bank across and we took our rest there for dinner after having crossed the river on a log. at noon we proceeded south along the section line over high land. . . . we encamped on the margin of a high bluff boardering the creek as I suppose near the section line. . . . in some of the ditches and springs along the creeks there is a gelatinous iron oxid deposit but no where any bog iron ore as far as this. . . .

Monday Aug. 28. fine weather. at 8 oclock we travelled in a south and somewhat east direction. . . the whole distance is an open marshy sand plain sometimes with scattered Tamarack or balsam trees of small size. . . . the spots with ore immediately show themselves by being covered with low brushes and

no grass. in some places the ore crust is not more than a few inches thick. the thickest seen is about 18 inches including a thin intermediate sand stratum and the average thickness of the whole is certainly not over 1 foot. . . .

Thuesday 29 Aug. took our way towards the mouth of the river where our boat lays. we travelled north about 3 miles over open swamp plains. . . it began to rain when we entered the woods so that after about 2 or 3 miles further progress we stopped for the day a few hundred yards from the river running north into the 2 hearted river. the rain continued all day and all night so we continued our way next morning

Wednesday 30 Aug. under streaming rain crossed the creek followed it for about 2 miles crossed it again to its east side and pursued our north course. . . . finally we arrived at 6 oclock under a continuous stream of rain at our boat harbor. the whole route was through hardwood land with only a few swampy places. . . . we found 2 camping huts of Indian hunters where I collected a number of beaver skulls but most of them are fractured or the lower jaws were scattered and lost. also a number of beaver domiciles we saw. likewise deer was often seen in close proximity.
when we arrived at the lake shore the lake was immensely agitated and during our absence the waves must have run over the river bank and almost filled our boat with water so that everything was soaked in water and we could not even get dry clothes.

Thursday Aug. 31. the whole day was spent with cleaning the boat drying our effects and picking up some rock which we used as ballast stone since our Drummonds island trip

Freiday Sept. 1. west southwest wind heavy blowing thunder storm with hail in the forenoon. no chance to get away. collected fossils along the shore among which silicified Stromatoporas of great beauty. also a Phillipsastraea was found. . . .
towards evening the wind appeared to change in our favor but at sundown it was again from the west. . . .

Saturday 2 Septbr. remained at two hearted river

Sunday 3 Sept. sailed $\frac{1}{2}$ passed 8 out of the river with almost no wind. after slowly lingering ahead we finally got good wind and arrived at Grand marais harbor a little before 6 in the evening. this is a very good well protected place with deep water surrounded by low sandy beaches overgrown with pine woods.
. . .

Monday 4 Septbr. having stormy contrarious wind I determined to walk along the shore to Point au Sable round the bay of Grand Marais. . . .

Dr. Rominger had more time than usual for his diary. He noted among other things that day finding bands of "magnetic iron ore sand with garnets ectr." and drift pebbles with "well preserved fossils." Tuesday he wrote: "we had this day 3 thunder storms and rain continued all night with heavy blowing from the west," and on Wednesday: "west wind blowing hard sky clear. cold . . . Lake considerably arroused at noon yet and the wind blowing hard so that no possibility of getting away is for today. . . ."

> Thursday 7 September fine weather rough sea yet and north wind. cant risk to go of because there is no harbor before reaching Grand island. at 10 oclock the wind got to the northeast and we sailed out but returned after an hour because there was not wind enough to transport us to Grand island in day time. In the evening the wind sprang up excellent but we have to wait until morning. In the afternoon I visited the peat deposits on the shore and convinced myself of their younger date than the drift strata. . . .
>
> Freiday 8 Sept. having fair wind we sailed at 4 oclock in the morning and reached without trouble Point Sable and 4 or 5 miles further then a heavy gale set in coming from south west we held on to pursue our course until we had passed about 2 or 3 miles Chapelle river then the storm was so severe that we had to return to save the boat and ourselves so with difficulty we reached the mouth of Chapelle river where we landed on a sand bank. . . .

Dr. Rominger was taking no chances. He knew that Michigan's first State Geologist, Dr. Douglass Houghton, had been drowned with two companions on this lake. On the evening of October 13th, 1845, while Houghton and four men were sailing along the Keweenaw Peninsula towards Eagle River, the wind had shifted to the north and become a gale with high seas and blinding snow, forcing them to take in sail. The four men were rowing hard, with Dr. Houghton as usual at the helm, when suddenly the boat capsized. They managed to right it and climb aboard. Again they made headway. Then a huge wave upended the boat. Only two men survived; Dr. Houghton and two friends, with the whole season's field notes and all instruments, were lost.

This story must have been in Dr. Rominger's mind as they fought the storm now; the relief when he got his men and boat safely ashore must have been tremendous. He spent the rest of that day examining the strange rock formations along the shore, later describing and sketching them in his diary:

> Chapelle river comes in a fall of about 7 feet into the lake. on its east side the rocks are excavated in to a chapel like structure where from its name. . . I expected to see in the pictured rocks some red and white variegated sand stones as at point aux Sables but there were none. the shore is at this place full with peculiar translucid quarz pebbles striped Jasper and hornstone ectr. . .

The weather was no better on Saturday, the ninth, for he wrote:

> we had all the passed night severe wind which now turned to come from the northwest so that our boat was in danger. we had to unload it and pull it as far ashore as we could it lays now on its side half on dry land half in the water but I think it is safe.
> the storm continues all forenoon and we can do nothing but patiently wait for our chances to get away.
> provisions are now out except hard bread tea and sugar. . . .
>
> Sunday 10 Septbr. we raise our boat buried in the sand and set it on rollers to be ready for a start as soon as the wind allowes us. this forenoon we have west wind and little of it. the sea has quieted down. . . .

Waiting, Dr. Rominger investigated a large cavern washed out under a promontory -- "about 100 feet wide at the entrance and 400 or 500 feet deep," its vertical walls about 50 or 60 feet high -- and picked up stones on the beach. "Of pebbles I made a large collection having nothing else to do," he wrote; "they are very interesting objects for study." By this time the weather had improved and that noon, Sunday the 10th,

> . . . we launched the boat in the water loaded it and sailed of, with scarcely any wind so we slowly moved around the rock walls and had not made over 4 miles at sun set. Then with head wind from out the bay we finally arrived after ten oclock in the night at Munising landing. . . .

Monday Dr. Rominger looked over the country near Munising, replenished their supplies, wrote letters, and so on. They sailed the next morning for Grand Island, then on to Bay Furnace where he found a letter from Major Brooks enclosing the twenty dollars he had loaned Mr. Marks. The weather, he noted, "has finally cleared up but the wind is very unsteady and generally against us."

Sailing near Au Train Island on Wednesday, "the sea began to run higher and higher so that water splashed all over our boat so we determined to return." With a "fair wind" Thursday (September 14th) they made good progress and "arrived at Marquette at about 3 oclock just before a heavy gale rose."

All was well; the long slow trip around the east coast of the Upper Peninsula, begun in May, was over. In that time Dr. Rominger had seen much of the land lying between the two Great Lakes. He described it in his final report:

> The whole eastern Peninsula is an unbroken forest, having, except the lumbermen, no other inhabitants than some solitary trappers in the winter time; while, during the summer season, the fishermen take their temporary abode along the shore. Only a few of them have squatted down, and remain there all the year. Besides these there are a few migratory Indians.

VI

1871, SEPT. 15 - OCT. 23: FIRST GLIMPSES OF THE IRON AND COPPER DISTRICTS -- TRIP UP THE MENOMINEE RIVER -- COMPLETION OF THE SEASON'S WORK IN THE UPPER PENINSULA

On Friday, September 15th, the day after their arrival in Marquette, Dr. Rominger "packed up the contents of the boat" and Saturday

> dismissed John Boucher [the Indian he had engaged in St. Mary] from service paid him 68 Dollars for one month and 4 days besides 6 Dollars for a passage

> on the Steamboat Northern light he insisted on having the following day paid also but doing this by grossly insulting expressions I refused to do so because the boat after the clerks statement leaves this evening at 6 and will in all probability arrive at St. Mary tomorrow morning. Paid also to Ed. Gibbins for 2 months service up to Sept. 20 one hundred Dollars. Packed and addressed 2 Fish barrels specimens 5 boxes dto. wrapping paper 80 cts.

Having no further use for the boat, he disposed of it on the following Monday.

Marquette with its natural harbor was the port through which iron ore was shipped east through the canal at the Soo to the waiting markets. The ore, brought there by railroad, came from many mines located on the narrow Marquette Range that extended westward from Marquette for about thirty miles, through Negaunee and Ishpeming to Lake Michigamme.

Dr. Rominger was fortunate in finding Major Brooks, investigating the iron district for the Michigan Geological Survey, in Marquette and that same afternoon went with him to see "the outcrops of Huronian rocks near the Carp river." They were inclined at a high angle, some nearly vertical, the rock being "an alternation of well stratified Quarzites in places with distinct wave lines and of clay slates of various colors and hardness." At one outcrop on the shore Dr. Rominger made note of "the most beautifull exposition of the contact between these elevated rocks and the beds of the brown [Cambrian] sandstone deposited inconformably on and against them."

Iron occurs in these Huronian rocks; it is thought to have been deposited as sediment in the waters of the shallow Huronian sea of Middle Precambrian age. In general, the iron formations are stratified, layers of almost pure iron minerals -- chiefly magnetite and hematite -- alternating with thin layers of rock rich in quartz, such as jasper.

On Tuesday, the 19th, Dr. Rominger went by train to Ishpeming. At the Lake Superior Mine he observed various kinds of iron ore, some red and some brown; later, not far from the Cleveland Mine, he saw

> a high hill which consists entirely of erected layers of banded Jasper and alternating bands of Iron ore which exhibit in a beautifull manner numerous contorsions and bends.

Back in Marquette the next day, he "sent Gibbins of and paid him 20.75 cts. travelling expenses, board and 2 days wages." This necessitated his borrowing a hundred dollars from Major Brooks to tide him over till his money came from Lansing; he needed it for his own "travelling expenses."

He was anxious to see something of the Copper Country also while he was in the north. Professor Pumpelly had given him some helpful suggestions -- names of men who could assist him and places to go. He had learned that Michigan's native copper was remarkable for its purity -- the purest known -- and that it was found in great masses or fissure lodes, in conglomerates, and in amygdaloids. He knew, of course, that it was igneous in origin and Late Pre-

cambrian in age.

He took the boat Thursday evening, September 21st, to Houghton, arriving there early the next morning. At the popular Douglass House he met a number of gentlemen who were pleased to show him "the arrangements of the rock beds." During the next three days he visited mining properties near Houghton and some across the Portage River near Hancock.

On Tuesday morning, the 26th, a "very rainy day," he

> received from Mr. Foster some specimens of Kopper ore from Sheldon et Columbia mine and a specimen of arsenical copper from an other locality which was explored by Mr. Hill. afternoon paid for a buggy 3 Dollars to convey me to Calumet et Heckla mines where I arrived at 5 in the evening. . . . At the Calumet mines I visited Mr. Wood the superintendent which received me in a very cordial friendly way and will do all he can to make my visit as instructive as possible.

Mr. Wood did just that. Wednesday morning he had "his mining capitaine" conduct Dr. Rominger through the mines, then about 600 feet deep. He wrote in his diary that the hanging wall often contained "large masses of copper. The copper bearing rock is a conglomerate . . . in places nodules of almost pure copper of the size of a fist or man's head are found."

Thursday Mr. Wood took him to the Cliff Mine, about 12 miles to the northeast. On the way they passed a number of mines and at the Seneca "found in a quarzose gangue mass considerable of metallic copper of malachite with some red copper oxyd. the traprock near the vein is of amygdaloid character." The diary continues:

> beyond this mine the so called greenstone ridge which forms the precipices of the Cliff mines begins to rise and gradually to protrude in picturesque cliffs several hundred feet high. . . . ascending the cliffs we found our selfes about 1 mile from the lake shore. . . . the greenstone ridge is seen continuing in a marked crest to the northward every where presenting abrupt declivities on its eastern fall. . . .
> after inspection of the situation of the mines and the character of its rocks we returned and arrived at 2 at Calumet from where I returned to Houghton the same evening.

Leaving two boxes of specimens with the hotel porter, Dr. Rominger went by boat the next day to L'Anse. There he made preparations to go with an Indian guide on a three-day trip into the deep woods to see some of his Paleozoic limestone cliffs near Otter Creek. It was "toilsome travel," he wrote. The limestone proved to be dolomitic, its fossils "scarce and indistinct," but he was able to recognize a coral, some brachiopods, and several mollusks. Returning on Monday in almost constant rain, they reached L'Anse late in the afternoon.

Dr. Rominger returned to Houghton Tuesday evening and was ready Wednes-

day morning to take the "small steamer Mystic" to Marquette. Not long before its departure he was presented with "a heavy copper specimen from Minesota mine which once had attached to it a large mass of silver parts of which are yet visible"; the spelling of the mine's name is the result of an error in its incorporating papers. He was given also "a fine specimen of crystalline copper said to come from the central mine." After packing them both carefully in a box and

> . . . leaving them in care of Mr. Louis Henis to whom I also consigned the other two boxes I went on board . . . and in the moment of departure I saw the porter of the hotel dropping one of my specimen boxes to the ground breacking it all to pieces and scattering the specimens.

With great restraint he added: "I sent a letter to Mr. Henis to take care of the specimens and to have them packed again and forwarded to me."

In Marquette on Thursday Dr. Rominger

> received letters from home and money from the Governor (300 Dollars) paid back to Mr. Brooks the loaned 100 Dollars. after delivery of my boxes to Mr. Spear which are in all 6 boxes and 2 barrels I left at 5 in the evening for Menominee. . . railroad to Escanaba. . . steamboat to Menominee. . . . My bagage was by mismanagement left at Negonee but I am promised by the officials for speedy recovery of them. left my name at the hotel to notify Mr. Brooks of it. arrived at Menominee Freiday morning at 8 oclock 6 October.

Dr. Rominger's last excursion of the 1871 season had begun -- not very auspiciously, to be sure.

In Menominee he "visited Mr. Ingalls and got by him aquainted with Mr. Saxton and Mr. Breen the 3 owners of Breen mine. Saxton drove me round in the afternoon showed me the rock exposures in the bed of the river. . . . Engaged a experienced woods man for my trip up the river and agreed to pay him 3 Dollars per day." The account continued the next day:

> Saturday 7 October - Expenses for provisions 10 Dollars. hired one 2 horse team a 3. 50 per day. 75 cts freight for camping utensiles.
> after taedious preparations for a trip on a wagon up the state road along the Menominee we finally started at half passed 3. loaded with considerable bagage and 4 persons Mr. Saxton Mr. Kennedy and Mr. Barry which wanted to accompany us. The road is in excellent condition and we proceded 13 miles to a farm house where we stopped for the night. the woods are all in flames and the smoke darkens the air. . . .

They left Menominee just in time; a giant forest fire, fanned by strong southwest winds, was advancing rapidly.

The summer of 1871 had been a dry one with many brush fires; Dr. Rominger and his man Gibbins had tramped through burnt woods near the Soo in early August. By October the ground was baked hard and dry, the rivers low, and wells and cisterns all but empty.

On that Saturday, October 7th, fires were racing northeastward through

Wisconsin and adjoining Michigan; by Sunday morning people from outlying farms and settlements, carrying their possessions, were streaming into Menominee. The passenger steamer Northern City, tied up at the dock, was prepared to sail with a capacity load of women and children if need be. All able-bodied men were at work pouring water on Menominee's buildings, touched by flying sparks, or making a firebreak around the town -- work that continued all night long.

When Monday morning came the danger was past but the news that reached the weary fire fighters was very bad. Peshtigo, Wisconsin, only a short distance across the Menominee river, had been burnt out with more than 700 dead; the city of Chicago, swept by the same violent wind, was now a smoking ruin.

Luckily, Dr. Rominger and his party had been traveling away from the fires. On the morning of that disastrous Sunday, October 8th, they left the farmhouse where they had stayed the night, traveled all day, and at eight-thirty that night reached another "farm and camping ground." Monday they

> started for Breen mine at half passed 7. distance about 10 or 12 miles. walked there on tolerably good road while mr. Saxton and the other compagnion were driving to a camp on Sturgeon river 3 or 4 miles of from the mine. . . Arriving at the mine. . . we found the strata of the iron bearing huronian group in some places croping out but generally also covered by drift. . . . about 4 oclock we came into camp. . . .
>
> Tuesday 10 October. rained all night. Mr. Saxton returns with a box of specimens and some other superfluous bagage (Ind. rubber coat) tried to send home Mr. Barry but he sticks to us like a Laus. . . .
> above the rapids we found a canoe took possession of it and floated it down the rapids or carried it in part. tomorrow we intend to continue our travel down the Sturgeon river being now able to transport our bagage in an easy manner.
>
> Wednesday October 11. bright weather. making preparations for our journey down the river. left at 8 oclock. . . .
>
> Thursday 12 Oct. in the morning the fellow to which the canoe belonged which we used coming down the Sturgeon happened to find it out and claimed 8 Dollars which sum as being extravagant I refused to pay. . . .
>
> Freiday 13 October. Mr. Kennedy went last evening 5 miles down the river to procure a canoe and man but has not returned yet at 7 oclock. returns at 12 with a man and canoe which we can use all the way down the river. at 2 oclock we carried our things over the Portage at the Falls and floated down the river. . . .

Saturday was a hard day due to a series of rapids; they arrived at Quiver Falls "in a heavy rain and set up camp."

> Sunday 15 Oct. it rained and snowed all last night the water run through the tent and we got all over wet. our fire was extinguished and the cold was very severe. in the morning fine sunny weather. . . . considerable Diorit rock

comes to surface and forms strong rapids in the river with a wild rocky scenery on its banks. . . .

Monday 16 October. ready for departure a little after 8. fine weather and pleasant nights camping. the state road with a fine bridge over a creek into Menominee is close under the falls. all other bridges towards Menominee village are said to be burnt down by the late conflagration. . . . again the diorit protrudes and forms numerous islands and rapids in the river this remains so in endless repetition until down to the beginning of white rapids the river is very wide and so shallow there that our canoe was considerably damaged and filled with water all things getting perfectly soaked in the water so we carried the effects and boat ashore and had to encamp. rain all night

Tuesday 17 October we are drying our things at the fire and patching up the holes in the birch bark canoe with pitch which will probably take the whole fore noon. then we have to make a portage of our very heavy baggage for about a mile or more the river being so low that we can not float down without breaking the canoe to pieces. at about 10 oclock we got ready to leave the canoe was loaded and our man brought it down to the regular white rapids which are about a mile below we walked an went over drift on a terrace some distance back from the river. . . .
a number of islands here begin to be emerging from the river bed they are called 60 islands. . . . Further on to the mouth of the Dicke river which comes in from the Wisconsin side and is a half a mile below the land is all covered by Drift. this continues so for about 6 miles below where we are encamped in a fine Norway timber grove.
our boat leeked considerable and I was obliged to save the specimens by buying an other one for 15 Dollars the man Davis I dismissed in the evening and paid him 20 Dollars for seven days labor 5 Dollars included for restoring a canoe which we took to his owner up the river. My specimens I had in the evening occasion to send down to Menominee on a wagon.

Wednesday 18 October started a little after seven and made about 8 or 10 miles down the river through an almost level country with banks elevated from 4 to 10 feet. . . the river has a gentle current is deep and about 100 yards wide. No rocks exposed on the whole distance. . . .
at a place inhabited by an old hermitical fellow named Lovejoy we stopped for dinner. . . . we stopped at night as guests in a farming establishement close to the river. it belongs to Samuel Stephenson.

Thursday 19 October. . . arrived at Menominee at 6 in the evening. Paid to Mr. Kennedy 45 Doll. for wadges 15 Dollars for rent of a team for 5 Days. during my absence a large map of Marquette County which I left at the Saxton house was stolen.

Freiday 20 October sent Kennedy up for my bagage which I had to leave on the banks of the river 3 miles up. Packed 5 boxes one bale and one chest and delivered for shipment.

Saturday 21 October. the railroad connection with the steamboat line is interrupted by the Sunday intervening while on Sunday I can travel without interruption so I determined to leave for home early tomorrow. . . .

Sunday 22. at 9 sailed with Steamer Dunlap to Green bay arrived about 4. . . departed in the evening for Chicago where I arrived 6 oclock in the morning.

> the Train for Ann Arbor leaves at 9. arrived at Ann Arbor 5 in the evening on Monday 23 Novbr. . . .

Dr. Rominger was probably so tired it seemed like November!

During the next months it is certain the doctor told his family about many of his experiences in the north. Some of these stories must have been relayed to relatives in Wuerttemberg -- and very possibly grew in the telling. At any rate, the Heidenheim newspaper Der Grenzbote of May 16, 1907, paying tribute to the late Dr. Rominger, discussed his work as State Geologist. A part of this article, translated, is as follows:

> These trips were very strenuous but also very successful. The robust and well-conditioned man roamed through parts of Michigan completely or only weakly settled and roadless. He was accompanied by two servants, one of whom had to carry his sleeping tent, the other a small iron cooking range, both also loaded with the necessary provisions, frequently augmented or replenished by the meat of hunted animals and by their fishing. Occasionally they still met Indians. As it is told, they once encountered a group of Indians whose Chief turned out to be a genuine Swabian from the South German Black Forest, surrounded by his family of redskins.

VII

1872, TO JUNE 19: FURTHER SURVEY OF THE UPPER PENINSULA'S PALEOZOIC FORMATIONS

Dr. Rominger was much pleased to receive two volumes of the "Palaeontology of New York" from his friend, James Hall, on February 15th, 1872, and set down at once to acknowledge them. "It is a very long time since I had not heard any thing from you," he wrote in the course of the letter, adding:

> You have of course heard of the withdrawal of Prof. Winchell from the Survey of Michigan and of my installement in his place. During the passed season I have been investigating the paleozoic rocks of the upper peninsula and am now engaged in working over the material and to make my report.

It was well he had given up his medical practice; being State Geologist had proved to be a full time occupation.

He planned during the 1872 season to continue the work in the Upper Peninsula and accordingly, on Thursday, May 2nd, went by train to Menominee where he arrived late Saturday night. The next day he

> went up the river on the Wisconsin side could not see any instructive outcrops nor any fossils in the loose bowlders. the boat Saginaw going north just de-

parted when I returned to Menominee too late to go along with it about ½ passed 10 in the fore noon.

This was unfortunate because there was "no chance to get of" on Monday. However, he could and did on Tuesday, leaving Menominee on the Steamer Dunlap, arriving at Escanaba the following morning, and going on from there to Mapleridge, 24 miles farther.

the distance from there to the Escanaba river is 8 or 9 miles an indian trail leads from there but no body has ever went that way and I could not get any guide the intervale is described to me as very swampy. at 9 in the evening the train from Negonee passes through Centreville and I returned with it arriving in Escanaba a little after 10. . . .

Freitag the 10 Mai engaged a boy to accompagny me on a tour up the Escanaba river for 2½ Doll pr day

They started the next morning:

Rode up to the sawmill with Mr. Olivers team taking along the camping utensiles Started from the mill about ½ passed 9 and followed an old supply road . . . up to the place where the river makes a big bend and flows eastward after having had before for a long distance a southerly course. we encamped at a Indian hut. . . did not come far enough to see the fine outcrops I visited last year we will go there tomorrow. . . .

Sunday 12 May. Started up the river on the supply road rainy day roads kneedeep filled with water. . . returned on the bank of the river to our camp and left there for Escanaba about ½ passed one arrived at Mr. Olivers farm at 4 and remained there a snow storm prevailing and all my clothes thoroughly soaked with water. sent my carrier eith the Pack to the Saw mill the lower falls are only 85 rods northwest of the Oliver farm house but a bad swamp is between.

Monday 13 May. From Olivers Farm it is 3 miles to the mill. along the river near the abandoned mill I closely observed the wedge shaped limestone exposed there. . . . with the four oclock train I left for Marquette. . . arrived at Marquette between 9 and ten in the evening.

The next day he found his boat "in good condition in the water. Brooks has not arrived but will be here very soon as his trunk is already on the depot."

Freiday 17. . . In the evening Brooks arrived and after talking over the plans for this seasons work, I found it entirely impractical to extend my work over a field which was entirely to be covered by both Brooks and Pumpelly. so I decided to make a more accurate investigation of some portions of my own field which was not sufficiently investigated.

Saturday 18 went with a sailing boat to Whitefish point but the wind left us and we arrived at Whitefish point only on Sunday morning at 10 oclock. the shore was yet covered with large masses of ice. went over the ground for about 3 miles back from the shore up along the Whitefish river and its branches. The sandstone formation is covering the whole ground ascending to the high ground about 100 feet above the lake. . . .

Monday 20 May. wet foggy weather investigated the strata forming the shore line of the point and the abandoned stone quarry. . . .

They started up the river at seven o'clock the next morning; he described the trip in his diary:

4 miles from the mill the state road to Marquette is crossed near the river. from there we entered the woods on the east side of the river without a trail. it is a swampy bad place to travel about 2 miles up we crossed the river and got into hard land where the travelling goes well. 4 miles above the state road the Whitefish lake is situated it is much biger than represented on the maps over a mile long and $\frac{1}{4}$ of a mile wide, from there we followed the narrow valley up to the falls which are 4 miles further up. . . .

Wednesday 22 May fine clear weather we started 6 in the morning from our camp downwards and took this time the opposite side of the river from the one we went up. arrived at 3 oclock in the afternoon at the sawmill. the river from the mouth up to the falls has a very strong current and mostly runs in rapids. it must certainly rise in its course to the foot of the falls 300 or 400 feet. the falls can be little less than 100 feet. the ridges lining Whitefish river are very probably the high hills visible from Marquette as the highest landmark backwards of Whitefish Point.

Thursday 23 heavy frost in the morning but bright sunny weather. . . sailed from Whitefishpt 10 oclock arrived in Marquette 4 oclock. took supper and night quarters at the Hotel and started 12 oclock at night with a small tug up to Granitpoint with Mr. Adams of Negonee. It rained all night and during the following day, Freiday 24.

The coming week brought further troubles. Sunday it rained, Monday was very cold and foggy, and Tuesday he wrote that "the man whom I intended to take along as guide and packer has not returned yet"; Wednesday he "succeeded in the afternoon to hire a man to go with me."

started at 3 oclock and went along the old State road to a place 4 miles behind Chocolate river village. it began to rain hard and we had to stop at a farm house for the night. . . left the house $\frac{1}{2}$ passed 6. the road is generally in very good order all round fine hardwood timber. . . at 9 oclock we arrived at Chocolate river no rocks exposed there. it is a pleasant valley with a meadow at the spot where the road crossed it. . . . from there we walked gently ascending over undulating hills until $\frac{1}{2}$ passed eleven and took rest for dinner. . . at our dinner place the timber is exclusively hardwood with only few Hemlocks. Birch trees are there of from 2 to 3 feet in diameter. . . .

Freitag Mai 31. at 7 in the morning started with the intention to strike laughing Whitefish river falls by following the section line straight north for 8 miles. I found the corner and followed the line for 2 miles but lost it then in a long almost impenetrable cedar swamp. . . returned to camp 2 oclock afternoon I felt very tired and somewhat sick in the stomach. During the night I could not sleep, had chills. . . .

Saturday 1 Juni. do not feel any better. it rains all morning otherwise I would have tried to return to Marquette. at ten oclock it stops raining and I com-

mence to return draging my feet with much fatique back to the main branch of Chocolate river where I encamped.

Sunday 2 Juni. went from camping ground to the settlement 5 miles distant and hired a wagon to bring me to Marquette where I arrived a little before 12 oclock. . . .

Monday had a sound sleep and feel improved, still unable to go to work. visited the quarries again (very rainy in the noon). . . .

A less hardy person would probably have recovered at leisure, indoors out of the rain, but Dr. Rominger would not give in. He continued to examine outcrops during the next few days, going by boat to one place and by train to another, and returned to Marquette on the evening of June 6th. Raining again on Friday, the seventh, he "prepared for excursion next morning."

Saturday 8 Jun. Sailed with a small boat holding 16 fellow passengers a cow and a calf an anoyingly mixed compagnie as usual. we had no wind or a contrarious one and finally arrived 6 in the evening at Whitefish point where we encamped. very cold rainy weather. dense fog all over.

Sunday 9 Jun. Started a little before 4 oclock with fair little breeze but in a dense fog, passed the Steamer Union which had run on the ground close to the shore of Whitefish point, wind soon left us and by strenuous rowing, in the fog scarcely knowing where we were, we finally landed in Munising about noon encamped there on old camping ground of last year. . . .

Dr. Rominger spent the rest of the day examining the rocks in the vicinity and making plans for a trip to the falls of the Au Train river on the morrow. That trip was not all he had hoped:

We started at 7 but missed to find the road and had to return. An Indian set us on the right track. Weber [his helper] is not able to carry a light pack got exhausted and I had trouble to reach with him a place where we could find water we had 3 pigeons for our supper but he lost 2 of them on the road his pack hangs on him in a really pityfull manner and on my return I will have to look for an older man. . . I did not see a rock. mosquitos are very severe on us.

The next day, Tuesday, June eleventh, things looked brighter:

a fine nice day. we started about 6 oclock or perhaps later, (my watch stoped to run) and arrived at about 12 on Aux Train river. the road leads constantly through splendid beach and maple woodlands over the roling high plateau. coming near Aux Train river a descent of about 150 feet is made such hills limit the river on both sides, the narrow valley is lined with small belts of swamp. these high hills are entirely composed of drift material sometimes with gravel and bowlders of various Huron et Laurent rocks with red sandstones but generally the material is a rich ferrugineous loam. the river exhibits there also no trace of rock it runs very rapidly. Thinking to find the falls above (some persons telling me they are south of the road others north which latter are correct) I followed it up for about 3 miles without finding neither rocks nor falls. the falls must be from 2 to 3 miles north from the bridge on the brink of the lower hill. . . . at noon we got caught in a thunderstorm

and severe rain, musquitos insupportable, fatigue great so I determined to return to our last nights camp and arrived there about 4. had a good pigeon sup which was necessary for our exhausted bodies.

They returned to Munising Wednesday. The weather was "very fine but musquitos in the morning awfull." He had another excursion in mind; "in consequence of contradicting opinions about the situation of the falls and intending to see also Mud lake and Trout lake I hired the Indian Thomas to bring me there." On Thursday, the 13th,

we started from camp 7½ oclock and arrived at a place said to be 4 miles from trout lake and about 1 mile from the lake at the head of Sturgeon river at 1½ oclock afternoon where we took dinner. the road we followed is the Grand island and Bay de Noquets road all the way through hardwood timber land of fine quality no water along the whole distance from the creek a few miles west of Munising from the Sturgeon lake to Munising they count 16 miles. after leaving the noon's camping place we followed the road 3 miles further the hardwood after 2 miles disappears and a level pine plain with much open land expands from the road after 3 miles we branched of in a southwesterly direction and travelled at least 2½ miles then our guide did not know any more about his exact whereabouts we went in a northwesterly direction further on finely after much walking entered hard wood timber again and reached the brink of the hills at the foot of which Trout lake is situated (hills about 130 to 150 feet elevated). Trout lake where we struck it is a series of small shallow springs ditches in which at several places strong springs bubble up through a white sand. in other places much vegetable mud has accumulated and in a few spots bowlder accumulations form bars in it. . . . went in the evening 2½ miles south along the lakes but did not reach the bigest of the lakes, had to return night over coming us.

Freiday 14 Jun. sent the men out to hunt for a corner to ascertain our whereabouts. found an east and west line but lost it on both ends about ¼ of a mile north of our camp. . . . at 10 oclock we left camp following the east side of the big mud lake and finally struck the river at 12 oclock where we took dinner the river has there a rapid course we crossed it and after about three miles travel partly along the river with rapid current and very tortuous in its course strong rapids succeed for a distance of about a mile. . . . after an extremely rugged travel we arrived at 6 oclock at the au Train river bridge where we found a nearly starved man which says he lost himself in a spell of drunkness and is erring in the woods since the 26 mai. how much of it is true I do not know. we feed him warmed him and will do so next morning when we return to Munising and send him help. we and the man are suffering severely from mosquitos in this locality.

Saturday 15 Juni. returned from aux train river 16 miles distant from Munising. started after 6 and arrived at Munising after 3 oclock. . . .

Sunday 16. at 3 oclock in the morning the Steamer Norman landed at Munising and at 6 started for Marquette. having no more inducement to remain at Munising I broke up camp and returned to Marquette where we arrived after 10 oclock. The weather was very clear and I could observe the Islands and the Peninsular coast very plainly. . . .

That same afternoon he had an opportunity to go with Major Brooks to Lighthouse Point, the "Pick-nik islands," and other localities near Marquette. Then, temporarily through with his work on the north shore, he packed and dispatched all the specimens he had accumulated, and went by train to Escanaba on Wednesday, the 19th of June. The summer was flying and he still had much to do.

VIII

1872, JUNE 19 - AUG. 6: COMPLETION OF SEASON'S WORK IN UPPER PENINSULA -- INVESTIGATION OF NORTH COAST OF LOWER PENINSULA

Dr. Rominger arrived in Escanaba late that afternoon (June 19th) and the next morning

> rode down to Ford river 8 miles distant I was told that at the sawmill men could be procured for the trip up the river and at all events Indians living at the mouth of the river were to be had, but I was greatly disappointed. the agent of the mill is a very unaccomodating man perhaps he does not know any better and the Indians are lazy dogs which wont work.

Unable to get helpers, Dr. Rominger spent some time looking over the land upstream from the mill and collecting fossils, then went back to town with the saw mill team.

> Saturday 22 Jun. made arrangements with a boat owner to bring me to Point Patterson and back a 4 Doll pr day hired an other man to go with me a $2\frac{1}{2}$ Doll per day they promised to be ready Sunday morning but until now at 9 oclock I can see neither men nor boat
>
> Sunday 23 fine clear weather slight south east wind
>
> Monday 24. after long waiting for the boat and men we finally got under sail at 9 oclock landed 2 miles below lighthouse and reached Elliots harbor after 6 in the evening we had much contrary wind the old boat leaks badly and my two men are about as green in woodscraft as any man possibly can be. camp fixture cooking every thing I have to show them because they have not the least idea of it.
>
> Tuesday 25. prepared for continuation of journey and started at 6 oclock. a Thunderstorm overcame us but subsequently the wind turned in our favour and we turned Point de Tour sailing with fair wind towards Point of Barques. at noon the wind at once faded away and we had by rowing to make a distance of at least 6 miles to the Point where we arrived at 4 oclock in the evening nothing new occurred to me in respect to the geological features. . . .

Wednesday 26 Jun. left Pt of Barques at 5 oclock with very little wind. about 8 we got a fair breeze but it soon died away and we was in the same situation as yesterday. about 8 miles from Seul Choix we had to use the oars and finally arrived there about 6 in the evening while if the wind had lasted an hour longer we would have been there before noon. . . .

Thursday 27 Juni. left harbor of Seul Choix before 5 oclock with good wind but after one hours sailing all wind was gone and a dead sea threw us hither and thither. we took the ores and rowed to near Scotts point when at 12 or 1 oclock favorable wind rose which brought us all the way down to Mille Coquins river. Matelon lives $1\frac{1}{2}$ mile further down behind the point which on the map is falsely named Kidles point there is a good harbor for small boats.

Asked Matelon for a guide to the trail of Manistique lakes which he promised for the next morning. the whole days journey did not offer any new geological facts which was not observed before. . . .

Freyday 28 Juni. rowed down to Matelons place and anchored the boat and stored away our things. about 7 took the road to Mille Coquins lake accompanied by an Indian. we followed principally the same road as last year. . . . at 2 oclock I had to encamp my men being entirely worn out and perfectly demoraliced. a worse set I could not have got entirely unfit for such business but being so far I have to subdue my self to the necessity hoping to reach the point of my destination tomorrow. up to our present camping place all rock near the surface is Niagara rock with many silic. nodules and containing Pentamerus casts. . . mosquitos abominable weather fine.

Saturday 29 Juni. left camp before 6 oclock travelled through most admirably fine hardwood lands over a comparatively level country along the well trotten Indian trail and arrived before 12 at the Manistique lakes. the men again exhausted resting every 15 minutes and almost giving out. no rock seen along the whole route. . . the background in the northeast corner of the lake has a high hill which on its northern slope sends his waters to the Taquemenon river. the Indian says that he travelled with a canoe in 5 days from the sources of Taquemenon to its mouth. . . . During the night a severe Thunderstorm the tent was not put up right and leaked badly and the men again showed themselves entirely helpless. I had to take care of them instead they of me.

Sunday morning 30 June dried our things at the fire and set out for return at seven in the morning. after 5 miles walk the men desired to rest and promised to follow me so as to be at Mille Coquins Monday noon to which I aggreed and went on my way arriving at Mille Coquins at 5 in the evening. . . .

Monday June 31. Staied over the night with Matelon. very fogy morning could not sail in any event. men have not arrived yet. . . at 2 oclock the men arrived.

Under such trying circumstances it is little wonder Dr. Rominger was mixed up on such details as dates. Not until the fourth of July did he straighten out the calendar.

Thuesday 1 Juli. last night a severe Thunder storm and rain. In the morning a dense fog had spread itself over the lake and no wind. when the tugboat Dormer of Makinak came in, on my request the captain gave us a tow to Scotts-

point. we departed at 8 oclock but owing to the dense fog and not knowing exactly the whereabouts it was noon before we arrived there. Scotts point is a very poor harbor and a stinking disagreeable place therefore we went of with very little breeze and this blowing against us. we did not come further than about 3 miles to the next point when we had to seek the shore an other severe thunder storm coming up and raging till after 10 oclock with considerable rain. . . .

Wednesday 2 Juli. Air clear but cloudy and a little breeze from the south we prepare for a start. soon after departure entire absence of wind and heavy rain, then a breeze comes from the southwest which just allows us to enter Seul Choix harbor we first passed it intending to continue the journey but with the old leaking boat it was a dangerous task and we soon returned to Seul Choix. Wind blows very hard from southwest and a dense fog coveres the lake we had arrived at Seul Choix $\frac{1}{2}$ passed 10 in the forenoon. Collected along shore several specimens of Huronia. all the other fossils of the Niag. grp are also found but in poor preservation. . . .

3 oclock afnoon wind still hard blowing from the same unfavorable direction so that for today the prospect of getting away is gone. in the evening an other severe thunder storm the wind changes to northwest all night severe blowing at 4 in the morning the wind moderates and we set out at 5 oclock in the morning.

Thursday 4 Juli. arrived at Pt. of Barques at noon. It is severely cold all day. sky cloudy. we passed the point and had good wind until opposite orthoceras point when at once the wind came from the south west again and for the little distance around Point Detour we had to contend for 4 hours finally we succeeded and sailed 3 miles up the bay and encamped opposite little Summer island, arriving there at dark. . . .

Freiday 5 Juli clear weather with southwest wind very fresh. . . at 8 oclock we left for Escanaba first with contrary wind but successively it got fair. we arrived about 12 oclock accross the Bay in a little Bay between the lighthouse point and the first larger promontory on the east side of it. . . took dinner there. at 6 in the evening we arrived at Escanaba.

Dr. Rominger took the train Saturday afternoon to Marquette where he found two letters from home, "took possession of the anneroid Barometer sent for by Mr. Brooks," and "wrote a letter home announcing my probable return at the beginning of August." During the next three days he "visited the mines near Michigami lake Champion mine Edwards mine et Washington mine," and two furnaces not far from Marquette.

He had one more excursion to make before going home, this one at the eastern tip of the Upper Peninsula and the northern tip of the Lower. Accordingly, on

Thursday 11 Juli. packed my things and delivered them to the Steamer Arctic on which I took passage down to the Sault St. Mary. it is expected to depart at 2 oclock in the afternoon. 2 barrels of specimens shipped to Detroit and Ann Arbor. boat departed $\frac{1}{2}$ passed 6 in the evening and arrived at St. Mary Friday morning 12 Juli at 11 oclock.

> on my arrival I found John Boucher whom I paid the 2 Dollars due to him from last year. . . .

Saturday morning Dr. Rominger "left St. Mary with a small boat," rowing past Sugar and Neebish Islands as far as St. Joseph Island, stopping from time to time to examine the rocks and collect fossils, and camping that night on the shore of Munuscong Lake. He returned to Churches Landing on Sugar Island Sunday evening. The next morning he breakfasted with Mr. Church -- such a good breakfast that he at once "bought from Mr. Church 4 gall. of Raspberry jam 10. 50" to send home.

Back at the Soo, he found the lake "too rough to go out in a small boat" so he decided to take the next southbound ship to De Tour at the entrance to Lake Huron. Wednesday morning "the steamer Japan entered the locks" and he went aboard, getting to De Tour about noon. He spent the next two days collecting fossils -- two barrels of them which he dispatched to Ann Arbor -- and then

> Saturday 20 Juli. sailed with a small boat to Scammons harbor [on the south shore of Drummond Island] where I arrived after 9 in the evening having no wind during the day to promote our journey.

From later entries in his diary it is apparent that Dr. Rominger now had only one man along to help him, not two as he had earlier in the season. On Tuesday they were "preparing for a start to morrow with a sailing boat to Makinak and the north coast of the lower peninsula." They got off the next day, the 24th: "started for Mackinaw a little after 7 oclock but did not arrive until passed 5 in the evening."

Thursday, July 25th, they "left Mackinak at ½ passed 8 and arrived with fair wind at the lighthouse point" on McGulpin Point, then sailed on down the coast to Cross Village. Dr. Rominger must have written in his diary while his man sailed:

> near Cross village the sandhills are elevated about 100 feet above the lake forming several terraces one very prominent one on which the village is situated is about 50 feet above the lake and extends on to little Traverse. . . .
> near shore is much cedar but on the higher lands backwards is hardwood and the prosperity of the settlement indicates a good congenial soil. no rock visible all along the shore line until to the head of little Traverse bay where on the south side of the bay about 1 mile east of the mouth of bear creek the rock crops out, first in the bottom of the lake with a gravelly shore line then in perpendicular bluffs 30 feet high and extending close to the mouth of bear creek [the site of present-day Petoskey]. . . . on the west side of bear creek mouth for some distance the rock beds have disappeared and loose detritus and drift material principally composed of the different Hamilton rocks form the shore and adjoining terraces.
>
> Freiday 26. went from Cross village to Bearcreek with fair wind and arrived there at 10 oclock. visited the rock bluffs east of bear creek
>
> Saturday 27. our camp is at the dock built by the owner of the small sawmill on

bear creek. I intend to remain there as long as necessary to investigate the next surrounding country. . . .

Dr. Rominger needed considerable time. The shales and limestones were full of fossils which he collected; in addition to this, he made measurements of the rock layers and worked out their relationship, drawing diagrams for future reference.

"Comparing the sect. west of bear creek with the sect. east of it," he wrote, "I come to the following conclusion the series east is highest, the blue colored beds at the base are probably above the top strata of the western section, the acervularia and Stromat. Wortheni are confined to the lower strata. Acervularia pustulifera et cespitose are restricted to the upper strata." He added: "The outcrops west of bear creek are by fire fallen timber and by the falling rock from above much more covered up than I found them 4 years ago when a far greater abundance of fossils could be collected."

The weather was changeable on Sunday, July 28th; "at 4 o'clock in the morning clear sky sun rising. after 6 a thunder storm and rain." However, Dr. Rominger seems to have put in a profitable day for he "ascertained on the exposure nearest to our camping place the true condition of things."

During the coming week, besides having contrary winds, he had a contrary helper:

Monday 29 Juli. passed night a thunderstorm with rain. sailed out about 8 oclock towards pine river with contrary wind. landed about 4 or 5 miles west of bear creek by wading to the shore. a very instructive section is seen there. . . .
¼ mile west of this escarpement an other still more extensive one is seen lowest black carbonac. acervularia beds abounding in fossils. . . . the high sea did not allow me to land any more and I postpone the visit of the remainder of the shore line to the future. we arrived at pine river 4 oclock and entered Pine lake at the lower end of which we encamped.

Pine Lake is now known as Lake Charlevoix; Pine river, its outlet, entered Lake Michigan at the site of the resort city of Charlevoix. To continue with the diary:

Tuesday 30 Juli. a severe wind blew down the Pine lake so as to prevent us from sailing up. I then went to the rock exposures at the headland west of Pine river the rocks exposed there amount to from 15 to 20 feet. . . .
My man refused to go with me pretending that he hired out to me only to manage the boat and in fact he did during the whole trip no other work to assist me. after this experience I got perfectly disgusted with the continuation of the journey and as soon as possible I will make myself ready for return to Mackinak not however before I have sailed around Pine lake which is reported to me to have nowhere along its shore any rock ledges exposed. a number of settlers have already made their homes along the borders of this lake part of the land is sandy but a good deal of fine productive soil is also in places. . . . Severe east wind blows all day with a fine spray of rain. in the evening the wind rises to a perfect

gale from the east and rain falls all night so that we got all wet and had to fasten the tent not to have it blown of.

Wednesday Jul. 31 all forenoon wind and fine rain. towards noon it is clearing up some and I intend to sail up Pine lake. . . . the whole afternoon and following night rain.

Thursday Aug. 1. sailed up the lake and arrived at its end about 1 oclock ascended the highest hill coming close to the shore and found it 270 feet high. . . in returning we had contrary wind and had to lay over night about $1\frac{1}{2}$ mile below the sawmill . . . .

Freiday Aug. 2 got up at 4 and saw the drift in which a number of Stromatopora and large favosites Hamiltonensis are to be found. at 6 we sailed downwards with contrary wind arrived at 11 oclock at Pine river where we encamped outside west of the dock. wind from the north west and hard blowing so we are forced to remain.

Saturday Aug. 3. sailed into little Traverse bay observed the rock bluffs extending for several miles along the shore in vertical escarpements about 15 feet high. . . . we sailed from there for Cross village and arrived there at 7 in the evening the wind had left us all before we came near middle village and only by helping with the ores we proceeded so far. at Cross village we slept in the boat and sailed out Sunday morning 4 Aug. 3 oclock with fair wind. arrived at Mackinack 2 oclock and went in the evening to Scammons harbor.

Monday Aug. 5 packed specimens and effects in the forenoon, afternoon went out to Spectacle reefs in Lake Huron the lighthouse in construction there is a really admirable piece of work. . . returned to the Harbor in the evening 15 miles distance. . . .

At Scammons Harbor he must have returned the sailboat he had been using and turned in the sailor; on Tuesday evening he took the "Steamer Warrington to Pt. Detour" on the northern shore of Lake Michigan.

The diary stops abruptly for he was hurrying home. The past three months had been full of accomplishment, sometimes tinged with aggravation, but ahead of him was an event to which he was looking forward eagerly. The American Association for the Advancement of Science was holding its annual meeting in Dubuque, Iowa, from Wednesday, August 15th, to Tuesday, the 21st. James Hall had been President of this society in 1856; he and other distinguished geologists were sure to be there.

IX

1873: SURVEY OF LOWER PENINSULA CONTINUED -- SALT PRODUCTION STUDIED -- TRIP TO CLEVELAND, OHIO, AREA

When Major Brooks and Professor Pumpelly completed their respective assignments in the iron and copper districts of the Upper Peninsula at the end of the 1872 season, Dr. Rominger was put in full charge of the Michigan Geological Survey's field work. By that time he had finished his investigation of the Paleozoic rocks in the Upper Peninsula and had examined them along the northwest shore of the Lower Peninsula.

The area of Lower Michigan was four times the size of that Dr. Rominger had covered in the Upper Peninsula, being approximately 35,000 square miles, and its conditions were very different; it was dotted with towns and villages, and criss-crossed by both roads and railroads. The scope of his work, however, would be much the same. Besides studying rock formations and collecting fossils, he would be evaluating the natural resources to aid the state's growing industries.

In general, Dr. Rominger knew what to expect. He had been to various places in Lower Michigan since he had moved to Ann Arbor, and had, of course, read Houghton's and Winchell's reports to the Geological Survey, discussing the matter with Winchell on more than one occasion.

He had learned that a thick blanket of glacial drift covered Lower Michigan, and that below it were Paleozoic rocks from the Lower Devonian Helderberg group up to and including the "coal measures" of the Carboniferous (Pennsylvanian). He understood that the youngest of these -- the coal formation -- occurred in the central part of this mitten-shaped peninsula, surrounded by successively older beds. He could hope to find these Paleozoic rocks at the surface only in such places as the beds of streams and railway cuts, in quarries, or wherever erosion had been great.

Dr. Rominger decided to survey this part of Michigan by taking short excursions from Ann Arbor to nearby sections of the state; he could thus be home with his family between trips. With such a plan he felt he could work best alone. As he explained it later to the Board of the Geological Survey:

> For several reasons, but especially as so many of the results of this survey had to be attained through the combination of fragmentary observations, made at different times and in far separated localities, it was found impossible to call any one to my assistance without danger of incurring endless complications, and of arriving, in many instances, at most unsatisfactory conclusions.

On Friday, the 23rd of May, 1873, he set out on his first trip, going by train to Jackson near the southern edge of the coal field. He found that the coal there was about 50 to 60 feet below the surface, "a shining bituminous coal not fit for cooking but said to be very good for heating steam boilers:; it contained the fossils Lepidodendron and Sigillaria, typical of the coal formation. From Jackson he went to Parma, Sandstone and Spring Arbor; on a second trip he travelled from Jackson to Napoleon, Albion, and Woodville -- interested always in their rock outcrops, mines, and well logs.

Early in June he went northwest of Jackson to Eaton Rapids and Charlotte, then to Bellevue where he saw "limestones which abound in fossils particularly a Zaphrentis, Bellerophon, Productus (rare). . . ." He was so pleased that the next day he "revisited the quarries in the morning and made many collections of fossils." Going on to Grand Rapids, he was taken to see the plaster mills and also the thick beds of gypsum which was being mined, then prepared for the market.

With a notebook full of data, on Saturday, June 7th, he "returned home and found my oldest girl seriously sick with endocarditis. remained at home to attend her until Monday morning 16 June. . . ."

Julie, then nearly sixteen, was indeed seriously ill; endocarditis, similar to rheumatic fever, could have been fatal had it not been properly treated. She was so much better, however, on that Monday that Dr. Rominger went off for the rest of the week, going first to Battle Creek. There, he wrote,

> about a mile below the railroad depot under a bridge the river runs over ledges of the fossiliferous Marshal sandstone. . . the hard rock contains a great abundance of fossils. . . . this Marshal sandstone seems to underlie the whole distance of the Kalamazoo river valley from Marshal to Battle Creek. . . .

Pleased with his success, on Tuesday he "revisited the outcrops of Marshal sandstone again and found some additional fossils in particular I mention a large aviculopecten and several Fish teeth."

Thursday he went by train to Grand Ledge and wrote:

> the village is situated on the bancks of Grand river which has carved its bed about 60 feet below the general surface which is formed by drift and only in ravines and in the river valley the rock beds underneath have been denuded from this covering.

While there, he was able to work out to his satisfaction the stratigraphic section below the coal. He returned home for the weekend, reassuring himself of Julie's continued improvement.

The following week he spent near Owosso, Flushing, and Flint; then he was home again with his family for a few days. On Monday, June 30th, he

> went to Detroit. Saw the Governor [Bagley] and in the evening took the cars for Williamston passing Plymouth Salem Brighton Howel. From Detr. to Ply-

> mouth a flat rich farming country. betw. Brighton Howel and Williamston the railroad makes several deep cuts through drift hills but the land in general is very good. only in few places marshes. . . .
>
> Thuesday 1 July. from Williamston to Lansing Owosso and Saginaw a tedious travel with freight train over a partly undulating partly level drift plain with no exposures of rock on the line. . . .

He went on to Saginaw Thursday where he found Dr. J. J. Garrigues, the State Salt Inspector, "and received all desirable information he could give." He learned that

> there are about 100 wells sunk in Saginaw district and the results of all borings are said to be essentially the same. . . . In all wells the carbonif. limestone was struck and forms a reliable geological horizon and in all borings the lower limits of the salt producing rock beds were indicated by bright red shales of considerable thickness which are considered by the salt men a sure indicator of the productive limits for salt. this red shale is said to be near Salzburg about 1000 feet below the surface while near Saginaw City it is only 600 feet below surface. . . .
>
> Jul. 4 went to Bay City. . . met Mr. Clemens of Ann Arbor at the Depot. his clerks very politely introduced me to all places of interest, in particular to Mr. H. M. Bradley an owner of a sawmill and saltworks the well of which is now in progress of boring. His salt pans are new fitted up with galvanized iron steam pipes running through them. . . .

The Saginaw Valley was the birthplace of salt manufacturing in Michigan, salt having been produced there successfully since 1860. The great salt companies of St. Clair had not yet been started, and the rock salt mine adjacent to Detroit was not in production until 1910.

After many hot cindery trains Dr. Rominger must have welcomed the chance to take the Steamer Dunlap up to Alabaster on the shore of Lake Huron. There in quarries and in the bluffs along the shore he saw thick beds of pure gypsum and limestone containing "an abundance of fossils." Later in the day he "walked up to East Tawas which is 8 miles distant from Alabaster, the shore road offers no rock exposure all loose sand, and at a short distance from the shore all along a bluff of Drift material rises to the hight of about 30 feet indicating a Lake terrace."

Visiting a salt well at East Tawas, he met "a Deutscher" who was one of the partners and who gave him "friendliest information"; he gave him also the well log which showed a total depth of 905 feet.

That evening Dr. Rominger went back to the Saginaw area, travelling by stage as far east as Caro. On Wednesday, the 9th of July, he "took horse and buggy for two days went up to Cass City"; this excursion enabled him to get a boxful of specimens as well as a lot of miscellaneous information. Then he returned to Ann Arbor and his family.

Not for long, however. He set off again Tuesday, the fifteenth, for Detroit

where he "failed to see Governor Bagley and went on to Port Huron to go on from there with The Evening Star to White rock where I arrived 12 oclock at night." This was the beginning of a busy ten days during which he worked his way up the eastern side of the Thumb from White Rock to Port Hope, Willow Creek, and on to Port Austin getting information all along the way about salt wells and the rocks. He was much interested in the Huron grindstones he saw at a number of places.

One afternoon he went to Point aux Barques, noting "some detatched islands like Barques at anchor"; another day he "went south of Wildfowel bay 1 mile along State road" and found "extended outcrops of the upper carbonif. strata." Following the outcrops east, he came to a place where there were "fine silicified specimens of Lithostrotion in countless numbers."

While most of the information Dr. Rominger crammed into his little notebook was important geologically, occasionally there is a comment important for its human interest. One day he "walked along the beach to Oak point," then on to Hat Point; here "a part of the point is divided from the main land by underwashing and forms an inverted conical Island like those at Pt. of Barques. an old Bachelor owns the point which showed himself very hospitable to me although I must say he had very little more to offer than a few mouldy crackers but the will was good." He was back in Ann Arbor on Saturday, July 26th, for a long weekend.

Dr. Rominger's next trip took him in a wide sweep to the southeast through Trenton and Monroe where he saw "in the bed of the river the lower dolomitic strata of the Helderberg group," then west to Adrian, Jonesville, Albion, Marshall, and Kalamazoo. He continued on to Allegan, Holland, and Grandville before taking the express train back home. It was only a brief stay as on Monday, August 11th, he left for Detroit and a visit with the Governor. Going on to Grand Rapids, he met there three men who advised him to go over to Ada to see "outcrops of carbonif. limestone." He found much more than that:

> 3 miles above Ada in the river bed mineral springs are rising and a bathing place has been erected there by Mr. Chs Holt. . . .
>
> The lower portion of the drift bluffs is crowded with large metamorphic bowlders and in the loamy and gravelly sand Mr. Holt a former California miner has washed out some coarse granules of gold and to convince me he tried the experiment under my eyes with success. Of outcropping rock ledges nothing has been found in the valley, and if there was any outcrops the observing talent of Mr. Holts family would doubtless have taken notice of it.
>
> At Mr. Holts a Mr. Thompson with family stayed for his health and takes baths.
>
> Only small distance above the mineral springs is Cascade village but without a cascade. however the river runs in quick rapids at the spot and almost all the way down to its junction with Grand river.

Wednesday 13 Aug. Staied over night with Mr Chs Holt on Thornhill creek a very intelligent and aimable family which had some boarders using the baths of the mineral springs (Mr. Thompson and his family). in the morning returned to Ada, a small but very pleasant village in the valley of Grand river surrounded by high drift hills. . . .

On his way home to Ann Arbor he visited Ionia which he described as "a town with a large number of splendid buildings and shows great wealth all of which as Mr. Blanchard says was made on the spot. all the rich people there came poor to the place."

Dr. Rominger next took a series of trains northward through the center of the state to Traverse City. Apparently he sat at the car window taking notes as the train chugged along. Take these, for example:

Near Kiddville is a nice rapid flowing creek.

Greenville is a handsome village near a larger creek much lumbering and prevalent Pine forest. . .

from Greenville to Gaywoods 5 miles and to Truffants 5 miles mostly continued pine forests and many lumbering establishements along the road. . .

Howard City. . . about 150 frame buildings placed between innumerable stumps of pine trees. . .

at 12 oclock went on to Big rapids. along the whole intervale it goes through continued pine forests partly interrupted by spots with hardwood. the intermediate stations are only Sawmills with the necessary houses for laborers and some store houses. . .

by oversight lost a day today is Saturday instead of Friday as I believed.

With such a schedule and such a pace it is little wonder he lost track of the calendar. He continued:

10 oclock the train left Big Rapids. . .

towards Manton the ground is rising and the road cuts through high sand hills and crosses deep ravines some streaks of hardwood alternate with the pine forest.

from Manton to Walton the road extends over comparatively level ground. mixed timber. after crossing Manistee river exclusively Pine forest.

near Walton the road cuts again deeply through sand hills Walton is a single house.

a few miles beyond Walton hardwoodland mixed with Pine and Hemlock begins.

Summit station is only the station house in the midst of the woods. . .

From Maifield to Traverse city a distance of 14 miles the road leads partly through extensive cedar swamps. . .

the shore portion of Traverse city is of course all loose sand. arrived there at 6. Saturday evening.

Re-reading these comments, Dr. Rominger would always be able to get a vivid mental picture of Michigan's interior.

At Traverse City he met a surveyor named Slawson who had been surveying in the district for more than twenty years and was "familiar with all the locali-

ties"; he had "also a taste for making geological observations." Mr. Slawson took him "to the hills west of the city" while making geological observations of varying importance.

Dr. Rominger spent parts of the next two days near Norwood at the northern end of Grand Traverse Bay, studying the interesting section of Devonian rocks and making a collection of fossils. Returning to Traverse City Tuesday noon, he noted that "the outcrops of black shales was limited to the portion south of Norwood and about 1 mile north of Antrim. all the remainder of the shore is a sand beach until near Browns town." After a trip out to Old Mission he was ready on Wednesday to take a train south to Reed City and another east to East Saginaw; on Thursday he went north to Otsego, and the next day south again.

> Freiday 22 returned at 5 in the morning with the train backward to East Saginaw. arrived there at 11 in the fore noon and took the 4 oclock train to Lansing from there the night train to Ann Arbor.

How different was this summer of 1873, spent largely on the railroad, from the two previous summers when he had travelled on foot or in a small boat! The tight schedule would have exhausted any one with less vigor. Seemingly Dr. Rominger was not troubled by the pace for he stayed home this time only a few days; on the following Tuesday, August 26th, he "left Ann Arbor with Michigan Central to Dowagiac."

To Niles, Buchanan, and Michigan City on Lake Michigan -- back to Niles, then northeastward to Cassopolis and Three Rivers -- and south to Constantine. Here he copied the log of a deep artesian well about which he was told much he found hard to believe:

> . . . the man reporting to me asserted that he boiled of the salt brine a quart to dryness and had a pound of salt as residue, a perfect impossibility. The well is now used as a mineral well. it is analyzed by Prof. McKynzie of Lansing. Its taste is not at all salty and very little differs from ordinary hard well water. The pump reaches only a short way down in the bore hole and probably only pumps the surface water mixed with very little of the brine of the lower strata, or else the story of strong brine must be a humbug. There is another spontaneous well near by which deposits some Ironrust and has more mineral taste than the deep well. The persons there make the assertion that this well has in summer time a temperature of 35 degr. Farenheit and in winter as much as 80 degrees, again an incredible story. at the time of my presence its temperature was 52 degr. Far.

He hurried over to White Pigeon and from there eastward to Sturgis -- "a most pleasing level fertile country" -- and thence to Coldwater and on the way home. He seems to have missed nothing of geologic or industrial importance, nor anything that was picturesque. Rocks, ores, and fossils -- all were of great interest to him. He noted Tuesday, September 2nd, that he found a large Nautilus on the farm of a Mr. Harrandine "5 miles south of Allen village" to

which he had driven in a buggy.

After a weekend in Ann Arbor he left again on the ninth of September, driving to Belleville on the Huron river and following its course to Flat Rock. During the succeeding days he visited quarries near Trenton, Newport, and "Pt au Paux" where he found fossils of Helderberg age. He wrote of the last place:

> on the landspur a few feet of clay soil cover the rocks and an excellent vineyard and fruit garden are cultivated on it the vine is of very good quality, I think even better than the Kelley Island vine. Bought and paid for 10 Gallons of Concord vine a 1 Doll 25 cts per gallon.

That done, he went back to the stone quarries, collecting fossils, still Helderberg in age, as far south as the Ohio border and westward to Lambertville and Ottawa Lake. There he was interested in the sinkholes, noting that "Ottawa Lake itself is nothing more than a large one of such sinkholes it has decidedly a subterranean outlet and is now almost empty while last spring it was entirely full and run over into Ottawa creek which is now dry."

On September 18th Dr. Rominger went to Cleveland to see the Cleveland Shale in its type locality. Dr. J. S. Newberry had described it as a black bituminous shale, underlying the Bedford Shale and forming the basal formation of the Waverly Group in Ohio; Dr. Rominger had found those Waverly shales in various places in Michigan. He arrived in Cleveland

> Freiday morning at 6. Mr. Newberry was not at home, but was expected during the day, so I waited for him. Could not make any aquaintance which helped me in any way to pass away the forced inactivity of the day.
>
> Saturday visited Dr. Newberry. afternoon went with him to see the outcrops of the Waverly formation forming the hills and terraces south of the city. the exposures are most beautifully distinct and exhibit the sequence of the strata as delineated in Newberrys 1 volume. evening went to Berea [a village south of Cleveland].
>
> Sunday 21 Sept. in the morning I saw the extensive quarries opened above and below the village of Berea. . . . Following the river down across the railroad the Berea grit forms for a while high cliffs along the valley. then red shales, Bedford shale, break out from under them 40 or 50 feet thick with few thin sandy micaceous layers and some calcareo ferrugineous concretionary layers. under the red shale follow dark blue almost black shales (Cleveland shales). . . . In the afternoon I found an abundance of Lingula and Discina in the shales above Berea grit.

The next day he went down to Grafton and southeastward to Medina. "A number of fossils I collected there," he wrote, "and a still greater number could be found if the place was carefully hunted over. remained at Medina over night." Then

> Thuesday took a horse and buggy with a man to help me for Bagdad, Weymouth and Richfield where similar fossilif. rock beds are pointed out to me. . . . towards Hinckley and Richfield the ground rises still higher and the formation is

exposed in a thickness of about 200 feet. . . . fossils same as at the other places with several others not noticed before. Crinoids found on the east and west side of village but rare and strata not well opened. returned Wednesday evening to Medina, packed 2 boxes and shipped them by express.

Thursday 25 Sept. returned to Cleveland rainy day.

However, the rain did not prevent his getting out that afternoon and seeing more of the Bedford Shale and its fossils -- "in some places many bivalves and Brachiopods, Orthoceras ectr. but only in nests otherwise scarcely a trace of fossils can be seen."

Dr. Rominger spent a week in southern Ohio before going home, the summer season of 1873 officially over. His survey of Michigan's Lower Peninsula would take him two years more to complete.

X

1874: FURTHER SURVEY OF THE LOWER PENINSULA -- ALPENA AND THE NORTH -- THE THUMB AREA -- LAKE MICHIGAN SHORE -- COLLECTING IN INDIANA AND SOUTHWESTERN ONTARIO

Spring came late to Michigan in 1874. According to Dr. Rominger's diary,

the 8th day of May for the first time this year warm weather sets in and continues so. on the morning of the seventh May the last heavy frost was noticed in Ann Arbor.

Wednesday 20. left Detroit for Alpena. . . .

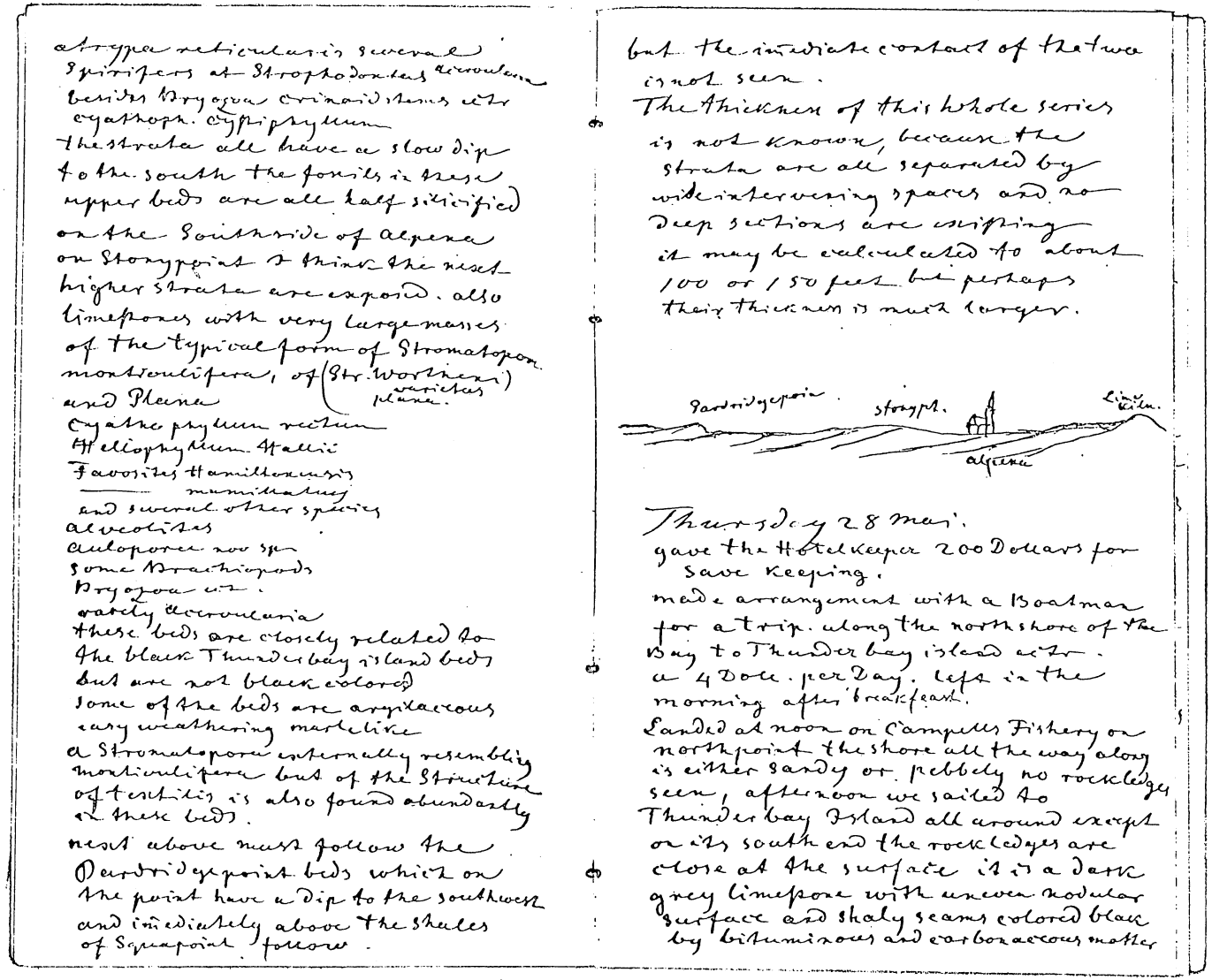
He had been in the Alpena region briefly in September, 1863, and he hoped this time to see more of the scattered outcrops of Hamilton limestones and shales, to work out their relationship, and to make an extensive collection of their fine fossils.

Arriving there late Friday, the 22nd, he visited a number of localities on Saturday and Sunday in spite of wet weather. Monday morning, still raining, he stayed in to write to his "Liebe Frau und Kinder" for, though his diaries are usually in English, he wrote always in German to his family. This letter is here translated -- as will be all others included in the text.

Alpena May 25, 1874

Dear Wife and Children!

I have been here since Friday evening. The trip on the Steamer Marine City



Stropheodonta perplana is several Spiriferes at Stropheodonta demissa besides Bryozoa Crinoid stems etc Cyathoph. Cyptophyllum
The strata all have a slow dip to the south the fossils in these upper beds are all half silicified
on the Southside of Alpena on Stonypoint I think the next higher strata are exposed. also limestones with very large masses of the typical form of Stromatopora monticulifera, of (Str. Wortheni) and Pleina
varietas plana.
Cyathophyllum rectum
Heliophyllum Halli
Favosites Hamiltonensis
—— mamillata
and several other species
alveolites
Aulopora nov spe
some Brachiopods
Bryozoa etc.
rarely Cornulites
these beds are closely related to the black Thunder bay island beds but are not black colored
some of the beds are argillaceous easy weathering marble like
a Stromatopora externally resembling monticulifera but of the Structure of testulifera is also found abundantly in these beds.
next above must follow the Partridgepoint beds which on the point have a dip to the southwest and immediately above the Shales of Squapoint follow.

but the immediate contact of the two is not seen.
The Thickness of this whole series is not known, because the strata are all separated by wide intervening spaces and no deep sections are existing it may be calculated to about 100 or 150 feet but perhaps their thickness is much larger.

Thursday 28 May.
gave the Hotelkeeper 200 Dollars for save keeping.
made arrangement with a Boatman for a trip along the northshore of the Bay to Thunder bay island etc. a 4 Doll. per Day. left in the morning after breakfast.
Landed at noon on Campells Fishery on northpoint the shore all the way along is either sandy or pebbely no rockledges seen, afternoon we sailed to Thunder bay Island all around except on its south end the rockledges are close at the surface it is a dark grey limestone with uneven nodular surface and shaly seams colored black by bituminous and carbonaceous matter

FIG. 14 -- Rominger's field notes on the Alpena region, 1874. Sample pages from his notebooks. The Michigan Historical Collections of The University of Michigan.

was a very slow one. We stayed at many places 3 to 4 hours. However, in general all went well. I had a spacious bedroom for myself alone.
Since I've been in Alpena it has rained continuously but then I am protected by my india rubber coat. I have already been on a few excursions in the vicinity. I will probably have to stay here at least 14 days. The little town has grown extraordinarily since I was here the last time and there is a very good roomy hotel here with which I am quite pleased although the coffee I get is not drinkable. With your next letter send me the before-mentioned photograph. If I should need my suitcase I will write later or I will perhaps get it myself.
I am feeling very healthy and well, sleep excellently. On my excursions I always lie on my red blanket, which I fold double on the sheet to sit on in a warm comfortable "nest," because it is still pretty cold here. Greet the children and tell them to behave well. Affectionate greetings and kisses, too.
Your father,

C. Rominger

Address your letter
Dr. C. R.
Alpena
Fletcher House

The weather must have cleared up as that afternoon he "went to the Salt well near the dam" and "in the evening went to Stony Point. collected many fossils, particularly fine specimens of Stromatopora monticulifera." The next day

Thuesday Mai 26. Walked to Pardridgepoint followed the State road about 8 miles and struck an Indian trail leading down to Squapoint. The road leads continually over a sandy Pineland elevated about 50 or 60 feet above the lake. on the lakeside continuous low swampland. about a mile before reaching Squawpoint under the roots of fallen trees black shales are seen. the whole of the point is likewise black shale.

a large bay with very low inundated marsh borders separates this point from Pardridge point and in order to get there, not finding any boat I had to walk 4 or 5 miles through the water from one to 2 feet deep. arrived about 2 oclock at Pardridge point. The south side of the point is low swampy. In the water hard limestone slabs without fossils are seen all along the southwest side. on the north east side the same limestones form the top of bluffs from 10 to 12 feet high. Under these hard limestone slabs are outcrops of 10 feet of shaly limestones with intercalated shale beds of greenish color, very fossiliferous particularly Bryozoa and fine crinoids. Made rich collections during the afternoon and next morning.

In order to get there one has to stand kneedeep in the water and this can only be done in very calm weather.
at 10 or eleven oclock a sailboat which came for me from Alpena brought me over to Sulphur Island which is entirely covered by the black shales as seen at Squabay. returned to Alpena at 2 oclock.

the boat was liking very bad and could only be kept afloat by constant dipping out the water. after dinner visited again Trowbridge point making additional collections.

"As far as I understand at present the geology of the place," he wrote in his notebook, the massive limestones "containing a profusion of Stromatopora monticulifera" and other fossils occurring northwest of Alpena were the lowest beds. Above these came hard limestones six or eight inches thick with many of the same fossils; next "easy weathering limestones" in which the fossils were "all half silicified"; and above these beds the limestones seen at Stony Point. The Partridge Point beds lay above the last-mentioned limestones, which were in turn overlain by the shales of Squaw Point.

"The thickness of this whole series is not known," he added, "because the strata are all separated by wide intervening spaces and no deep sections are existing. it may be calculated to about 100 or 150 feet but perhaps their thickness is much larger."

Below this section Dr. Rominger drew a neat pen-and-ink sketch of the Alpena area, with the spired church on the horizon above the dipping rock formations (see figure 14).

The diary continues:

> Thursday 28 Mai. gave the Hotelkeeper 200 Dollars for save keeping. made arrangements with a Boatman for a trip along the north shore of the Bay to Thunder bay island ectr. a 4 Doll. per Day. Left in the morning after breakfeast. Landed at noon on Campbells Fishery on north point. the shore all the way along is either sandy or pebbely no rock ledges seen. afternoon we sailed to Thunder bay Island all around except on its south end the rock ledges are close at the surface it is a dark grey limestone with uneven nodular surface and shaly seams colored black by bituminous and carbonaceous matter. Some of these black seams. . . contain a great number of fossils. . . the most obvious and abundant fossil is Stromatopora monticulifera in large subspherical masses from 2 to 4 feet in diameter and some still larger. . . .
> On the north end of the Islands a great number of sea gulls have nests on the ground made of straw. we collected 3 dozens of eggs one or two in a nest. the inhabitants of the Islands eagerly collect them every day for their family use.

The next noon they "crossed over to Sugar island" and that evening landed on 9 Mile Point west of Middle Island to spend the night. Setting off early Saturday morning, they sailed farther along the coast before returning to Alpena. On the way back he noted that

> little Thunder bay is a recess with very shoal water but with abrupt sinkholes of about 100 feet depth. . . . the probable explanation. . . is to me a underwashing of the rock beds which are underlaid by the blue clays . . . and a consequent sinking of the shattered and fissured rock masses. above little Thunder bay appears to be such a large sunken pot hole. . . .

During the coming week he saw more of these sinkholes, went to several quarries where he collected fossils, and continued his stratigraphic studies; on Saturday, the sixth of June, he

> left Alpena for long lake. The road leads to a great extent over the Stromatopora beds of the Hamilton grp. at the narrows an extension of the outlet of Long

> Lake into a lake the water we found 15 feet deep covering the flat rock in the bottom of this abruptly descending large sinkhole. . . .

Dr. Rominger found the rocks of Long Lake rich in fossils and, from the number of brachiopods and corals he listed, must have made a fine collection; he returned to Alpena Sunday evening. Monday he left "with Propeller Wenona" for Crawford's Quarry, going on the next day to Rogers City where he remained for several days. The limestones here were older than those he had seen near Alpena, much like those at Crawford's Quarry.

On Thursday a Mr. Lark took him to the high bluffs back of Rogers City -- drift bluffs, with gravel and boulders containing both Niagara and Helderberg fossils.

> the top of the bluffs forms a high plateau overgrown with most splendid hardwood extending for many miles southwards. numerous clearings are made on top of this plateau and the aspect of the new made farms is highly promising. they raise abundance of superior potatoes oats barley some wheat beans peas fine grass and even corn with success, and there is every indication that these persons which came there in absolute poverty will in the course of a few years be in very comfortable circumstances. the persons are generally Germans of the Polonian provinces of Prussia (Danzig). . . .
>
> Saturday June 13. arrived at Mackinak 9 oclock in the morning my boat was at the moment used from Mr. Bates and I could not see it but heard its being in good condition. . . . Weather intensely cold and stormy. the day before snow at Mackinak.
>
> Sunday June 14. hired a boat to Grass and Bear Island. both are formed by limestone pebbles mixed with large metamorphic bowlders. Bear island connects with the mainland by very shallow water from which large bowlders project.

From his diary it is apparent that Dr. Rominger made his way through the interior back to Alpena. Then, taking the steamer "Marine City" there on Sunday morning, the 21st, he went home for a ten-day visit.

He arrived in Alpena again on July 3rd and on the following day, left with a party of men to further investigate the sinkholes in the area. Stopping that night at a farm with one near the house, he learned that there were springs in the bottom. He was told also that

> on the line up to sunken lake more than 100 such sinkholes are found. many of them with narrow fissures extending down to the depth of over 100 feet 2 miles north of sunken lake is one narrow above and considerably expanding below which reaches the depth of 112 feet at the bottom a wide space is in which a large stream of water flows and disappears. Some streams of water issue from the sides of the crevice and fall down to the bottom the rock walls are variously colored limestones with some shaly intermediate layers.
>
> Sunday 5 JUNI [sic] left for Sunken Lake at 5 oclock arrived there a 9. by a lumber road leading close to the Lake on the way there is generally good agri-

> cultural soil. partly hardwood, partly mixed with Hemlock and some pine the rock is frequently seen under the roots of fallen trees but no extensive outcrops. Pioneer farmers have settled almost every where in this district.
> the lake is an abrupt sink hole about 1½ mile long and only about 500 yards across. at the west end a vertical rock wall of about 15 feet with an abrupt dip of the ledges towards the sink hole is observed its ledges are about 2 feet thick with narrow shaly seams between the rock is partly dolomitic contains some fossils Spirifer granulifera, Atrypa retic. Strophod. demissa crinoid stems ectr. the water in the lake at present is 25 feet below high water mark. its total depth is said to be 90 feet at times the lake is entirely empty and the water is seen disappearing in the crevices at the west end. . . .

They returned to Alpena on Monday.

Dr. Rominger then hired a man with a boat and sailed up the coast to False Presque Isle, getting back to Alpena Friday in time to take the "Marine City" north to Cheboygan, where he arrived early Saturday morning. Sunday they started up the Cheboygan River to Black Lake. According to the diary, "the river divides a few miles above town in two arms one coming from Mullet lake and navigable the other coming from Black Lake and equally large but not navigable on account of rapids in the river. . . We went up black river. . . . Cheboygan or Black lake is a very beautifull large sheet of water."

Camping that night beside the lake, they continued next morning towards the mouth of Rainy River. The shore varied. In one place it was "all low sandy and the lake near it very shallow with fine sandy bottom"; near a creek "a brisk sand bluff rises to the hight of 30 or 40 feet," and a little farther "suddenly the limestones of the Hamilton grp form a vertical escarpement of about 40 feet." "Proceeding towards the mouth of rainy river. . . the rock has disappeared and red drift clays or sand are forming the beach and the land joining the lake is low again. I left the boat at its mouth and went by a loging road up to a camp on the river where the beds exposed at the point on the Lake shore are seen in the bed and the embankments of the river." Here he collected some well-preserved fossils.

The next night was a bad one:

> restless night from mosquitoes, left camp at 5. . . . on our return to Cheboygan we were considerably impeded by timber floated on the river, perfectly obstructing it. we had to remain on mister Thomas farm 8 miles from Cheboygan unto next day, when the river drivers broke the jam. . . returned to Cheboygan at noon.

On Thursday, the 16th, he "walked up to Mullet lake a distance of 6 or 7 miles from Cheboygan. a good road leads to Dodges point from which a fine view over the whole lake is to be had. . . Mullet lake is a splendid water surrounded by sloping banks which at the waters edge are the red well stratified clay. . . . In the immediate borders of the lake I notice from this point 6 or 8 clearings and houses. The forest is mixed timber and a principal occupation

of the present settlers seems to be cutting cordwood which is taken to Cheboygan by small steam tugs and scows."

The following Saturday the mail carrier gave him a ride to Little Traverse Bay. He was surprised to find at the mouth of Bear River "a new village came into existence name Petoskey." He had camped at that place just two years before when there was little more than a small sawmill and dock.

He planned now to study in greater detail the rocks he had seen in 1872, at which time he had been hampered by a most uncooperative boatman. Monday he "went along the shore west" and at the end of the day summed up the results:

> it is very peculiar to see in such small distances so great and frequently changing variations in the appearance of the rock and the alternately great profusion of fossils or their sudden absence in the same strata.

During the next ten days Dr. Rominger investigated the lake shore from McGulpin Point on the Straits of Mackinac down to Petoskey and beyond, making collections of fossils and taking copious notes. He worked out a composite section of "the strata seen in all the outcrops from bear river to the Khagochewing point" which he estimated to have a thickness of about one hundred feet.

Then he had a well-earned though short rest:

> In hotel at Mackinak from Sunday night to thursday morning. all family for 2 full days of it. employed a man for sailing the boat at 2 Doll pr day.

Whether this reunion took place at Mackinaw City or the Island is not specified; the name "Mackinac" was applied to both.

On Tuesday, August 4th, Dr. Rominger sailed to Round Island and Bois Blanc; Wednesday he and his man "sailed out for Beaver islands but had no good wind and had to take harbor at St. Helena." The next day they "left St. Helena with good light brise which died away when we came near Wakeshang lighthouse. from there we had to row for over 12 miles until we reached Hog island 9 p. m. where we found a rocky shoal shore with no opportunity for landing. We forced a landing took supper and anchored out. all night very quiet. Hog island is overgrown with cedar and in the more elevated portions with hardwood. . . ."

> Freiday 7 Aug. at half past seven we sailed out with a good light brise for Beaver island. no inhabitants on hog island. about 800 souls living on Beaver Isl.

Saturday they returned to "Mackinak" in time for Dr. Rominger to take the Steamer Dunlap to Bay City whence he went on to Ann Arbor by train.

After a weekend at home, he went up to Port Hope on the Lake Huron shore Thursday, August 13th, and during the next two weeks visited many rock outcrops and salt works in "the Thumb." On Tuesday, the 18th, he "hired horse and buggy for the head waters of Cass river. . . the direct road from Port Hope

to Verona is impassable by the fire and we had to go first to Sand beach. . . ." It was a hard day's travel:

> the road from Cass river mills to our night quarters are terrible. we had to lay down 5 or 6 fences, cross over logs and finally had to cross Cass river which is filled with logs. The horse had to be led over and came very near breaking its legs. after we crossed him, we pulled the buggy over the logs and came through to the State road by a very much obstructed unfinished road full of tree trunks and paved with huge boulders.

In fact all the district between Port Hope, Cass River, and White Rock had been ravaged by fire. As Dr. Rominger described it: "the dead trunks of former forest stand there and after some years wood and timber will be scarce in that country while it is now an encumbrance which is to be removed as speedly as possible."

He arrived back at White Rock late Wednesday, August 19th, and the next day went up to Port Austin. Its salt well, 1182 feet deep, furnished a brine of 92 per cent from which 120 barrels of salt were produced daily. The diary gives this data:

> 12 men are constantly employed with the salt boiling part of them are paid 2 Dollars a day, part 1.50 and 1.75. the value of barells is about 25 cts piece Price of salt at the dock 1 Doll 35 cts.

On the 29th Dr. Rominger took the Steamer Quimby to Bay City and went from there by train to Saginaw where he again had the assistance of Dr. Garrigues, State Salt Inspector. By the time he left for Ann Arbor early in September he had observed various systems of salt production, including "solar and spontaneous evaporation which furnishes coarse salt for pork packing."

Before continuing his survey of Lower Michigan Dr. Rominger looked forward to a short excursion -- first to Springfield, Illinois, where he would call on Dr. Amos H. Worthen, Director of the State Geological Survey; then he planned to go to Crawfordsville, Indiana, to collect some of its wonderful fossils. Accordingly, on

> Wednesday Sept. 9. left Ann Arbor at noon arrived in Springfield, Illinois, at 4 a.m. on Thursday 10. failed to meet Mr Worthen he left with the train a half an hour before I came to his hotel the St Nicholas. The collections of the Survey are stored in the new Capitol basement but all boxed up and not accessible for inspection. . . .
>
> Freiday 11. arrived at Edwardsville in the morning.
>
> Saturday went back to Alton. inspected the stone quarries.
>
> Sunday 13 Sept. left Edwardsville at 8 in the evening. arrived at Crawfordsville Monday morning at 4 oclock 14 Sept. went to fossilifer. outcrops near town and bought a collection of crinoids from Corey, an old collector of fossils for the sum of 160 Dollars, 5 paid in hand and 155 to be paid to Expressor before delivery of the box.

> Thuesday 15. this box sent of by Amer. Expr. started at 10 in the morning for Michigan City. sent letter home ordering the money to be paid. Quit smoking to make up for the extravagance of buying the collection.

He had little excitement during the next few days to take his mind off his recent purchase. Near St. Joseph, East Saugatuck, and Holland he saw prosperous farms and orchards; at Muskegon he noted many saw mills. He went home before the weekend, doubtless to explain the expensive crinoids.

On Monday, the 28th of September, he and Dr. Garrigues went by train up to Goderich, Ontario, to visit some of the salt wells and salt works near Goderich and Seaforth, going from there to St. Mary's and Guelph. The village of Widder was Dr. Rominger's next objective; he had been there in 1863 but not long enough to see much of the outcrops already becoming famous for their Middle Devonian fossils. Their arrival this time was not ideal:

> Friday 2 Oct. rainy and cold. arrived at 2 in the morning in Widder.

Perhaps they awoke to better weather for during the day he went to the Grand Trunk railway cut not far from the village and measured the section. Saturday he "went to Arcona" and "in the creek near rock glen mill" made another section, collecting fossils from each unit.

> Sunday 4 Oct. went to Kettle point.
>
> from Widder to the Lake shore nothing but drift covers the surface.
>
> near shore the black shales come out, forming where we first struck it loose accumulation in comminuted fragments. in the Lake very numerous limestones in angular blocks are noticed. the ledges of these are not plainly visible but all indications are for their close proximity. . . .

What interested him most, however, were the "kettles" and his description of these concretions is an accurate one:

> . . . the most remarkable thing are large sphaerical masses of stinkkalk of fibrous structure radiating in all directions from the centre to the periphery. those balls are mathematically true globes of from 1 to 4 feet in diameter. they lay in the shales entirely isolated, and the laminae of the shale are bending over and beneath them.

Below a diagram of a kettle, Dr. Rominger described what is now called the Kettle Point black shale:

> the surface portions of the shale beds appears to have been burning and is of bright red color. large old trees grow on this burnt red shale. the lower black portions are divided by vertical fissures into large almost rectangular plates of from $\frac{1}{2}$ to several cubic yards in extent.

He noted that his "expenses at Widder, Canadian money" were thirteen dollars.

XI

1875-1876: COMPLETION OF WORK IN LOWER PENINSULA -- SLATE QUARRIES ON HURON BAY (LAKE SUPERIOR) AND SILVER MINES NEAR ONTONAGON -- REPORT FOR GEOLOGICAL SURVEY -- MONOGRAPH ON "FOSSIL CORALS"

Dr. Rominger marked the cover of his new leather-bound notebook "Diary May 18, 1875" and set off the next day on his first trip of the season:

> Left Ann Arbor 12 at noon 19 Mai arrived at Owosso 7. departed from Owosso 10 a. m. 20 May Thursday arrived at Bay City at noon.
> after dinner I went to the House of Mr. E. M. Fowler who was not at home. his wife directed me to Mr. Chappman and while inquiring for his residence I made the aquaintance of an other gentleman who directed me to the owners of the presently opened field for exploration Mr. Gustin of Merrill. Mr. Gustin invited me to his house with irresistible kindness and I accepted it. during the afternoon I was introduced to many different parties of which I forgot the names. among others I met again with Mr. Smith the owner of the Alabaster quarries.

Then follows a story in which it seems prudent to substitute letters of the alphabet for the names:

> I learned also that a settler with the name X found the coal first and brought it to notice of some persons in Bay City. he made consequently application for a certain place under the homestead law and was cheated out of it by Y et Z which found out his design and took it in advance of him who is a poor man and an actual settler.

Poor X! One hopes that eventually he got what was due him.

On Friday Dr. Rominger "went to Rifle river accompagnied by a young man in the employ of Messrs Gustin et Merrill." A shaft had been sunk about a mile from the dam to the depth of 27 feet through shales and sandstone into a layer of cannel coal seven feet thick. Looking over the loose shale, Dr. Rominger saw "very numerous lingulas"; in fact, he remarked, "the shales are entirely similar to the lingula shales of Williamston."

By the time he returned to Ann Arbor he had covered much ground on the west side and north of Saginaw Bay, seeing many outcrops of rock. These included "a natural section of the gypsum formation" on the Lake Huron shore below Alabaster Point.

He returned, briefly, to Ann Arbor, then left again on Monday, June seventh, for Monroe, Toledo, and Columbus, Ohio. At the latter place and at Newark he visited quarries of Helderberg limestones where he made collections of fossils. From there he went north to Sandusky, Put-in-Bay, Kelley Island,

and nearby localities before going back to Monroe and home. His notes appear to have been written in haste as he hurried from one outcrop to another.

The next excursion must have been more restful since much of it was by boat. After taking the train across the state to Muskegon, he took a steamer up the Lake Michigan shore, stopping at Pentwater and Ludington, and arriving at Manistee Friday morning, the 25th of June. Quoting from his diary:

> Manistee is much larger than I expected and the part situated on the hill on south side of river is not without natural beauty offering good soil for gardens and elevated above the sandy borders of the river. The lake behind the mouth of the river is quite large in extension and serves as a splendid reservoir for an immense amount of logs. Mr. Ruggles took me out in a buggy to the environs which made a very favorable impression on my mind. . . .

Saturday he "left at noon with steamer to Frankfort" and on Sunday went "by tug to Glen arbor. Clay and Sand bluffs of variable hight and locally interrupted by glens are bordering the lake all the way. Their hight is frequently about 200 feet generally over 100. Sleeping Bear may come near 300. the Sleeping Bear and all the spur between it and Glen arbor is entirely free of vegetation a barren sand accumulation with only a very few widely separated shrubby trees no grass nor anything else covering the sand." Here he sketched the famous dune.

There is no mention of his return to Ann Arbor nor of his going to New York City; his expense account, however, shows that he went there July 8th. At five dollars a day, his hotel bill was forty dollars, and the total cost of his week's trip -- including railroad fare, sleeping cars, meals, and "sundry small exp. for street car and omnibus ectr." -- only $87.35.

On Monday, July 26th, Dr. Rominger again took a train, this time for the Saginaw valley and points north -- Standish, St. Helen, Deep River, and the Rifle River. At the last place he found "the coal now is seen to be mostly of inferior slaty quality. below the coal beds of hard fireclay with plants are dug out. . . . In the afternoon went with train to Standish." From there his work examining boreholes took him through the woods for two days, following "an old overgrown log road" in one place and trails in others, and spending the intervening night in a lumber camp. On the fourth of August he returned home for a few pleasant weeks with his family.

In the report Dr. Rominger wrote later he summed up his next trip as follows:

> By special order of the Board of Geological Survey, I left on August 23d, 1875, for Lake Superior district to examine the slate quarries on Huron Bay, with a view to reporting on the conditions under which the slate rock is found, and upon the quality of the rock as a roofing material. . . .

He arrived in L'Anse on Monday, the 30th. Mr. S. C. Smith, an explorer with long experience in that part of Michigan, gave him valuable assistance

throughout his investigation. Taking two Indians as helpers, they spent the better part of the coming week in the area between L'Anse and the Huron Mountains. Dr. Rominger jotted down all the data he would need later in writing his report. He noted that the slate beds, which were at least a thousand feet thick, occurred from the head of L'Anse Bay to the northern slope of the Huron Mountain range.

The slate best suited for roofing came from the latter location. Its quarries were connected with L'Anse, fifteen miles away, by a fine road, and with a dock on Huron Bay, about three miles to the north, by a tram-road. Its slates, he wrote, were capable "of being split into large, even slabs of any desired thickness," had "a fine, silky, homogeneous grain," and combined "toughness with smoothness." He described their color as "an agreeable black, and very uniform." This slate, in his opinion, compared favorably with the best slate quarried in the eastern states, being superior in both color and durability.

At the conclusion of this trip, Dr. Rominger returned to Marquette. Here he met some men who were interested in the new silver-mining district near Ontonagon and who urged him to visit it with them. He was delighted to do so.

They left for Ontonagon on Thursday, September 9th, stopping at the Minesota mine on the way. Dr. Rominger's diary contains this interesting descriptive paragraph:

> the geology of Ontonagon district is very well marked by its topographical features. the Potsdam sandstone distr. is a roling hilly land much lower than the broken abrupt and higher lands formed by the Kopper traps. Porcupine mountains are a splendid ridge of mountains from 12 to 1300 feet above the Lake and extending close to the shore.

In Ontonagon Friday a "high sea" prevented their going on to Iron River but Saturday they sailed to the river mouth and went upstream to the Superior Stamp Works; this gave Dr. Rominger an opportunity to see the thick section of layered rocks. On Sunday they walked to Little Iron River where the first silver of the area had been found.

The weather was bad both Tuesday and Wednesday, the 14th and 15th -- rainy, with such a storm on the lake they were forced to remain at the mouth of the Iron River. Still stormy Thursday, Dr. Rominger "walked down to Ontonagon," close to fifteen miles; on Friday he went by stage to the Ridge Mine where the copper-bearing beds contained "large quantities of mass copper," and to the nearby Adventure Mine; here he saw finely crystallized epidote, stilbite and other minerals of which he doubtless was given specimens.

One gets a much better idea of this whole region from Dr. Rominger's report to the Geological Survey than from his diary. In that report he noted that the Ontonagon district is a continuation of the Keweenaw Peninsula, the latter divided into two parts by a ridge of copper trap having a northeast-southwest strike. Between the mouth of the Ontonagon river and the Porcupine Mountains

the rock series, three to four thousand feet thick, contains seams of both silver and copper, often separated by only a few feet. Both minerals are found in fine scaly particles and granules, copper occurring in much greater quantities than silver.

He described the silver-bearing rock as a "shining black shaly substance," ranging in thickness from one to four or five feet. Beneath it a thick brown sandstone is a sure indication to the miners that the silver lies above.

"The silver is extracted from the rock by stamping all the rock as it comes from the ledge, without selection," he wrote, "and subjecting the stamped rock to the amalgamation process. The results of the experiments were quite variable, yielding, per ton of rock, from fifteen to fifty dollars worth of metallic silver. The process of amalgamation was very imperfectly carried out, leaving in the sediments which settled from the wash-water a considerable proportion of amalgam globules. I am fully convinced, therefore, that, by proper management of the process, the average quantity of silver per ton would not be less than thirty dollars."

To return to the account of this trip --

On Sunday morning, September 19th, Dr. Rominger went to Hancock, arriving in time to have dinner with the clerk of the Quincy Mine and to catch the Steamer Pacific for Detroit. But a "stormy sea kept us in the canal till Monday night 20 Sept."

> Thuesday noon left Marquette arrived at 4 at Munising loaded 350 tons of Iron came to Whitefish Wednesday morning 7 oclock 22 Sept.
> arrived at Ann Arbor Thursday night express from Port Huron to Ann Arbor 3.50. Freight for Boxes 3. fr Negonee.

This time the boxes were full not of fossils but of minerals -- fine specimens of copper ore and of green chloritic rock with garnets, greenstone, magnetite, plus a silver specimen from the Minesota Mine for which he had paid three dollars, and many others.

Home now for the winter, Dr. Rominger went to work on his report for the Geological Survey, going over the notes he had written in his diaries during 1873, 1874, and 1875. Volume Three was to include his "Geology of the Lower Peninsula," accompanied by a geological map, and his "Observations on the Ontonagon Silver-Mining District and the Slate Quarries of Huron Bay." Furthermore, he had agreed with the Survey to complete his monograph on fossil corals in time for its publication in the same volume. All this meant a vast amount of work -- and a deadline.

On February 13th, 1876, he paused long enough to write a letter to

> My dear Prof Hall.
>
> I have promised to deliver to the printer the complete manuscript of my report and 50 plates before the end of June which is a very short time for so much

work in unfinished condition yet. You see yourself that under these circumstances I can not think of an excursion into the Helderberg mountains as you propose in the spring, but towards fall I will gladly go with you over that district and come to a definitive mutual understanding about certain agnera and species.

You ask me how I propose to sell duplicates of my collection and how much I would consider the price for my crinoids all this I can not attend to before I have relieved myself of the present urging duties. When I see you in the fall we can quietly talk this thing over and come to some aggreement. The White collection is in the University intact but I can not see in it any duplicates except some of the very commonest forms, and there is also no body which has enough knowledge of paleontology to make a selection and tell what is duplicate or not. I do not know whether Mr. Harrington, which has the superintendence of the Museum, had the authority for making a disposal of the duplicates of the collection, I seriously doubt it.

I expect to receive within a week or so a number of proof sheets of my plates and shall send you some of them to see how you like them.

Very respectfully yours
C. Rominger

The "complete manuscript" on which Dr. Rominger was working was of great size; as it appears in print as Volume III, it totals 321 pages.

The monograph on fossil corals is still, a century later, considered authoritative. It contains descriptions of over thirty genera -- 172 species -- many of them new. Dr. Rominger named one new genus Quenstedtia in honor of his professor at the University of Tuebingen. The plates actually number fifty-five rather than fifty, most of them having several photographs per plate.

Although this monograph is technical in format, being written for paleontologists, the report on the Lower Peninsula is of general interest. It refers in a number of places to Alexander Winchell, the previous State Geologist, who had written the section on geology in Walling's "Atlas of the State of Michigan," published in 1873; its geological map had been drawn to Winchell's specifications. Travelling about the Lower Peninsula, Dr. Rominger had had a chance to test Winchell's statements, with some of which he had not agreed.

Reading this report, one realizes that Dr. Rominger was a conservationist, a man ahead of his times. At the end of the chapter about "our world-renowned stores of pine timber" and the thriving lumber industry, one finds the following paragraph:

To the first settlers of the country, the heavily timbered forests were a great impediment; with great labor the trees had to be cut down and burned, for no other purpose than to get them out of the way. This system of destruction, first suggested by necessity, has been continued up to recent times, and while it is true that the development of agriculture has been considerably hastened by it, yet it is equally true that, in the lower part of the peninsula, our forests are reduced to such a degree, unnecessarily in some cases, as to render it highly advisable that measures be adopted for the preservation of what we have left,

otherwise, I fear, our descendants will sorely feel the consequences of the unwise husbandry of their fathers.

The combined manuscript in the hands of his publisher, Dr. Rominger prepared for a trip east with his seventeen-year-old son, Louis; it included a stopover in Albany as he wrote Professor Hall on September sixth (1876):

I intend to visit Philadelphia and to see you at Albany on my return trip home, for which reason I notify you of this plan and ask you to let me know whether I can find you at home about the 20th of September or so. I leave home at the 8 of Sept. and a letter from you would reach me, if directed under my address to Lawrence House corn. of Broad and Callowhill Street Philadelphia.

An invitation must have been forthcoming, judging from the hasty note Dr. Rominger sent his wife and the girls on the 19th from New York:

Only a few words to you. I must go with Louis into the city. I've been here with him since Saturday so have been enjoying myself immensely. Besides, in Philadelphia I was with the Ramspergers. I'm going in the morning to Albany and will probably stay there about a week. I can't tell you more about what I've done but I'm very well satisfied.

That the two paleontologists while they were together discussed fossil corals can be taken for granted. Dr. Rominger wrote Hall as follows on October 14th after his return home:

I express you my sincere thanks for the trouble you took to send me a copy of the figure of Ptychoph. Stockesii, there is no doubt that Omphyma verrucosa and Ptych. Stockesii are generically identical.

You wish an explanation of what form I call Favosites Hamiltonensis. this is not very easy to be described to satisfaction, except with a series of specimens at hand to exhibit the principal common characters and the manifold variations in size of tubes simplicity or complication of diaphragms and more or less abundant developement of pores. If you wish I will send you a complete series of my best specimens of this and related forms found in association with it, but I would ask you to return them again in the course of 4 or 6 weeks because I will be in need of them myself after such a time.

I expect to be very soon able to send you a printed finished copy of my essay on corals. Mr. Bien promised to have it finished in a few days.
Please send me word whether I shall send you the specimens.

But trouble was brewing. A month later Dr. Rominger received a disturbed and disturbing letter from his friend; it elicited an immediate, equally disturbed, and lengthy reply, part of which is below:

Ann Arbor, Novb. 14 1876

Prof. James Hall
Dear Sir!
I just received your letter of Novb. 12 and feel glad that you give me occasion to explain myself to you with regard to the anxiety shown by me to have my descriptions of Corals published as early as I possibly could. I never had a thought of insinuating to you any unfairness towards me but I felt uneasy about

the reception of my work, after I found out that you had prepared a work on corals too and with similar photographic figures, and had so far advanced with it as to be ready for publication even befor me if I did not make haste. I expressed this uneasiness personally to yourself saying that I considered it a very unfavorable circumstance for me if your work should come out in advance of mine. It would be a lost game if two writers one a man of established fame and the other comparatively unknown, would come out with essentially similar publications on the same subject, and more so if the latter should have the misfortune to be behind in time of publication.

Agitated by such sentiments I wrote after my return home to Mr. Bien to hasten with the printing as much as he could, describing him the awkwardness of my situation. This is all that occurred from my side. From the remarks of your letter I must suppose that some body which may accidentally have learned from the printer a superficial statement of the case, made base insinuations reflecting on you. If this should be the case it would make me feel very sorry. I do not recollect of having spoken about the case with any body except with Dr. Sager and to him I merely expressed the above mentioned sentiments of anxiety in case your work should appear before mine but without accusing you in any way of unfairness or having in the least an unfriendly personal feeling towards you. You may call me foolish to allow myself to be agitated as much as I was, but it is over now, and I hope those which put a malignant construction on the case, shall be convinced of their absurdity by the continued friendly regard I have for you. I feel very sorry for the occurrence of such misunderstanding and thank you for it that you openly asked me for an explanation.

I will select for you a collection of duplicates of corals as complete as I can make it and send it to you in the course of this winter. . . .

The letter then shifts to other matters and ends on a cordial note: "Please give my kindest respects to your Family." From further correspondence all seems to have been forgiven.

Professor Hall's illustrations of the "Corals of the Upper Helderberg and Hamilton Groups" -- forty-three plates with seven pages of explanation -- were published that same year (1876) in Albany. His preface sheds additional light on this delicate situation:

During the printing of the Explanations of the plates of this volume, the author became aware of the intended publication, by Dr. Rominger, the State Geologist of Michigan, of a work upon the Fossil Corals which had engaged his attention for many years. To avoid misunderstanding and multiplication of synonymy, the Explanations relating to the Corals were withdrawn from the printer until the species illustrated in common by Dr. Rominger and the author, could be identified. This having been accomplished through correspondence and interview, all the names of new forms proposed for the Michigan report were accepted, but the advance copy of the work was not received in season to permit a reference to description and figure.

XII

1877: DETAILED MAPPING OF THE MARQUETTE IRON REGION BEGUN

The clouds had blown away, leaving Dr. Rominger and Professor Hall again the best of friends. James Hall was now at work on a paper to be called "Fossil Corals of the Niagara and Upper Helderberg Groups" and he needed help. He must have mentioned the matter in a letter to Dr. Rominger early the next year as the latter's reply dated February 16th, 1877, contains this suggestion:

> If you will send your plates and manuscript on corals I will with pleasure read it and make as you wish me to do critical remarks to my best knowledge. Regarding the tabular exhibition of the different coral species, which you find desirable, I agree with you and will prepare it in the manner indicated by you.
>
> I have not found out yet what I can do concerning the continuation of description of corals. The legislative body is in session now and shall soon discuss the question whether the work of the Survey is continued or not. As far as the geological board is concerned my prospects are favorable and it may be that they let me go on if they can keep some political wirepullers out of the way.
>
> The survey is intended to be principally directed towards the mineral districts of Lake Superior, which would force me on an entirely different field of operations, but if my present report is well received by the public I may be allowed to work out in the shape of an appendix to the future principally metallurgic report a separate chapter completing the unfinished portion of the paleontology.
>
> In some respects it would then be very desirable to have for exhibition of the structure some lithographic plates besides others which I intend to have executed by photography.
>
> Your proposal to make arrangements for mutual agreement on the systematic principles by which the generic definitions shall be improved and strictly settled is highly welcome to me and seems to be a desideratum felt by most of the earnest lovers of science. . . .

The letter has a cordial postscript: "You intimated in your letter of 15 January that you had an inclination to spend some time with me next fall. if you can possibly do this, I shall be very much pleased and will arrange matters so that I can be at home during a prearranged term of time. I ask you therefore to calculate in your plans for the comming season this visit to Michigan, also my family will be very much pleased to have you here again. Please bring my best respects from all of us to your family and receive also an invitation for any of them to accompany you on the trip westward."

The Legislature decided to continue the work of the Geological Survey, and the State Geologist was directed to begin in the Marquette iron region. A small dark green notebook inscribed "Diary for the Explorations of the Geolog. Survey

of Michigan during the year 1877 by C. Rominger" tells some of the story. One learns from the first entry that he "left Ann Arbor on May 22 for Detroit. took Steamer St. Paul at night of same day," and that, due to delays along the way, it was not until seven o'clock in the morning of May 26th that they docked at Marquette. It was cold there for

> the Lake was that morning all over covered by a thin crust of Ice which had formed during the night. Found vegetation tolerably well advanced only about one week behind the vegetation of the environs of Ann Arbor.

Dr. Rominger commenced his investigations with the immediate surroundings of Marquette, going Sunday "on the road passing the Brownstone quarries and Catholic cemetery about $2\frac{1}{2}$ miles back. . . . the land rises up to that point about 400 or 500 feet above the Lake. On both sides are outcrops of Dioritic schists in knolls the strata strike all in east and west direction and . . . stand in almost vertical position with a slight dip to the north."

The next day he set out to examine the town itself and his comments are interesting in that they portray Marquette as it was a century ago:

> Streets on top of Hill running east and west 66 feet wide. width of Blocks 300 f. wide
> Name of streets on top of hill
> 1. Ridge street ending at the shore alongside of Holly waterworks
> 2. Arch street in an east and west line with the lighthouse point
> 3. Michigan street striking the small island north of the lighthouse point
> 4. Ohio strt } scarcely a
> 5. Mt Vernon street } building erected

The notes continue in this manner.

On Saturday, June second, he left Marquette with an unnamed companion to see "the outcrops of a silver lead ore vein" near the headwaters of the Chocolate River. They

> crossed the burnt pine plains in a north east direction until we struck a hilly hard timber land cut up by deep ravines tributary to Chocolate river close to the bed of which the metalliferous vein is denuded resting on a granit wall. . . . The vein is milky quarz has a thickness from 8 inches to one foot as far as visible and is tolerably rich in argentiferous galena mixed with a small proportion of Iron et copper pyrites. about a mile below this locality the river forms cascades by descending through fissures in the Granit from step to step and over highly inclined surfaces on hight of about fifty feet other cascades of similar character are met with one mile below these mentioned ones. the Granit is soon hiding itself under the drift and Potsdam sandstone after the cascades are passed. returned to Marquette on foot a Distance of about 20 miles. Heavy rain in the afternoon surprised us on the road not far from Harveys furnace and continued until I came to town all wet.

Next Dr. Rominger turned his attention to the shore and to some of the islands relatively near Marquette -- "the Gull Islands one mile east of Presque isle they consist of 4 large Granit knobs entirely free from all soil," the

"Picknik Islands about 3/4 of a mile north of the Lighthouse point like the Gull Islands entirely naked Rock masses," Presque Isle, and Partridge Island. He was impressed with the tremendous force that had been responsible for the rock structure he was seeing and wished he understood it better:

> On the North side of the Island [Partridge] similar Dykes are noticed but one becomes entirely bewildered by the effects of the elevating forces on these rock masses. the granite and Diorite bands are contorted in labyrinthical curves streaks of granite Dioritic rock Epidote seams Feldspathic bands following each other in delicate lamination describing serpentine lines. In places the granite is striped by interrupted wedgelike seams of Dioritic rock or in the dioritic bands fragments of the granit rock are inclosed so that one can not tell which of the rock masses is the accidental and which the principal. the theory of injection leaves one fully in despair and the assumption of the origin of this laminated and mottled agglomeration of different rock species by metamorphosis of sedimentary strata is just as unsatisfactory for the stunned surprised observer while close by again a regular Dyke of basalt-like rock or of Diorite penetrating sideways into the smallest accidental cracks of the sidewalls leaves the mind not a moment in doubt about the origin of these by igneous injection.

He described at length the country near the Dead river he traversed Thursday and Friday, June 7th and 8th. It left him with a vivid mental picture -- "an isolated knob of granite . . . which seen from a distance emerges from the timbered level land surrounding the creek like the shining timbers and roofs of a newly built Farmhouse."

There are no entries in the diary between those of June 10th and July 6th. It seems probable that Dr. Rominger was in Ann Arbor at least part of that time from a letter he wrote on the latter date to his wife and children from Marquette:

> I have just received your letter from which I learn to my joy that the dear Julie is slowly improving. But she must take care of herself now. She should take the iron and quinine one or two times a day until she has grown stronger.
>
> I had a very good pleasant trip but I only got away from Detroit on Tuesday evening. I have already made a few small excursions today and have dragged home a bag full of stones. I found everything in order and I will soon catch up with what I have to do.
>
> Adieu, write me again soon.

He wrote up those "small excursions" with his usual care:

> Freiday Jul. 6. went with some students from Bethlehem Pa. to the Picknik Islands. The largest, and most easterly situated, consisting of a massive coarsely crystalline Dioritrock pervaded with reticulated thin seams of Epidote and frequently containing segregated seams of flesh red feldspar and Quarz bands, is intersected from east to west by a Dyke of about 4 feet width . . . From the Picknik Islands I landed at the shore close by and walked in a south and somewhat westerly direction through the sandy flats bordering the Lake.
> . . .

> Saturday 7 Juli. cloudy and rainy in the forenoon at noon a severe hailstorm. Towards evening went along the road to Lighthouse point. . . .
>
> Sunday Juli 8. bright day. in the afternoon travelled out Ridge street which on Oak street or at the point where Arch street angles into Ridge street has risen into a very prominent knob. the southside of the street is on the edge of the declivity of the hill and is formed by argillaceous slate with some more compact schists. . . .

The inaccuracy of all the available maps was a source of continual annoyance to Dr. Rominger. For instance, he wrote on July 9th: "The course of the creek on map is perfectly false there is no arm running parallel with the railroad on its south side," and at another location on the 11th: "The position of the creek and swamp on the map is incorrect."

Dr. Merrill (1920) relates what Dr. Rominger did to remedy the situation:

> As no good topographic map of the region existed he undertook to construct one for himself, using the Government Land Office maps as a base. In determining the position of hills, watercourses, and the larger rock exposures, he measured the distances by pacing, and the directions by the ordinary hand compass, taking section corners and quarter posts as initial points for the measurements, and at the same time making his geological observations. In this way he surveyed over 200 square miles from the shores of Marquette westward.

Commenting on this work later, Rominger remarked:

> I candidly confess that had I to do this over again I would no more attempt [to] perform all the work myself, but would employ someone else to do the counting of steps and observing the compass while I was engaged with the examination of the geological features. Both occupations combined are too severe a strain on body and mind. On the other hand, I am satisfied that this modus operandi brought many things under my observation which otherwise would have escaped it.

One can understand how severe the "strain on body and mind" was when one reads his diary. Fortunately he had some one with him -- a man he referred to as "Wagner" -- to help in some capacity if not to do all the counting and compass work. Surely he looked after the camp and carried the bags of rocks.

By August Dr. Rominger was counting steps continuously, and writing in German for days at a time. Occasionally he sent Wagner off in a different direction to expedite the mapping; a notebook written in a very distinctive hand, with scattered dates in August and September, shows that Wagner was counting steps and taking notes at one place while Dr. Rominger was doing the same elsewhere. Most of the time, however, they were together.

Take, for example, October first. After considerable climbing up and down, Dr. Rominger wrote:

> we ascend now an other hill but have to cross the circuitous creek three times on a very narrow space. the hill is quite steep and composed of similar dioritic

> Schists. the quarter post is right on top of this hill. 100 steps further west we are on a broad shallow depression. at 200 over an undulation come into a small shallow valley of a creek running from north west to south east. at 325 steps we are in an other larger creek with steep valley running from north west to south east and course south south east. at 415 passes at the foot of a rocky hill Diorite see specimen. at 3/4 of a mile nearly on its summit hill on north and south side apparently free unto 611 steps. from quarter post we continued slowly to ascend when we pass the head of a ravine running north east. further west still ascension hills decline northward and southward.
>
> at 660 steps west of quarter post Diorit rock intersected by a granit like Quarzite band parallel. still ascension ravines seen running north east on right hand side at 882 steps on summit right before us a ravine divides with one running south and the other north (900 passes centre of ravine). rock spec. from there Diorit rock mottled with Granitic seams.
>
> at the corner which is on top of a little higher hill yet the hill seems to fall towards the west we do not follow the line further but take the line southward. 137 steps northward from corner the rock ridge falls off to the northward. also to the west and east the hill dips down and seems to be the highest point all round.
>
> 94 steps south brings us into a ravine descending westward. at 210 steps at the head of a ravine which we descend. at 544 steps we came down a steep rocky hillside to the bed of a creek running from west southwest to east northeast. ascend a diorit hill now. . . .

And so on and on.

The going was somewhat easier on October eleventh when, after walking for a long time in a swampy valley, they "ascend the Quarzite ridge and follow it eastward until we are 1940 steps from our starting pt. at creek." Dr. Rominger noted the kinds of rock and the position, then added this final paragraph for the day which had obviously been a tiring one:

> we have gradually descended again in a valley where we meet with a trail which we follow. the Quarzite range is very high and must be recognized from distance as we do not know exactly our whereabouts. at 2456 steps we are on the top of Quarzite hill above the farm where we have our horse, about 40 acres from the north of south line of Sect. 2. our general course therefore was east southeast.

There the diary ends and likewise the field work of 1877. Later Dr. Rominger figured he had mapped about 60 square miles during that season.

XIII

1878: MAPPING OF THE MARQUETTE IRON REGION CONTINUED -- AAAS MEETING IN AUGUST

Dr. Rominger paused in his work on March 20th, 1878, to write his old friend, James Hall:

> Your letter was duly received. I would have written you before this but being at present thrown altogether out of the Paleontological line into the Lithological I had no immediate cause for a letter to you.
>
> I will as soon as the season is a little more advanced return to Lake Superior and continue the explorations I have begun.
>
> I believe I have previously informed you of the plan I pursue, that is I restricted myself to a smaller confined district and examined it with greatest possible accuracy, hoping to find in this way much sooner a key to a thorough understanding of this complicated rock system than in any other manner. Last season I examined and mapped out about 60 square miles surrounding Marquette and this season I will go over a similarly confined areal [sic] joining the former and embracing the principal Iron mines of Negaunee and Ishpeming. In the quiet way I prosecute my work, with small expense to the State, I find no opposition, and every body lets me go my own course, but I think the case would be different as soon as I would claim assistants and increase of appropriations. Fortunately I do not believe that with assistants I could work more successfully than I do at present, therefore I need no larger appropriations and have in all things my own way, not to the disadvantage of the State.

He turned now to that "Paleontological line" and to a fossil apparently mentioned by Hall in his letter:

> The Tentaculites subtilis of Winchell is not represented in my collection, I have seen however at the locality where he found his originals here and there a specimen imbedded in the rock, but as they did not seem to me different from the usual form, (found for instance abundantly in the Hamilton group of Arcona Canada) I did not take any of them with me on account of their unfavorable preservation in a brittle calcareous shale and singly dispersed over the surface of slabs in great scarcity, mingled with fragments of bryozoa. Of the Arcona specimens I expect you will have a sufficient supply if not I can let you have some. . . .

This offer triggered a rapid exchange of letters. Dr. Rominger wrote on March 31st to say the Ontario fossil was ready to go:

> I have packed a specimen of the Arcona Tentaculites and will send it to you to morrow by Express. . . .

It seems odd that a tentaculite -- conical, tapering, and only about half an inch long -- should be shipped by Express and not enclosed in the letter; per-

haps the mails were less trustworthy then. At any rate, it arrived safely in Albany; Dr. Rominger referred to it again on April 18th:

> I have neglected to answer your letter dated April 4th until now, because nothing required an immediate reply. . . . The tentaculite specimen I intended to give to you, as I have an other one of equal beauty. I do not know of any body in the vicinity of Widder or Arcona which is a collector or who could be emploied as such. . . . About first of May I hope to leave Ann Arbor for my northern trip. . . .

He started off on May 6th and after a series of delays, reached his destination a week later. A letter written to his family from the Cozzens Hotel, Marquette, described the eventful trip:

> I only arrived here last evening. When I got to Detroit Monday the boat was still not quite ready and not till Wednesday morning at daybreak did we manage to sail as far as Port Huron where we arrived at noon and left again at night. The next morning we were in Port Austin on Saginaw bay and the following night in Point Detour near the St. Mary's river where we remained until morning. At noon we were at the falls of the St. Mary's, went through the canal, and there the weather was very rough and windy. We lay at anchor in Waitka Bay and stayed there until Sunday morning, then we sailed as far as Whitefish Point and had to anchor again in a bay on account of rough stormy weather. At last on Monday morning we set forth and arrived safe and sound in Marquette at 10 o'clock in the evening. We did not suffer much from the stormy weather. We went away from the storm as much as we could to protect the women on board from seasickness but there was enough of it. I felt quite well always. I passed my time by eating and drinking well, smoking, and actually reading novels of which we had a whole box full on board. It was pleasant for me, too, because I was acquainted already from past years with all the people of the boat from the sailors to the captain.
> Marquette is quite deserted. I am, I believe, almost the only guest in the hotel. I will soon be moving on to Negaunee and will tell you of it. Write me soon and send your letter to Negaunee. Later I can tell you the number of my letter box. If any letters come which must be answered by me, send them up to me. . . .
> So long, stay well. Affectionate greetings from your father, C. R.

Later that same day he went to Negaunee, rented a room at six dollars a month, and arranged for his post office box.

Beginning his mapping of Negaunee on Wednesday, the 15th, he found the "edge of first Iron mine at crossing of town line and not far from corner which is visible yet on a stump." The following day he paced 200 steps from "line on Jackson hotel to first opening of Jackson mine at the south end of Breitung street."

There is an interesting story about the origin of this Jackson mine -- the first iron mine in the state. According to the book Michigan: a Guide to the Wolverine State, in 1845 a party of explorers from the town of Jackson, Michigan, was on its way to the Keweenaw Peninsula to mine copper, silver, and gold when, near the site of Negaunee, an Indian chief pointed out a bed of iron

ore. This ore on Jackson Hill was so near the surface that it could be loosened easily with a pick.

As might be judged, the men stayed to mine the iron. A forge was built at Negaunee in 1848, but it took the completion of the railroad from Marquette in 1857 to make the town boom. Both Negaunee and Ishpeming were flourishing in the 1870's. Ishpeming's first mine -- the Cleveland -- had been started in 1849.

Dr. Rominger worked quite alone during the first two months of the 1878 season. Then, in spite of what he had written to Hall, he acquired a helper; he needed one. Doubtless the man's wages did not require an increase in the Survey's appropriation. On Wednesday, July tenth, he noted that he went on an

> Excursion with assistant to north tier of T. 47, r 25. Provisions 3 Doll 50. sent for supply 2.80. Crossed Carp river in the centre line of the Section 6, and ascend a hillside. . . .

The mapping proceeded as it had the previous year -- with Dr. Rominger counting the footsteps, watching the compass, and writing all the data in his notebook. What the assistant did is not specified.

There were days when tramping through the woods must have been enjoyable, as on a Monday (no date given):

> from here we go west on the low ridge enter pain [sic] plains which continue to the next corner interrupted by some Hardwood and mixed timberlands. from that corner we turn nord towards the Carp river. the first $\frac{1}{4}$ of a mile leads us over a Quarzite and marble knob on the other side of which we find a fine creek where we take dinner. . . .

One day, unfortunately, they went out of their way and

> followed a wrong line to far east. . . . we are on a declivity eastward which descends north to the Carp at a distance where we can hear the falls north of us. at the falls we find the line again. we have been much too far east. . . .

Sometimes it must have been a hot, discouraging job, such as on the day they descended into a deep valley of "low but dry land" which soon changed to a swamp stretching in all directions. Dr. Rominger climbed "a high tree to look out"; the swamp appeared to be "nearly half a mile wide." Towards the west he could "see a high hill at some distance"; they worked their way towards it and out of trouble.

In the latter part of August he took time off to attend the annual meeting of the American Association of the Advancement of Science of which he had become a member in 1872. The excursion this year was to Pilot Knob and Iron Mountain in the Ozark region of southeastern Missouri. It began on Saturday, August 24th, when, Dr. Rominger noted in his diary: "passing at first for 10 or 12 miles down along the Mississippi we saw extensive outcrops of the St. Louis limestone." Later they came to outcrops of the Iron Mountain and Pilot

Knob iron formations, of particular interest to him in view of his work in the Upper Peninsula.

The day ended most enjoyably:

> from pilot knob we returned near dark and arrived at St Louis again about 11 at night. The citizens of St. Louis and the Rrd co. made every effort to make the trip for the participants as pleasant as possible Beer lemonade Ice cream cakes were in abundance served round the cars and a few miles beyond the Pilot Knob we stopped at a large country mansion with garden where a sumptuous dinner was served.
>
> Sunday afternoon accepted an invitation to Doctor Hambach which acted during the past few days as a faithfull cicerone to me and Prof Safford in which latter aquaintance I rejoice considerably not only from the Standpoint as a Scientist but for his pleasant social qualifications.

Beyond this point the writing is hard to decipher, with the exception of this brief note: "To Pueblo Dinner excellent. A H & Geo B. Worthen Warsaw Ills."

Dr. Rominger returned to Negaunee on Saturday, September 14th, to continue his investigation of the Marquette District, working out from Negaunee or from Ishpeming. Much of the time during the next five weeks he had either "John" or "Friederich" to help him. The country they traversed was extremely rugged. Take, for example, Wednesday morning, October second:

> went along a road north from our camp until we struck the north line. . . found the line in swamp. . . from the aforesaid swamp we ascended high lands and descended then to the creek. . .ascended a ridge on which we find the corner on the northwestern slope. we then follow the line north. . . descending into a swamp. . . ascend unto a high plateau mostly drift covered but in places full of large angular boulders of the ferrug. slates. . . we now follow the line south ascend the ridge which here has no good outcrops. . . .

The work must have been tiring and often discouraging. Then the weather abruptly ended the season:

> Freiday 18 Oct. Snow. quit work packed boxes and prepare for departure afternoon to Ishpeming where the Barnum mine co. bored through the upper Quarzite in the village for ore. . . found 18 feet of Iron ore at a depth of 600 feet below surface.
>
> Sontg 20 Oct. left Negaunee for home.

XIV

1879: CONTINUATION OF WORK IN THE MARQUETTE IRON REGION -- MARIE'S VISIT TO THE UPPER PENINSULA -- REPORT FOR THE BOARD OF THE MICHIGAN GEOLOGICAL SURVEY

Professor Hall's invitation was a tempting one but it must be declined. Reluctantly, on February 17th, 1879, Dr. Rominger took time from his pressing work to do so:

> I received your kind invitation to spend a few weeks at Albany assisting you in the finishing arrangements of your paleontological work, with great regret, because I can not accept it and would very much have liked to do so. The work of preparing a detailed geological map of a country so complicated in structure as the Marquette region, and the examination and proper description of all the innumerable rock varieties is a very time robbing task and I am not half done with the work I proposed to have finished before the field work of the comming [sic] season begins. You will excuse me therefore if this time I can not comply with your wishes which under other circumstances I would have cheerfully responded to, considering it always as a pleasure to have an occasion to exchange views concerning the paleontological science.
> Please give my kind respects to your family.
> Very sincerely yours,

The signature "C. Rominger" was written with a flourish.

The "geological map" to which he referred showed "the Environs of Marquette, Negaunee and Ishpeming" and was drawn to the scale one-and-a-half inches to the mile. It was in color, the eight colors indicating rocks from the Precambrian up to and including the Silurian. Its preparation would indeed have been "a very time robbing task." This map was to be a replacement for the Government maps he had found inadequate and inaccurate. As he explained in the introduction to Volume IV:

> the course of creeks and rivers through the interior of such squares, and the hills inside of the circumscribed lines, were merely located by guess-work, which led to considerable errors. Under these circumstances I was compelled to supply the topographical deficiencies of the maps, and to correct their errors, which is a very slow, time-robbing work, requiring an often repeated crossing of every square mile, noting the distances by counting the steps taken in a certain compass direction, in order to locate the drainage channels and surface elevations in the interior of the sections in their proper positions. . . . straining all my energies, I could not accomplish more in a summer season than to make the examination of about sixty square miles. I selected the environs of Marquette as a starting-point for my explorations, taking in a strip of land about ten miles in width from north to south, and extending the examination of this belt westward as to include Lake Michigamee. . . .

To continue his field work Dr. Rominger departed early in May for the Upper Peninsula. He rented a room at Mr. Friederich's in Ishpeming and on Tuesday morning, May 13th, started out to visit some of the many iron mines and test pits in the area; sometimes the ore deposits were near the surface and sometimes covered by boulder drift.

On Sunday, June first, he noted in his diary that "the red jaspery ore beds beautifully polished by drift action are seen on the surface in almost vertical position or other times with southern dip. north of them the brown Jaspery ore strata with fine bunches of grape ore are largely exposed." He followed these beds for some distance, adding:

> The reasonable explanation of the arrangement of these different rock outcrops is a matter of great perplexity and I am for the present not settled in my opinion as to the age of the Quarzite, whether it is the upper or the lower Quarzite. the diamond drill will solve this problem in a short time.

He had watched one earlier in the day, boring through quartzites thought to be not less than three hundred feet thick.

The notation on the following Tuesday was terse: "remained home waiting for Wagner but he failed to come. Wagner arrived during that day." After wasting so much precious time Dr. Rominger may have had much to say when the man finally put in an appearance. It will be remembered that this Wagner had been his assistant in 1877. Although he is not mentioned again by name, he doubtless accompanied Dr. Rominger on his excursions for the rest of the week; the entries are all plural, such as: "we leave now the strict compass direction and wind our way westward."

There are no entries at all between that of Saturday, June 7th, and Tuesday, July 29th. It seems probable that during that interval Dr. Rominger carried another notebook, which has since disappeared. However, two letters written in Ishpeming fill some of the gap. The first one, to James Hall, bears the date June 14th:

> Your letter dated May 13 was sent to me from home, but as I could not give you satisfaction by sending the requested specimens, or answer the special points in regard to fossils, I did not reply immediately. Nearly all this while I camped in the woods and returned to Ishpeming yesterday. I ask you therefore to excuse my long delay of a reply to your letter, and as I have nothing of particular interest to yourself to communicate, I send simply my kindest regards, to you and your family.

Short and to the point. A letter to his family written a month later, on the 14th of July, is more informative:

> This morning I received the letter from Julie and I am glad to have the good news about her health. Last week I was 10 days in the woods and in a ghastly swamp territory with rain twice every day so that I had to dry my suits twice during the evening for several hours only to be thoroughly soaked again during the first half hour the next day. Otherwise I was quite well and feel completely

refreshed again after two days of rest.

Tomorrow I will begin another excursion for a full week or ten days in order to be back home when Marie arrives. The berries here are not ripe yet but she will not be here before another fortnight. Advise me of her departure. She had best take the railroad and let Breissacher get her a ticket. However, if she prefers, she may take a steamer from Detroit. When I know at what time she plans to arrive I shall fetch her from Marquette or, if she comes by rail, I'll meet her at the station in Ishpeming.

I still have not had time to answer the letters from Bielhuber. Besides, I do not know how to advise him. So -- in ten days I will be at home to expect Marie so I can roam around with her and show her the beauties of nature in our surroundings.

The letter was signed: "Your father who sends you all his love."

By this time Peter Krier, the young man who had been with Dr. Rominger the previous summer, had rejoined him. Marie, then just sixteen, must have arrived in Ishpeming before July 31st because on that date, according to the diary, both Peter and Marie went with him to Eagle Mills. That was doubtless a good place to enjoy "the beauties of nature" and ripe berries as well as to do geology work.

If Marie was with her father and Peter during the following week she had some strenuous exercise. They camped in the woods, and Dr. Rominger's descriptions of the country he was mapping contain references to "a steep high hillside," "a deep east and west ravine," "a very steep third slate hill," and "the swamp valley" into which they slowly descended. Perhaps she helped carry the specimens of rock he was continually picking up; at any rate, as he was counting his steps all the time, he would not have made much light conversation.

They "returned to Ishpeming Freyday evening [August 8th]. hired wagon for going and returning from camping place 2 trips 5 Doll. 8 days work paid to Peter Krier 16 Doll." Saturday Dr. Rominger paid Friederich for his room, Sunday and Monday he did "office work at Ishpeming," and Tuesday's activities are unrecorded. That might have been the day Marie left for home as the entry of Wednesday, the 13th, is unusually short:

Went with Peter Krier on Trip to S. 14. T. 48 r. 27

Dr. Rominger and Peter were together on one trip after another until the latter part of September; his notes contain chiefly data for his forthcoming report on the Marquette region. Just once, on September first, is there mention of a moment he wanted to remember. After climbing steep hills, walking "in timberland," and then descending into the valley, they climbed another high hill. "From the top a view of Lake Superior is offered," he wrote; "it is the highest point all around." Surely they stopped for a while to enjoy it before going on.

It was hard walking much of the time. On the last day of the season -- Friday, the 25th of September -- they took "558 steps over hill land on plateaulike top" where there were "large boulders," descended into a large swamp which they crossed, and went over another hill and down into another swamp; they walked up once more onto a plateau covered with boulders, and finally "descended into a ravine with creek. . . . we are probably too far west of the section line several 100 feet or perhaps as many steps."

Dr. Rominger wrote a description of a granite outcrop near that creek, took a sample of the rock, and called it a day.

Saturday he paid Mr. Friederich's board bill and, presumably, packed up and left for home.

He completed his report on the Marquette iron region and delivered it to the Board of the Geological Survey that fall as requested.

XV

1880: SURVEY OF THE MENOMINEE IRON REGION -- NEGAUNEE TO LAKE MICHIGAMME

The Board of the Michigan Geological Survey temporarily filed Dr. Rominger's report of the Marquette district and asked him to survey the Menominee iron region during the 1880 summer season. His two reports could then be published together at a later date.

The Menominee region was very large. It extended westward from the Brien and Emmet mines (about 33 miles west of Escanaba) to mines near Iron River, and south from the Felch Mountain range to the Brule-Menominee river. Much of it, in Dr. Rominger's words, was "as yet an unbroken wilderness, accessible only by slow, tedious travel."

He left Ann Arbor on Thursday, May 27th, to begin his new assignment and, settled at Vulcan Mine, wrote a letter full of information to his family on the 31st:

> I have been here since last evening in quite a nice hotel, although the food is not to my taste; at least I have a pretty good little room. The mosquitoes are here in abundance but I don't mind them as much as I used to.
> Friday, instead of coming here, I went to Negaunee and Marquette. Got the necessary charter from the Land Office there. In Negaunee I saw Peter Krier who has now taken up another occupation; however, in about eight days he will come here to stay with me again for the summer. I will give him 40 dollars a month and all expenses paid.

> A lot has changed since I was here 7 years ago. Around the railroad station and at the mines they have built a great number of houses, in fact a pretty little town with 500 to a thousand inhabitants. They have also built roads everywhere so travelling is very much easier for me.
>
> The next time you have a visit with Professor Jones give him my best greetings and say that I will write him soon, when I am better established here. He ought not to fear the mosquitoes too much. Apropos of this I give him a consolation somebody gave me today as an excuse for this pest. He says he feels free from all his troubles as the mosquitoes leave him no time to think about them.
>
> . . .
>
> I almost forgot to tell Marie that Friederich and Ivor went to Green Bay a week ago and have rented their house in Ishpeming.

Professor Jones -- Dr. Samuel A. Jones -- was Dean of the Homeopathic Medical College at The University of Michigan. He and Dr. Rominger enjoyed frequent, sometimes heated, discussions on many subjects, one of which was immortality; this led to a solemn pact that whoever died first would communicate with the other. Years later Dr. Rominger failed to keep that rendezvous to Professor Jones' surprise and disappointment.

While staying at Vulcan Mine Dr. Rominger made daily excursions in the vicinity and to the Brien and Quinnesec mines, studying the layout of the land and the character of its rocks. At one place he estimated that the Iron formation amounted to "not less than one thousand feet of strata and perhaps much over."

He moved on Tuesday, June 8th, to Waucedah, a few miles to the east, and at once started to examine all the country within walking distance. Returning to a lumber camp Thursday, he was caught "in a constant rain soaking me all through"; he went on, however, to the falls of the Sturgeon river where "at the entrance of the chasm on both sides high walls of Quarzite" enclosed the bed of the river.

Dr. Rominger was interested not only in the structure of the Menominee region per se but in correlating its formations with those of the Marquette district. He thought about this as he studied the "precipitous cliffs" of quartzite:

> an other Idea awakened in my mind by seeing the structure of the Menominee region is the possibility of the so called 4th group in the Marquette district being misapprehended in its actual position in the series. it may be above the ore formation instead of below as I believed. This question is to be altogether reconsidered by me. A good many facts in the Marquette district hard to be reconciled with the presumed older age of this group could be more satisfactorily explained by taking the 4th group as a younger formation than the ore formation.

Friday, the 11th, he took the train to Quinnesec, about six miles the other side of Vulcan Mine, and on

Saturday 12 Juni. attempted to walk to Quinnesec falls but found the road and adjoining marsh country so floated over that after persevering efforts to get through proved in vain I returned and hired a boatman for the next day to bring me down.
In the afternoon walked to Lake Antoine over drift covered hills the Lake is beautifully situated, surrounded by high ridges from the north and south side. the ridge on the north side is clear of timber by a former destruction by fire On its slope towards the Lake a number of testpits have been sunk through the drift which is very thick. . . .

Sontag 13 Juni. by boat to Quinnesec falls in comp. with Ingenieur Hungerford whom I invited. hired a man and boat for 3 Dollars. Quinnesec falls break through a rock barrier about 400 feet. . . .
Afternoon visited the mines. in the oldest pit the superposition of the Potsdam sandstone on the ore beds in a trough is well exposed. . . .

Dr. Rominger must have had word at some time that Peter Krier was not going to be able to join him after all for, returning to Waucedah on Tuesday, the 15th, he "engaged a man at 35 Doll. per month and all his board and traveling expenses free. his name is Steph. Nickels."

On Thursday he and Stephen "went with camping equippements" on a trip that was to take them over high granite hills, crossing and re-crossing Black Creek which, Dr. Rominger noted, "is very incorrectly marked on the Gouvernements map." They returned to Waucedah Sunday and on

Monday Jun. 21. started at noon with camping equippements for Felch Mountain. wrote to Dr. Jones. arrived in the evening at Holms Farm. . . 9 miles distant from Waucedah found good quarters there. . . .

Tuesday they "left Holms camp at 7 in the morning followed a lumbering road winding along the south side of Sturgeon river." It was not long before they began to see test pits -- first, the "testpits opened by Mr. Wolf of Chicago. . . . we go further on through Sect. 8 and find all the surface covered by testpits. . . . the test pits of Mr. Jacobs have struck the Iron formation direct under a thin crust of Silurian sandrock ledges."

Not all prospectors were as lucky as Mr. Jacobs for some pits were dug with more optimism than wisdom. Major T. B. Brooks, who had spent years in the Upper Peninsula's iron district, had published a report on the "Iron-Bearing Rocks (Economic)" in 1873. It described the digging of these pits, with some sound advice to the prospectors. For example: "Exploring excavations should always be done by contract; a large amount of 'test-pitting' has been done in the Marquette region at seventy-five cents per foot in depth for a 4 x 6 shaft."

He wrote that payment should only be made when solid rock was reached and uncovered, that the average depth of test pits was twelve feet but some were 35 feet deep.

After two or more trenches had been dug across the ore formation, Major Brooks continued, small rock fragments should be chipped off every two inches

across the whole bed. These should be washed, broken into smaller fragments, and mixed. Finally, to get an approximate analysis, one should "send a teacupful to a reliable chemist."

Both time and money were saved when the test pits could be evaluated on the spot as Dr. Rominger was doing.

On Tuesday, June 22nd, he and his assistant reached Felch Mountain which, he wrote, "is not a high mountain but a gently rounded drift ridge." It is located in what is now the Sturgeon River State Forest. Each day Dr. Rominger inspected test pits and examined the strata, impressed by the "rich seams of Iron ore" he saw at many places; each night they stayed at a different mining camp. Friday, according to his notes, "we took our dinner there at a clear creek with cool water," and at length arrived "after taedious travel at Bad water village and camp on roadside much troubled with musquitos so as to make my face swell." They were no longer a joking matter.

The trip ended Saturday afternoon; on Monday Stephen's pay was "suspended until he enters my service again."

Dr. Rominger moved that Monday (June 28th) to Quinnesec and began his study of the area by going in the afternoon to the Keelridge mine. During the rest of the week he visited many mines from Iron Mountain City eastward to Waucedah. Wednesday, near Lake Fumee, he learned that in some places "very strong magnetic attractions are observable. a spot of this kind has been pointed out to me by Mr. Fitzgerald an untiring explorer. . . The needle on this spot points with its north and southward, and 10 or 15 steps further it returns again to its normal position."

It was not until Sunday, the Fourth of July, that Dr. Rominger notified his family of his new address

> I have now settled myself in Quinnesec because I am almost finished with the eastern part of the iron formation. Here I have much more opportunity to make excursions into the interior. The people who operate the mines or are visiting them are all very polite and give me every possible assistance -- rides, etcetera.
>
> I am in excellent health and work continuously, but I'm waiting for more letters from you than I've had up to now. Send all letters to Quinnesec, P.O. Box 76. Especially tell Professor Jones that I've waited a long time for news from him and still have received none.

The following day was a holiday. Dr. Rominger described the occasion in his diary:

> saw the popular 4 Juli exhibitions of the villagers and miners of the surrounding country which assembled in large crowds and gave me an idea of the number of working men spread over the woods in all directions. 3000 people present is not overestimated.

Stephen returned to his job Tuesday but he lasted only a week; on Wednesday, the 14th, Dr. Rominger "settled up with Nickels and dismissed him." It is interesting to read that on the 15th the State Geologist bought himself a pair of spectacles for a dollar.

The ore beds of the Menominee iron region continued across the Brule River into Wisconsin, with two important mines -- the Commonwealth and the Florence. Dr. Rominger made a point of visiting them because, as he wrote, "if we want information about the geology of a district we can not mind State boundary lines."

On Monday, July 26th, he "went with Stage to Florence" and the next day, at the Florence mine, met Capt. Morrison to whom he had a letter of introduction. The Captain, he wrote, "kindly went with me through the mine and exploring pits west of the mine." Then he

> went in the afternoon with Landlord per buggy to the Commonwealth mine Captain Tobin led me through the mine and the surrounding test pits.
> Under a drift cover of 5 or 6 feet thickness on the plateaulike top of a hill an iron ore belt of 162 feet pure iron ore is uncovered. . . . from there we went south of the ore belt to see the overlying beds. . . the total of beds seen exposed including foot and hanging wall of ore belt is not less than one thousand feet. . . .
>
> Wednesday 28 Juli. went in Co. of Mr. F. H. Alward Mr. F. A. Ames and of Capt. Morrison to Jack Armstrong's so called Mastoden mine. . . a tolerably good wagon road leads to the place. North of Florence ere coming to the bridge across Brule river we have to cross a high ridge of Diorite but most of the rock is hidden by drift deposits. on the Michigan side of the river we drove for a long distance over drift covered woodlands partly burnt partly covered with hardwood timber. . . .

Going from one camp to another all day, they found the same series of rocks, with ore "similar to the Commonwealth." It was late at night when they returned to Florence.

While these men were helpful to Dr. Rominger, he was equally helpful to them. Take, for example, July 29th:

> was invited by Mr. Harvey to ride out to his mining pits. accepted the invitation. . . . I found most all the test pits opened in various ferrugineous schists which seem to overlie the ore belt. the testpits are consequently all too far north while a broad belt. . . supposed to underlie the ore belt remained unexplored. I gave Mr. Harvey and his men my opinion in regard to this and he will accordingly change his plan of exploration. . . .
>
> Freiday 30 Juli. returned by stage to Quinnesec. . . received letters from home and from Dr. Jones. answered them.

At the end of another week spent in much the same way Dr. Rominger very wisely, on "Sunday 8 Aug. made a day of rest. prepared for trip to Felch mountain."

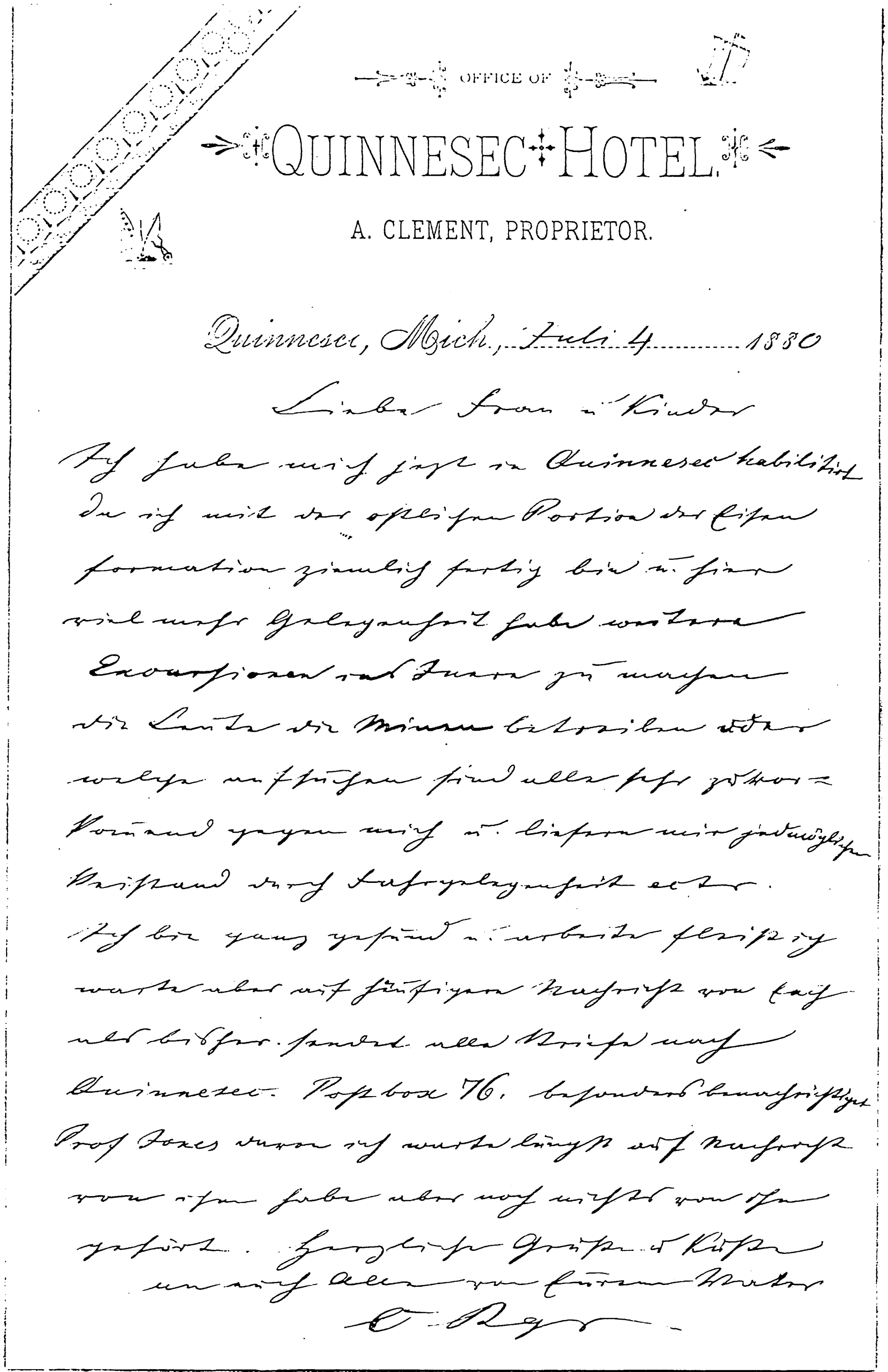


FIG. 15 -- One of Rominger's letters to his family which have been preserved, this from Quinnesec on July 4th, 1880. The Michigan Historical Collections of The University of Michigan.

With Mr. Alsworth Ames and the editor of the Quinnesec paper he set off the next day, stopped overnight at McMinn's camp, and arrived at Felch Mountain Tuesday afternoon. They went to several camps on Wednesday and Thursday, inspecting test pits. At one place Dr. Rominger noted: "This is decidedly the richest ore deposit known on the Felch mountain range. It is a direct continuation of Coreys ore bearing belt but much richer in good ore," but at another:

> I never saw a larger belt of decayed granitic and gneissoid rock masses which are well laminated by an evidently sedimentary striation. there is not the least prospect for iron ore deposits in this series and I advised Mr. Kemp to quit work at once, which he did.

Poor Mr. Kemp was disillusioned again the next day. Dr. Rominger went with him to other exploring pits of his where, after studying the rocks, "I advised him to quit work at once, which advice he followed."

Back in Quinnesec Saturday (August 14th), while sorting and labeling specimens, Dr. Rominger "had a visit from Professor Chamberlin of the Wisconsin Survey." Dr. Thomas C. Chamberlin was then thirty-seven years old and Chief Geologist of the Wisconsin Survey; later he was to become President of that state's University, and to win renown for his planetesimal hypothesis. On Tuesday, the 17th, the two geologists visited "the Quinnesec mine and then the Norway mines et Cyclops."

Sunday, August 22nd, after a morning of office work, Dr. Rominger went to Norway, somewhat to the east of Quinnesec. There he

> found great hospitality and politeness at the Wendel house by its proprietor Gehner found also my specimens collected at Felch mountain there and took them to Quinnesec where Mr. Gehner brought me in his carriage after having taken supper with him.

And so the weeks flew by, Dr. Rominger trying to see as much as possible of the extensive Menominee iron district. Wherever he went he found cooperation and interesting companions. His mode of travel and the weather varied. Wednesday, August 25th, he "went with train to Waucedah," Friday "per wagon to Pemenee farm on the Menominee river. all day heavy rain and thunderstorm"; the next day he "went with Canoe up to the Falls weather clear and bright."

On Sunday, the 29th, he

> went with wagon to an Indian camp $\frac{1}{4}$ of a mile below the mouth of Holmes creek. engaged the Indian to take me down to Quiver falls.
>
> Not far below the Indian camp are rock bluffs on the Michigan side of the stream where about 6 or 800 feet of strata are exposed which are in part richly impregnated with Iron oxyd. . . .

He returned to Quinnesec that evening and on Tuesday had the opportunity to visit a number of mines with the American Association of Mining Engineers.

Wednesday, September first, Dr. Rominger departed on a week's excurs-

ion with Mr. Kemp and some other men -- across the river to the Commonwealth and Florence mines, then across it again to Iron River at the western edge of the Menominee district. After looking over several outcrops on Thursday they "went by road to Chicagon lake . . . and camped there on the embankment of the Lake." Friday they continued "over a very rough road to Iron river, a distance of about 8 miles over high hills with no outcrops but drift masses filled with large granitic and dioritic boulders. we passed an exploring camp about 3 miles from Lake Chicagon but saw no rock ledges exposed at the exploring camp of Sheldon where we arrived about noon. we pitched our tent."

After writing in detail and at length about all the rocks he saw -- their type, color, fracture, streak, etc. -- Dr. Rominger had this wise idea: "Instead of describing specially the rock found in the different locations I refer to the specimens collected. be it only remarked that with the mentioned silicious and argillaceous Iron bearing rock beds more or less graphitic seams are found interstratified."

Going every day from test pit to test pit and from mine to mine, it is little wonder that he arrived back at Florence on the 8th "with a Pack of about 75 pounds of specimens." There he had

> expected to meet Mr. Kemp and party but they were already departed without waiting for me as previously agreed. found Mr. McKenny with a team and accepted his invitation to ride with him to Quinnesec where we arrived after 7 in the evening.

As one might expect, he "packed specimens in the forenoon" the next day.

He was off again Friday on another trip, this time "to Bad Water with wagon," then "with boat up stream to great bend of river where we took dinner"; the next day at "8 oclock in the morning arrived at the falls of Michigami at the union with the Brule," and "from falls of Michigamee we went up some distance on Brule river." Sunday they "went down the river, halting at every outcrop and collecting specimens thereof" -- lots of them, for in Quinnesec Monday Dr. Rominger "sent by freight 13 boxes with rock, 1 wooden trunk."

Dr. Rominger had done all he could that season in the Menominee iron region. As he wrote later, he had been unable to see all of it so he had tried to understand "the general structure of the whole district." "The country west and northwest of the Quinnesec mining district" would have to be investigated another year.

On Tuesday, September 14th, he went up to Negaunee and at once "bought from Mineral store 4 Dollars worth of Specimens. Ichthiophtalon banded grape ore, Pyrolusite, 1 mineral not determined." He spent Saturday, the 18th, at the Champion mine where, he wrote, "the chloritic rock of the ore formation is charged with nests of black Turmaline and with Garnets."

Monday he went by train to Michigamme for a few days. While Tuesday

might have been somewhat disappointing -- rainy, with "no outcrops" on the promontory south of the mines -- Wednesday was a day to remember. Going "with Mr. Kroll per boat to Silver Island in Lake Michigamee," he found the rock "full with twin crystals of Staurolite and garnets of small size. There are also large transverse seams of white quarz and white and black mixed inclosing large crystals of several minerals andelusite? ectr. the thickness of this rock series which forms all the Islands in the lake and projects in high vertical walls amounts to several thousand feet as it appears." The $3.75 he paid "for man et boat" were well invested.

The next morning he returned "to the hillside west of Michigamee mine and found again my former observations confirmed. As shown in the sketch on the other side of this. . . ."

Perhaps he was too leisurely in his sketching because he

went at noon to Negaunee packed up and tried to leave for home with the two oclock train but came a few minutes too late.

XVI

1881: PAPER FOR INTERNATIONAL GEOLOGICAL CONGRESS -- WORK IN BOTH MARQUETTE AND MENOMINEE IRON REGIONS -- LAKE GOGEBIC -- "MICHIGAN AND ITS RESOURCES"

Dr. Rominger felt it urgent to complete the survey of both the Marquette and Menominee districts before the test pits caved in or filled with water. Impatient to go north again, he took precious time in the spring of 1881 to do what Professor Hall had requested -- write a paper for the meeting of the International Geological Congress to be held later in the year. Closely spaced, his "brief statements" on the nomenclature of the metamorphic and Paleozoic rocks of the Upper Peninsula filled seven and a half sheets of paper. He dispatched them to Hall with a note on May 5th, and six days later departed for Negaunee.

Temporarily settled there, he made a quick trip on Saturday, the 14th, to Marquette to order "maps drawn on cloth" for his field work. Then he went out to the Lighthouse Point to look again at the familiar vari-colored rocks and at Lake Superior before returning to Negaunee.

It was cold and rainy there the next morning but in the afternoon's "fine weather" he visited "the different Haematite mines" south of the village and some newly-opened test pits. Monday he went by train to L'Anse to see what had developed since his last trip to that area.

The following Friday, May 20th, in Marquette the Vice-President of the Houghton and Ontonagon Railroad, Mr. Hornby, presented Dr. Rominger with a pass which he used continually thereafter as the railroad served many of the mines. In fact that same afternoon he took the train to the Champion mine station, roughly thirty miles west of Marquette. Sunday, along the shore of Lake Michigamme, he saw rocks "crowded with garnet crystals," some of which doubtless were taken for his collection.

In Negaunee on Monday (the 23rd) he wrote letters to his family and to his friend, Dr. Jones, and on Tuesday went to Ishpeming. At the office of the Lake Superior mine he got helpful information about a drill hole; the same rock was encountered that had been met with in a drill hole at the Cleveland mine. He visited many mines that week -- the Saginaw mine on the 26th, the Teal Lake mines on the 27th -- sometimes several in one day. At each locality he examined the strata lying above and below the ore belt, drawing diagrams for future reference.

He saw an interesting section at the Conrad mine on Saturday, May 28th. The ore belt "in one place," he wrote, was "bright slate ore in other pits a dark granular ore of fine grain or of coarse grain with octahedric crystals." Studying the rocks there and on the west side of the range, Dr. Rominger became convinced that "the whole series is to all appearances in an over turned position, the lowest above, the highest below. South of these pits in Sect. 18 an other Company has put up a Diamond drill and bored 250 feet into the actinolite schists below the ore formation. I therefore gave them the proper advice and told them to stop work in that locality as they never would strike the ore formation there."

Back in Negaunee on Monday, June 6th, he "received proof sheets from Jul. Bien, and read proof, made the necessary alterations in text." A week later he took advantage of a rainy day to correct 120 pages, returning them all to New York. He received, corrected, and returned another batch of proof sheets on the 20th, and still more on the 25th.

After five weeks in the Marquette district, Dr. Rominger went south on June 21st to Quinnesec for ten days' work in the Menominee iron region. The next day at the Quinnesec mine he noted with surprise that "the strata of the entire hill have a regular dip to the north." After going to several other outcrops he realized he had previously been wrong in his interpretation of their beds. As he wrote in his diary:

> West of the Quinnesec mine are new exploring pits in which the formation dips likewise north and the limestone is found on their north side. it seems therefore in these localities that the limestone is the overlying rock. and then the silky shining grey schists would be the lower strata underlying the ore formation and resting on the dioritic rocks south of the Menominee river. The limestones of the Norway mine are then in an over-tilted position and the sericite schists

north of them likewise. in this case the Commonwealth ore formation would be a higher instead of a lower series of strata.

This radical change in his thinking needed to be checked so he

went to slope of ore hills on west side of Quinnesec and convinced myself by the rock exposed in numerous test pits of the error in which I previously fell. The silky shining slates are the truly underlying rock of the ore formation and the Lake Hanbury series is consequently an older rock than the ore formation.

On Thursday, June 23rd, he went to Norway where he tested his "recently adopted views." The beds there were indeed overturned as he had theorized. At the Ludington mine Friday the shape of fossil "ripple marks" on the upper side of the strata seemed further evidence of "the overtilted position of the ledges."

He took the noon train Monday, the 27th, to Florence, Wisconsin, across the Brule river, re-crossing it into Michigan. The next day at Crystal Falls he saw a series of rocks distorted by tremendous compression, a "very instructive exposure" he described graphically as follows:

a succession of over a thousand feet of strata is exposed there striking across the river but the beds are so much dislocated that their strike often changes abruptly in a sharp or right angle. other parts of the formation are seen bent in sharp zigzak lines hither and thither or coiled up in a spiral way.

It was Saturday, July second, when he returned to Negaunee; Sunday he went over to Ishpeming to make "arrangements for the trip to Gogebik lake."

Dr. Rominger had heard much about the iron district near Lake Gogebic and was anxious to see it. On the afternoon of the 5th, "with Mr. Swift and others" he went by steamer to Houghton and from there by stage to Rockland, more than thirty miles to the southwest. On Wednesday evening, July 6th, they arrived there and "visited Minesota mine. . . splendid view from these hights."

At the Minesota he must have been told about the huge mass of solid copper found by the miners in 1856. Its weight was estimated variously between 400 and 600 tons; its size was long a matter of conjecture since it had to be cut underground before any of it could be removed. Earlier, in 1848, a prospector had discovered in a cave on this Minesota property ten cart-loads of stone hammers and other primitive implements that had been left beside a large chunk of the copper by prehistoric miners.

From Rockland Dr. Rominger and his companions continued on towards Lake Gogebic. Friday morning, the 8th, they arrived at the lake's outlet where they "waited for Boats all the way high bluffs of Copper trap afternoon to a promontory in Lake rough lake." Early the following morning they left camp and

rowed to inlet of Lake Gogebik. . . . Just at the entrance into the river at south end of the Lake a rocky knob consists of silky shining hard schists and of harder thick bedded rocks. . . . up the river a swampy valley extends for about 2

miles. the river bed is very tortuous, the water deep and sluggish contains a great abundance of Trout from 2 to 4 pounds. in the Lake are Perch of large size in great numbers. . . .

Sunday 10 Juli. went to Falls of river at the head of Lake Gogebik. Large outcrops of hard mica schists of great thickness dip apparently south. . . returned in the evening to camp on the river. . . .

Montag 11 Juli. went with boat up Lake Gogebik to the Flambo indians trail examined the shoreline carefully but could not find outcrops of any kind. . . Monday night hard rain and our camping place transformed into a mudhole. Mosquitos very plenty.

Dienstag 12 Juli. went for some distance on newly blazed trail along Sect lines to a locality in the centre part of Sect 35 T. 46 r 43. . . .

Dr. Rominger described this occasion fully -- and frankly -- in his Report (Volume V) as follows:

. . . I accepted the invitation of an explorer to accompany him to Sec. 35, T. 46, R. 43, where he pretended to have found a gold-bearing quartz vein intersecting the granite. The trail he led me went through almost impenetrable brushes of ground-hemlock (Taxus Canadensis) in alternation with spacious marsh grounds, where acrobatic dexterity was required to walk the slender poles laid across the bottomless mud holes; finally he showed me, in the midst of an alder bush swamp, a few knobs of granite associated with hornblende rock. . . intersected by a narrow vein of milky quartz containing small, thinly scattered concretionary masses of iron and copper pyrites, so little promising in appearance that even in case the pyrites were auriferous, which I positively doubt, the poverty of the quartz vein in the pyritous minerals would preclude all expectations to mine with the slightest success.

Considerably more conversation must have followed for Dr. Rominger added:

After a short rest from this tiresome walk we took our back tracks, both disgusted, the explorer because I would not believe in the value of his discovery, and myself for having seen so little of the structure of the country over which I had to travel with so much exertion.

To return to the diary --

On Friday, July 15th, they left their camp on the river and rowed down the lake for six miles. "Camped at Flambo indians trail which same trail leads to the exploring pits of Gillis for argentiferous galena. . . spent afternoon in fixing up camp near shore. in the evening a Thunderstorm." That storm cleared the air:

Saturday 16 Juli. a most delightfull morning. after breakfeast went to Gillis exploring pits a fine trail leads there. . . at Gillis place on north side of camp are bluffs of Quarzite well laminated partly grey partly red and portions of the rock weathered rust colored et porous. . . the Quarzite contains irregular narrow seams and nests of Galena Iron and Copper pyrites. . . From Gillis camp a trail is cut out to Sunday lake

Sunday 17 Juli. left with boat for outlet of Gogebik handed to Mr. Swift bag

with 30 specimens. returned in the evening to camp. . . . hid the boat and prepared for trip to Sunday lake.

The trip seems to have added little of importance. They returned to Lake Gogebic Friday and left early the next morning on a long day's walk "to Fergusons where we stopped over night . . . J. Coon carried a part of my baggage to Fergusons" -- rocks, no doubt.

Back in Rockland on Sunday, the 24th, Dr. Rominger "bought Silver specimens 10 Doll." and Tuesday went by stage to Houghton. There he found friends -- "Mr. Ames, Mr. Sheldon, Mr. Hoar and several others remained with them until 2 oclock at night. Mr. Sheldon presented me with 2 very fine Silver specimens one from Cliff mine the other from Ridge mine." By Saturday he had accumulated so many rocks that he shipped six boxes and a trunk to Ann Arbor before leaving again for the woods.

Reporting later on this Lake Gogebic trip, Dr. Rominger wrote that his observations had depended largely on "the work of the explorers, as natural exposures are very limited in these unbroken forest lands, and many of those existing escape the attention of a transient traveler who usually cannot see many rods beyond the spot he stands on."

On Sunday, July 31st, he went south to Quinnesec to work in the Menominee iron region. His first project was to revisit the mines and test pits on Felch Mountain and he left the following Monday for that area with a Mr. Brotherton, going by way of Norway. In spite of heavy rain on two days, he was able to visit the Metropolitan and Northwestern mines and many exploring pits, before going back to Quinnesec on August 9th. The next day he received from his publisher the proof he needed to make an index for his report; thanks to "hard tunderstorm et rain" he attended to "office work" on both Wednesday and Thursday.

On Friday, the 12th, he went with Mr. Hamilton to Dikes mine beyond East Vulcan, then across the Sturgeon River to some newly opened test pits. What he saw at the latter place confirmed his theory as to the relationship of the various beds. "It is certain," he wrote in his diary, "that the limestone regularly overlies the ore formation of this locality and further it is certain that this ore formation is identical with the Quinnesec ore formation."

Back in Quinnesec, he "sent manuscript of index of my report to Jul. Bien sent letter home also to Prof. Jones." Then, his desk work done, he was free for work in the field. That afternoon and the following day he examined test pits with Mr. McMinn.

His next long excursion was to the western part of the Menominee iron district, going first to Iron River. On the day after his arrival there -- Wednesday, August 17th -- he went to some explorations "higher up the hillsides than formerly"; in several shafts "a very large body of iron ore was discovered, so far as known from 800 to 900 feet in length and in one place 119 feet wide in an

other 81 feet." After studying the situation, he decided that it was "in all probability a loose mass inclosed from all sides by lean rather light colored quarz schists."

One day he went with Captain Stephens to Broadmann's mine on the north side of Chicagon Lake. Here the ore beds varied -- "a belt of pure hydrated ore about 50 feet wide beside a large series of banded ore bearing jaspery strata" in one place, "a 50 feet wide belt of clean ore" in another, and "a layer of a fine blood-red soft hematite easily friable with the fingers into an impalpable powder" in a third. It was on this day that he had a treat:

> for dinner got an excellent venison roast as tender as I ever eat any.

Dr. Rominger returned to Quinnesec Sunday morning, the 21st, and spent the next few days relatively close to his base. Thursday near Waucedah, he was examining "the shafts of Mr. Ferguson," then cut through about 50 feet of white and reddish Silurian sandstone, when he found fossils:

> In the sandstones are fragments of a Lingula and Trilobite fragments quite abundant. I found head portions and tails of Dicelocephalus some very well preserved. In the other pits on the Brien mine property I could not find any Trilobites in the sandstone but Scolithus is quite common in them.

The following Saturday, August 27th, Dr. Rominger "wrote to Governor [Jerome], sent duplicate receipts for ¼ly salary to Lansing, asked permission for journey to Europe, received letter from Dr. Jones." That afternoon at Mr. McMinn's test pits he found "an abundance of Lingula shells" in some sandstone thrown out of the shafts. As a paleontologist he would have been much pleased, even if the specimens were not rare ones.

A week later he "received letter from Governor consenting to my journey. had a letter from Westerman ordering a volume of the third volume of my reports. lost letter or left it in coat pockets or trunk. Sent 4 boxes by freight 3.00 trunk by express 1.30 paid."

The very next day -- Sunday, the fourth of September -- he "took train for home at 4 in the afternoon" and on "Monday 5 Sept arrived home."

According to his diary, two days later he "went officially to Detroit to meet the Commissioner of Immigration" who needed his help.

At the January, 1881, session of the Legislature, the Governor of Michigan had spoken of the "millions of acres of good farming lands in this State unoccupied." Efforts should be made, he said, "to secure our share of the emigrants now landing upon the shores of the United States, and of the surplus population of the eastern States." A Commissioner of Immigration had then been appointed, and a volume to be entitled "Michigan and Its Resources" was in the making. Dr. Rominger, as State Geologist, was to contribute to this little book a "brief sketch, describing the surface character of the different parts of the State of Michigan."

No one was as well qualified as he to do this and, back in Ann Arbor, he set to work at once. Touching first on geography, climate, soil, and other physical conditions, he wrote a section he called "Openings for the Enterprising." Here he explained that there was still government land to be had for a dollar and a quarter per acre.

Since the book was designed to lure people, it presented only the State's best features. It boasted, for example, that "settlers in the upper peninsula are by no means dependent upon its railroad system for facilities of travel. . . . many wagon roads have been substantially built."

It said that the "Agogebic" district to the west of the lake of that name was "wholly undeveloped as yet, but is being carefully explored under the supervision of the State Geological Board" -- indeed, by none other than Dr. Rominger. It said, also, that "large quantities of land in that region have been sold with a view of explorations during the season of 1881 by the United States Land Office at Marquette."

As an added inducement to prospective settlers, the book described the fine university in Ann Arbor, which in 1880-81 had an attendance of 1534.

XVII

1882: FURTHER WORK IN MARQUETTE AND MENOMINEE IRON REGIONS -- THE COPPER COUNTRY (KEWEENAW PENINSULA WESTWARD TO WISCONSIN)

Were it not for a letter Dr. Rominger wrote to Professor James Hall in the winter of 1882 one might not know that his European trip had materialized. He told much in a single sentence:

> From my journey to Europe I have returned last April, but a few weeks only was I at home, and then went again to the Iron district of Lake Superior, where I remained unto September.

He arrived in northern Michigan late that May and, according to his 1882 diary, on Tuesday, the 23rd, presented a copy of his "Report" to Mr. John Hornby who, the year before, had presented him with a pass. The Vice-President of the Houghton and Ontonagon Railroad must have been pleased to read such a favorable account of the region served by his line.

This report, published by the Michigan Geological Survey as Volume IV, gives one a clear picture of the Marquette region as it was in the 1880's:

> The district was once heavily timbered, partly by hard wood, partly by pine; the marshy portions are occupied by almost impenetrable cedar thickets, not so often by tamarack, by alder bushes, or by other lacustrine trees and shrubbery. Since the settlement of the country the forests have been pretty well cleared off in the vicinity of the mines and furnaces; large parcels of timber land have also accidentally suffered destruction by fires and wind storms, but very little of the cleared lands has been cultivated and tilled, as agricultural pursuits have so far not been considered equally well remunerating as the working of mines. Many of the clearings have therefore already recovered their forest nature by a vigorous new crop of seedlings of poplar, maple, and other trees of rapid growth. Other places once covered by fine forest trees growing on a thin crust of soil with a rocky underground, after being accidentally destroyed by fires and wind storms, could never recover; the little crust of soil became speedily washed off by the rains, and the naked usually drift-polished rock faces can often be noticed for miles in length on the crests of ridges still bearing here and there the blackened stump of a gigantic pine-tree, the growth of former times, whose wide-spreading roots entered every available fissure.

Dr. Rominger described the substructure of this part of the Upper Peninsula as very complicated, its rocks -- Precambrian in age -- having been violently contorted, even overturned, by volcanic action.

"The surface of this area is extremely broken and hilly," he wrote. "It rises by degrees from the level of Lake Superior to an elevation of about 800 or 900 feet, but reaches in some summit points a height of 1000 or 1100 feet. The outlines of the hills are generally rounded, notwithstanding their frequent composition of greatly disturbed, often vertically erected rock-beds. . . ."

There still remained much to be done in this region and shortly after his arrival in Marquette, Dr. Rominger went to Michigamme inspecting explorations. At the slate quarries near L'Anse he noted that the thickness of the strata was "very great perhaps over a thousand feet but not all of it is fit to be used as roofing slate."

Returning to Marquette on Sunday, May 28th, he "packed and labelled specimens in the forenoon," then re-examined some of the nearby outcrops. The following day he went on to Negaunee and, in spite of considerable rain, visited a number of mines near and west of the town before going back to Marquette.

On June 5th he took the train to Quinnesec -- his headquarters for the next three weeks while he checked new developments in the Menominee iron district. Again he visited mines and test pits to evaluate the ore, often finding specimens he wanted for analysis or for his collection.

He had been to Felch Mountain, Waucedah, Norway, and Crystal Falls and to Florence in Wisconsin by Friday evening, the 23rd of June, when he returned to Quinnesec. The next day, conversing with "the man which drilled the hole on the Metropolitan property," he learned why he had found such puzzling rocks at a certain drill hole. The driller told him that "a large number of cores of a

dark diorite-like rock" had been carried there by a man named Corry "in order to deceive persons regarding the results of the boring. These occurred in a drill hole of an altogether different locality."

By the 3rd of July he had completed his investigations in the Menominee region and returned to Marquette. Two days later he went to Houghton in order to see more of the Copper Country with which he was less familiar. In the course of the next two weeks he saw most of it -- and copper in all its forms.

The Keweenawan Series of copper deposits occurs in a relatively narrow belt, two to eight miles in width. It extends southwestward for about 100 miles from the tip of the Keweenaw Peninsula through the Porcupine Mountains into Wisconsin. The series dips under Lake Superior, and appears at the surface on Isle Royale and again in Minnesota. To Houghton and Hancock, across the narrow end of Portage Lake from each other, gravitated men interested in all aspects of Keweenaw copper.

On Thursday, July 6th, at the "Quinzy mine" on Quincy Hill above Hancock, Dr. Rominger noted that the "ore bearing amygdaloid rock averages about 7 feet in thickness." The next day, in spite of rain, he saw more of this amygdaloid at the Portage mines, the soap and candle factory, and other places before he called a halt.

Saturday he took the train to Calumet and went from there to the Delaware mine "in a 2 horse stage carrying 19 passengers besides baggage. Several times broke down. at Delaware mine stopped for an hour. walked over the mining locality. old pits were worked once in an amygdaloid trap which contains seams of Calcspar and Prehnite in abundance. the mines presently worked are opened above this horizon in a belt of conglomerate about 20 feet wide. . . ."

Next he "went with mail carrier wagon to Copper harbor." It is easy to locate on a current map the mines he visited for most of them gave their names to towns and villages strung along the modern highway which bisects the Keweenaw Peninsula.

On Tuesday, July 11th, he went to the Phoenix mine where he saw "a fissure vein like the Central mine. . . from here to Cliff mine. . . . I notice west of the diabase not far from the Lake shore a mining pit but have to inquire [of] Mr. Brockway agent of the Cliff mine about the nature of the rocks in that place."

He walked that afternoon "with Agent Brockway along the cliffs, observing several surface indications of other fissure veins all of which carry some copper. . . ascended the bluffs. . . . Mr. Brockway drove me in the evening after supper over to Eagle river where I met Mr. Hill which explores in the neighborhood in this so called ash bed. . . from specimens shown to me it appears he found a very productive copper bearing belt." Wednesday he and Mr.

Brockway went "to the south part of the Cliff mine location where he is exploring the ground with a diamond drill but has so far not discovered any valuable rock bed."

The Cliff mine, started in 1845, had produced a vast amount of copper by 1878 when it had to be abandoned due to lack of marketable ore; efforts were being made in 1882 to find new sources of it.

Dr. Rominger continued on alone visiting mines until Thursday evening when he returned by train to Houghton with many new specimens for his collection. Friday, after packing these specimens, he

> saw Mr. W. Edwards cabinet of Lake Superior minerals it contains some most excellent specimens of Calkspar with Copper, crystalline Copper and Silver in large masses also Prehnite Apophillite and Analcinn are very fine.
>
> intend also to see the cabinet of Mr. James Walls in Hankock who is said to have a specimen of Calkspar with copper from the Phoenix mine for which he paid 90 Dollars. Made arrangements with Mr. Gillis to depart with him on Monday for Lake Agogebic.
>
> Afternoon to Huron mine Collected some specimens containing a peculiar sulphuret of copper of black color and obtained from the Capt a piece of Datolithe found there quite frequently.

The next day, Saturday the 15th, he

> hired a livery team to visit Osceola Calumet and other mines in that vicinity in Co. with Mr. Ames, Capt. Daniels of Osceola mine also Agent the Ahmeek mine and the Tamarack mine, a most liberal and well informed gentleman. . . . There are abundant specimens of crystallized and native Datolite, of Prehnite and of fine Stilbit to be collected, and the Capt. gave me of them very fine specimens he has a most wonderfull collection of Lake Superior and New Mexico specimens besides some from European localities all those specimens are in crystals of great beauty and perfection.
>
> Before we came to the Osceola we went through the rock house of the Albany and Boston mine now called Ohio mine. the Conglomerate there is very coarse but locally contains considerable copper in some of the cupriferous conglomerates the copper is transformed into green silicate of copper and into red oxyd which sparingly occurs in fine bright red crystals also leafelets of Silver are not rare in the rock. . . .

Dr. Rominger returned to Houghton after a stop at the Calumet mine.

On Tuesday, July 18th, he went by stage to Rockland; there he hired a man to help him and made other arrangements for a trip to Lake Gogebic with Mr. Gillis. They set off in a wagon Thursday, driving as far as Ferguson's camp where they spent that night; Friday they continued on and arrived at six in the evening at the landing where they camped.

Saturday morning, probably with Mr. Gillis though the diary is not clear, he walked up to Gillis' camp near which were bluffs composed of quartzite and

conglomerate containing galena; he noted that "the galena is occupying narrow seams or nests parallel with the formation and is to be found scattered through the rock through a thickness of 70 or 80 feet." The next day, after further examination, he drew a diagram of "Gillis lead mine."

In addition to lead, the area had much iron ore, some with "a strong magnetic attraction. in test pits sunk there a black magnetic schist found containing about 15 or 20 perct of Magnetite. . . . In the ore formation are some narrow seams of a good soft haematite but as a general thing the Iron ore is so mixed with Quarz seams that as far as the test pits exhibit it no prospects for a large deposite of clean ore can be had." They left Gillis' camp on Thursday, the 27th, went to Sunday lake which they crossed in a canoe, and took the trail to "Pieces camp." They saw much that was interesting:

> In an old windfall the ore is partly haematitic and of metallic lustre partly very fine crystalline limonite or grape ore and goethite. it occurs in 4 or 5 different belts of a width from 4 feet others 18 feet wide the ore is very rich clean of the inclosing rock which is hard quarzite. . . Stayed at camp of Capt. Piece.

Dr. Rominger identified this man later as Captain Pease of Ashland, Wisconsin.

Leaving camp Saturday, he "took trail to Montreal river leading over very nice hardwood lands"; this river divides Michigan at its western extremity from Wisconsin. Later in his Report he wrote that he had "followed the iron-bearing rocks into Wisconsin, which was the shortest way to get out of the woods and more instructive than my return by the same way I came would have been." On Sunday he "went by trail over to Wisconsin," crossing the Gogogashung River, the west branch of the Montreal, and "went on from there in a south west direction." With him was the man named Hunt he had hired in Rockland as packer. After dinner they "started west on the trail. . . struck potatoe river about in Sect. 19 and camped in an old Railroad survey shanty close to the river."

> Monday Juli 31. followed the trail to Taylors fork, a branch of bad river without seeing much of outcrops. On the other side of it however we ascended the high hills of Penokee range. . . . It rained all day severely and on the 20 miles long distance from Potatoe river to Penokee gape we had all to do to get ahead and paid little attention to the frequent large outcrops of the Iron formation which I expected to see to full satisfaction exposed at the Penokee gape. finally we arrived there at 5 oclock in the evening all wet even the interior of our packs which were more than twice as ponderous as when dry. went with railroad at half past six from Penokee station and arrived at Ashland stiff and chilly although the conductor kindly made for us a fire in the Stove.
>
> Went to Michigan hotel a modest inn but tolerably well kept in the large hotel opposite the charge regularly 4 Doll pr day which I considered too extravagant paid 2 20 cents railroad fare for me and my packer paid him on account the sum of 5 Doll found in the evening Mr. Piece, Mr. Day and Mr. Moore met also again with Mr. Roy of Milwauke.
> could not sleep at night for pain in my leg from over exertion in climbing dozens

of those steep hills and descending again.

Thuesday 1 Aug. rainy stiff leg. packed my specimens and dryed Blankets clothes and boots which were all wringing wet. wrote home.

How strong the smell of rain-soaked woolens must have been in that hotel room as he wrote! The next day, sparing his leg, he took a train ride to see outcrops exposed in the railroad cuts. Even so, he was still miserable:

Donnerstag 3 Aug. Staid at Ashland on account of stiff leg. Saw some fine specimens of Silver and Sulphuret of Silver at Mr. Becks, an old miner in the north shore district. got some specimens from him. . . Got an other fine specimen of argentif. Lead ore from Black bay 1½ mile from Lake shore from Mr. H. E. McDougal promised him an analysis. Saw at Mr. Vaughans' office -- van pronounced -- Graphite which forms a belt 14 feet wide in the black slate of the Iron formation. . . 3 miles north east of Penokee Gap. . . .

Freiday Aug 4 went by sailboat at 8 oclock to mouth of Montreal river arrived there Saturday morning at 4 oclock very cold night no sleep.

Saturday 5 Aug. Sent Hunt with Mr. Gillis back to Rockland went on Wisconsin side along Lake shore which is lined with high clay bluffs. . . . after dinner with boat to falls of Montreal. . . .
I followed the river for nearly a mile from its mouth. . . .

Sunday Aug. 6. remained in camp as my foot was still sore when I walked weather fine, lake quiet perfectly smooth.

Montag 7 Aug. to old mining location on Montreal river. 5 miles above its mouth followed an old wagonroad now used as a trail of the Iron miners. . . . returned to camp as my leg became swelled and painfull from the exercise I made. . . .

Then the weather changed and with it the notes in Dr. Rominger's diary:

Dienstag 8 Aug. Stürmisches wetter erwarte das Boot vergeblich

Mittwoch 9 Aug. Stürmisch. . . .

Apparently things got much worse for they evoked a paragraph in German However, the next evening

Moore comes with the Boat. Sail for mouth of Bad river arrive at 9 oclock in the evening.

Freiday 10 Aug. waited all Day for favorable wind. Indian left the boat to go to Dans [?] did not come back. in the afternoon heavy storm.
Tug Wadsworth went up the river returned six oclock in the evening took me aboard but had to stay in the river over night Morning went 4 miles up the river again to get breakfeast on board of an other boat belonging to one of the Saw mills at Ashland returned to mouth of river and remained there until Sunday morning at 6 oclock when the sea had calmed down.

Sunday 12 Aug. at 12 oclock arrived at Ashland [Wisconsin]

Montag 13 Aug. packed two boxes of specimens shipped them by Railroad. the Steamer Manistee left yesterday morning for Houghton. I have to wait for his return and down trip unto Thursday morning. . . . did not wait for Manistee

> and took a Boat to Bayfield [Wisconsin] taking my chances for a Boat going to Houghton. Thuesday the Peerless came and loaded lumber 250000 feet which took him unto Wednesday morning 15 Aug. when we started. . . .

Late that night they arrived at Houghton. A brief entry on Sunday, August 20th, indicates that he packed three more boxes of specimens to be sent to Ann Arbor, and settled accounts with his man Hunt. There the diary ends.

There is an informative and amusing letter on file in Albany, written to James Hall by Dr. Rominger on December 18th, 1882. Part of it follows:

> I am at present engaged to work out my report on the Iron District and considerable of my time is to be spent with analyzing ores and other rocks; likewise I prepare microscopical sections of rocks which is very slow work, but I have to do it in order to keep up with my Wisconsin neighbors.
>
> To examine the rocks microscopically is a great progress which I fully acknowledge, but all such things are carried to an extreme by fashion and much display of learnedness is made with microscopical lithology from persons which have their eyes not open enough for their next makroscopically observable surroundings.
>
> We have elected a new Governor in Michigan and I do not know yet whether the new official will let things unchanged, or whether I will have to make room for some one else; as far as I know there is none which calculates to step into my position and it is likely that no change is intended.

The new Governor, Josiah W. Begole, was content to leave things unchanged; Dr. Rominger was reappointed State Geologist.

XVIII

1883: TO JULY 27 -- A GOLD MINE AT ISHPEMING -- INVESTIGATION OF THE COPPER COUNTRY

The 1883 season began officially for Dr. Rominger on Thursday, May 17th, when he left for the Upper Peninsula. Arriving in Marquette Friday evening, he found the north country still in the grasp of winter. As he wrote in his diary: "The Bay is full of Eis yet."

On Saturday he went to Ishpeming to examine the Ropes gold mine about which he had heard; it was to become the largest in the state. He noted in one locality

> Several veins of white quarz some 5 and 6 feet in width. . . which locally are richly charged with the sulphuretes of Lead Copper Zink and Iron besides Gold and Silver in small leaves and in minute nuggets. a ton of such Quarz contains

> from 10 to 100 Dollars worth of Gold which is frequently visible with the naked eye.

After returning to Marquette later in the day he "sent a box with specimens from that locality to Ann Arbor." There was a "snowstorm nearly all day" Sunday.

Dr. Rominger planned to spend most of his time this year visiting copper mines and mining properties. With this in mind, he moved on Monday, May 21st, to Houghton on the Keweenaw Peninsula, having ordered maps of Keweenaw Point and "bought 50 cig. for 3 Doll."

Tuesday -- a "very cold but clear sunny morning" -- he began his investigation of the mines in the Houghton-Hancock area by going over the grounds of the Portage Lake Mine; in the course of the next few days he visited the Isle Royale property, Atlantic Stamp mills, the Hancock mine, and the Pewabic. At the last mine he must have picked up a lot of good chunks for he "paid man to help carry specimens 1 Dollar."

With a rented horse and carriage, he went southwest of Houghton on Sunday, May 27th, to "Ryans mine on 6 mile hill. . . a very rich belt of Amygdaloid lately has been discovered. . . in its amygdules the copper occurs in larger masses from a pound upwards." Monday he visited the Atlantic mine, Tuesday he went by stage to Torch Lake, and on Wednesday and Thursday examined the Wolverine, Calumet and Hecla, Osceola, and the Albany and Boston mines. Back at the Hancock mine Friday, he noted that

> Copper is generally scarce but locally rich deposits occur in granular distribution or also in masses from several pounds to several hundred pounds. obtained in the rock house a very rich specimen.

While Dr. Rominger was interested in seeing each of those mines, he was more interested in trying to work out the relationship of their ore-bearing beds with others of the Keweenaw series. He got much helpful information on June 4th when he spent the day at Calumet:

> went to see Mr Daniels Capt of Osceola mine and of the work at Tamarack shaft. This shaft is at present 740 feet deep the strata dip at an angle of about 37 degr. like those at the Hecla. First about 50 feet of drift had to be sunk through before rock was struck. the upper 460 feet consist of alternating beds of Melaphyr and amygdaloid which latter carries considerable copper. . . .

The section continues to a depth of 673 feet where the rock was "supposed to be the equivalent of the Allouez conglomerate." Then follows data which must have been important to him -- horizontal measurements on the Seneca property of distances between the Allouez conglomerate and the Calumet conglomerate, between that bed and the Osceola amygdaloid, between that and the Kearsarge conglomerate, etcetera. The pieces of the puzzle were beginning to fall into place.

On Wednesday, June 6th, he took the stage to Torch Lake in order to see the Douglas Houghton falls:

> the Falls 75 feet high over trap. above falls for some distance all trap. Below the falls some mining explorations have been made small fissure veins composed of Calkspar Prehnite Datolith Quarz carry minute granules of Copper. the Trap is partly amygdaloid dips under an angle of about 35 degrees NW. . . .

Descending the ravine, he made notes on the character of the different beds he could see until the outcrops were obscured. "The embankments," he wrote, "are a soft mass of sand and pebbles intensely red colored and not exhibiting distinct stratification. Still descending under this gravel and sand mass the horizontal Silurian sandstone strata come to the surface and are exposed all the way down to the bottom of the valley."

Dr. Rominger moved north on the 11th to Eagle River for nine days' work near the end of the peninsula. Arriving in the early afternoon, he first "examined the exposures of conglomerate on the beach south of Eagle river. this congl. belt is very wide its dip is about 25 to 30 degr. At the bridge the river forms falls and the strata are finely exposed."

He spent the rest of the week looking over the Copper Falls property, the Northcliff mine, and the Phoenix mine where, he noted, "the high bluffs are composed of the so called Greenstone." Then on Sunday, June 17th, he

> went with Mr. Brockway over the grounds of New Cliff mine south of the road. observed the different alternating outcrops of Amygdaloid and Trap belts. . . . the New mine is on a fissure vein striking across the formation. . . .

His mineral collection may have been increased that day for "south of shaft no. 1 are several pits opened in Amygdaloid belts which carry some copper and silver, Prehnite, Quarz and Calkspar, sometimes also Epidote and Delessite fill the amygdules."

They went from there to "Mr. Bennets farm in Sect 5" where he saw a quartz vein "richly loaded with grey copper ore. the vein contains there occasionally some crystals of violet Fluorspar. Staied over night with Mr. Brockway."

The next morning "heavy rain but nevertheless went to No 2 shaft of New Cliff and descended to see the Fissure vein exposed. the vein is at the bottom of the shaft (at 125 feet depth) about 6 feet wide a brecciated mass of brown amygdaloid cemented by Spar and Prehnite seams, full of disseminated copper in a heavy solid network of films which in places form solid masses of copper from 10 to two or 3 hundred pounds in weight. the general appearance is very promising. . . a good many tons of mass copper have been extracted besides a large amount of stamprock full of coarse copper."

Tuesday, the 19th, was "cold windy and cloudy." While he was examining some test pits belonging to the Phoenix mine "east of the old location"

heavy rain set in for the whole rest of the day and I had to return all wet. 50 cts for transportation of specimens from Copper falls. Hotel bill for 9 days 18 Doll. bought copper spec. $2\frac{1}{2}$ Silver spec. 1.75 cts.

Wednesday 20 Juni went with Stage to Calumet and then to Houghton. expense 2 Doll. found Dr. Kiefer there had a pleasant evening with him. received letters from home.

Whether or not this was Dr. Herman Kiefer, with whom he would have had much in common, could not be determined. He answered those letters the next morning and in the afternoon was able to straighten out a perplexing stratigraphic problem for a young geologist; he described the incident:

went in the afternoon with one of the Columbia College assistants to Pilgrim creek where he believed to have observed the discordant contact of the Lake Superior sandstone with the Trap form. but it was simply an exposure of horizontal lake Sup. sandst. with the exhibition of the false bedding. I brought him then from there to the creek on Isle royal ppty and showed him the contact of the Lake Sup. sandst. with the trap.

The rocks he had been collecting had become burdensome and on Monday, June 25th, he wrote that he "determined to return to morrow to Eagle river and dispose of my specimens." This he did, packing two boxes to be shipped home. Two days later he returned to Houghton by the mail stage.

On Thursday, the 28th, he left with some men by boat on a trip to the Porcupine Mountains. Friday morning they

landed at Union bay where the shore is formed by brown sandstones dipping under an angle of about 25 degr. north ripple marks abundant but no signs of organic remains from here landed again 4 miles west at the foot of Porcupines. there similar sandstone alternating with conglomerate belts forms the shore. . . . the path leads over a clearing to the mines which are situated on top of the south slope above Carp River. . . returned to camp on shore. . . .

Saturday 30 Juni. went with small boat along shore about 1 mile beyond Lone rock a small Sandstone Island. . . the shore all along this distance of 7 miles is formed of similar upheaved sandstone and conglomerate beds, some of which are nicely ripple marked or covered with mud cracks moulds. . . . the valley of Carp river is swampy in the bottom and shows no rock outcrops. A large beaver dam is hemming the river at the location in its free course lower down large falls are said to exist. This first hill chain is about 1300 feet above Lake Superior. the second chain which we did not ascend is 1400 feet high. returned to the shore and met the Steamer Estelle which brought us back to Houghton the same evening about 12 oclock at night.

Sunday 1 Juli. received letters from home. Stayed the previous rest of the night at the Douglas house as my room at Millers was occupied.

Monday Juli 2. wrote home. went over the hillside between Quinzy and Hancock mine. . . in the evening I went with Mr. Oppenhof a farmer west of the Atlantic mine to his home stayed all night with him and came back with him Juli 3 at noon. . . stayed afternoon at Houghton as it is not practicable to make

> any further excursion on account of the preparation for celebration of the 4th Juli.

The next entry is merely "Juli 4 celebrat. of the day."

On July 5th Dr. Rominger "went with stage to Rockland," about 35 miles southwest of Houghton; this was to be his base for a while. The following Monday he went to Ontonagon by train. There he

> made arrangements with Mr. Mitchel to go with him to his explorations SE of Lake Gogebick a week from next Thursday. returned in the evening. intended to go to morrow with a man to the south trap range on the headwaters of east branch of the Ontonagon but the fellow backed out.
>
> Thuesday Juli 10. went with Hotel keeper Mr. Chynoweth per buggy to the Bohemian mine met Mr. Brand the Agent in his office and were very cordially received and invited to dinner which invitation we accepted. The mine is . . . well loaded with copper in barall work sic and in stamp rock. all the material hoisted is intended to go through the stamp mill.

The next day Dr. Rominger "bought camp implements 2 Doll. Victuals 5 Doll." and on Thursday, the 12th, having found a man who would take the trip he had been trying to arrange, "left with a man for South range. Dayly wages of man agreed for 2 Dollars." That money was earned the hard way.

For Dr. Rominger was unusually strong physically. As Dr. George P. Merrill later wrote of him:

> His tremendous physique enabled him to make collections in regions which were practically inaccessible to those having less power of endurance.

He was to need such endurance that day when his route took him through woods which had been ravaged by a violent windstorm. They

> left at seven in the morning. from yesterday's rain the grass and bushes were all wet and we got soaked through in the first start then crossed the river by wading and short distance after had again to wade the South branch then followed an old supply road on the east side of the South branch which was also overgrown with high grass and underbrush.
>
> 9 miles from Rockland crossed a deep ravine in which Silurian sandstone was exposed in the bed of the creek but this is the only spot where the rock could be seen on the whole days route. The road was frequently obstructed by windfalls and was very hard to follow. 14 miles from Rockland. . . is a great windfall over a mile wide which is difficult to pass. Then we struck an old road again. . .we camped in the north part of S. 10 marked on the map as pine plains but near camp is mixed timber and a creek flows through a deep ravine eastward to the east branch. we arrived there at 5 and was completely wet and had to dry our things with the help of a large fire.
>
> at seven the sun came out and we expected fine weather for the next day but in the morning it rained again so that we could not continue our voyage the end of which I estimated at least 16 miles off over a very rough country. Night very cold which hindered us from a sound sleep.
>
> Freiday 13 Juli. remained in camp unto noon and as no prospect for clearing up

> seemed to exist, I determined to return, and came about 6 miles to the place where we took dinner the day before. Mosquitos were plenty but we managed to drive them off with smoke and kept the tent clear of them.

The weather continued to be uncooperative on Saturday:

> cloudy and rain during the fore part of the day. we left camp at 7 and arrived in Rockland at noon. travelling through the grass and underbrush we got wet right in the start and subsequently wading two branches of the river the soaking was made perfect. paid the man six dollars and gave him the remainder of the grub. found letter from home. Telephoned to Mr. Mitchel but got no anser that evening.

Ironically, Sunday was bright and sunny. Dr. Rominger seems to have spent it wandering along "the railroad track northward for about one mile or more" and seeing nothing of great interest. However, as "Mr. Mitchel sent word he will be ready to start for Gogebik next morning," the State Geologist must have felt things were looking up. The diary continues:

> Monday 16 Juli. went in the morning with a two horse wagon toward Lake Gogebic but as it rained all forenoon and the road was in awfull bad condition we stopped over at Fergusons unto next morning.
> Thunderstorm in the afternoon.
>
> Thuesday 17 July. left Fergusons with wagon. the road to Lake Gogebic is in undescribably bad condition and to my surprise horses and wagon stood the trial of going over it. we arrived at the lake towards noon took dinner there and left with two row boats. the Lake was very rough and we had to keep close to the shore on the wind side to avoid danger as the same boats had capsized the day before in a squal.
> Arrived about 5 oclock at Gillis landing and camped there.
>
> Wednesday morning 18 Juli. left with our boats at 6 oclock in the morning and safely landed about 8 on the east shore of the Lake about $\frac{1}{2}$ a mile from the inlet of Gogebic river. followed a trail in SE direction which leads to the exploring pits of Mr. Mitchel. . .

Dr. Rominger had been to Lake Gogebic the past two summers, each time finding new developments. Now he examined the area near Mr. Mitchell's camp and test pits; he noted that some beds were impregnated with iron ore, particularly an "actinolitic quarz schist rich in octahedric Iron oxid and Garnets," and concluded with the statement: "the only place where Iron ore can be looked for is between the actinolitic quarz schist and the quarz schist belt further north."

Thursday being "fine weather," they "left camp at 7 oclock," continuing to examine outcrops. At one place they came upon "an immense angular block of Epidotic melaphyr inclosing heterogeneous light colored reddish rock masses of a somewhat laminated structure. This block seems to be a loose mass about 20 feet high 40 feet wide and 15 feet thick. on the surface of this knoll and in the surrounding lowlands are a great many other smaller blocks of melaphyr from 1 to 4 tons in weight. . . . this knoll is visible from the Lake Gogebick

appearing to be about 1 or 2 miles east of the mouth of Trout river. . . . returned from there to camp. mosquitos terrible to day."

They broke camp early Saturday morning, arriving at the outlet of the lake about one o'clock. Unfortunately, "the man with wagon which promised to be there did not come but toward night an other wagon arrived" and eventually they got back to Rockland.

On Monday afternoon, July 23rd, Dr. Rominger took the 4 o'clock train to Ontonagon and the next day left there "in company with Mr. Beaser per wagon to Iron river." He described the trip:

> the road follows closely the shore and is all located on a sandy low ridge of the beach. about 4 miles from Iron river red sandstones locally crop out they dip under a low angle northward. on Iron river a large exposure of reddish grey Sandstone is right at the mouth and higher up the stream a very large succession of slaty grey colored arenaceous layers succeeds. from the strike of the strata I infer the sandstone outcrops at Union bay to be lower ledges and the Quarz rocks containing Silver at Iron river. . . must be next above these Sandstones. Mr. Beaser tells me that he observed this fact all over the country which is well known to him from frequent exploring trips he made over this ground.

They went to Union Bay and then to the Union mine, later taking the road to the Nonesuch mine three miles away. There Dr. Rominger saw "the formation extensively displayed in the bed of the creek," and had opportunities in the next few days to study the series of rocks and to figure out their relationship. Mr. Beaser was full of information about other outcrops he had observed in the past.

Saturday morning at seven they left Union mine and took "an old road which leads to the Stamp mills of the old Carp lake mine following the north slope of a high ridge. found at the head of the Union river a small lake in Sect. 20 in which several large springs are seen in the bottom of the crystal clear water. thence we went on to the tributaries of Carp river and followed one of the principal branches up to the top of the ridge. . . ."

Returning to camp that day, they ran into difficulties:

> a large windfall had obstructed the road to make it totally impassable. after long taedious work we finally succeeded to overcome it. At the river we could not find a boat to cross it and had to wait until Mr. Lockwood and his men arrived at the other side and built a raft which brought us over as we had no provisions with us. we camped near the House left of the old Carp Lake mine as the only remainder of former structures of this location. . . .
>
> Thursday 26 Juli. early in the morning a thunderstorm came up and rain which impeded us from doing any work this morning. toward noon we decided to return to Union bay. broke up camp and arrived there about 2 oclock. from there Mr. Beaser and I walked to Union mine where we made headquarters in a barn filled with Straw. Examined the strata exposed in the river and found the statements made to me by the mining captain to be erroneous.

On the following day Dr. Rominger, alone, tried to "ascertain the statements of Mr. Beaser" -- without success.

There is an entertaining account in Angus Murdoch's book "Boom Copper" of this Mr. Beaser. A retired Lake Superior schooner captain, he was a friend and confidant of Austin Corser who, in 1855, had discovered a vein of native silver beside the Little Iron River on land which would be tied up in a grant until 1872. The silver was worth watching. Mr. Corser built a log house near it for himself and his family and sat tight for those seventeen years.

Time up, he hurried to Ontonagon and bought all the potentially rich land; then he hurried over to the bar frequented by would-be investors. A group of Pennsylvanians with ready money gladly took the property off his hands -- at his price. The Scranton Mining Company was formed and went into production.

Not long afterwards Mr. Corser, again at a crowded bar, casually remarked that the vein of silver was really by the Big Iron River, not the Little. In the mad rush that followed, speculators and prospectors found to their surprise that a town named Silver City had already been laid out beside the Big Iron by a certain Captain Beaser; he was busy selling lots, convenient to the new mining property, in his new development.

The town boomed, the silver mines flourished -- for a few years. By that time both Mr. Corser and Capt. Beaser had become comfortably rich.

When Dr. Rominger visited this area in September, 1875, he doubtless heard enough of the story to want to "ascertain the statements of Mr. Beaser."

XIX

1883: JULY 30 - AUGUST 18 -- FURTHER WORK ON THE KEWEENAW PENINSULA -- ATTEMPT TO CLIMB MOUNT HOUGHTON

Dr. Rominger returned to Houghton by stage on Monday evening, July 30th, with a lot of specimens and with a better understanding of the strata near Iron River and the Union mine. On the following Wednesday afternoon he went "with Mr. Hill to see Capt. Vivian of the Franklin. inspected the mine which is now producing 180 tons of Copper monthly. the surface work of this mine is kept in admirably good order."

The Franklin mine and the Quincy are situated on the top of the steep hill above Hancock.

Friday, August third, Dr. Rominger went "with Mr. Ryan in his carriage and in Co. of Mr. Hill to Ryans mine and to the old pits in the vicinity." He found that much had been done at the mine since he had been there in May, noting in his diary:

> Ryans copper bearing belt is about 7 or 8 feet wide . . . The copper is in heavy nodular masses dispersed through the amygdaloid, often enveloped with Spar. The proportion of the copper to the rock mass is larger than I have seen it in any other mine. The shaft is at present 95 feet deep and on both sides about 20 feet long drifts are commenced which everywhere exhibit the same richness in copper nodules, some over 100 pounds.

Again with Mr. Hill, he took the train Saturday "to Osceola and Tamarack shaft," northeast of Houghton. There he learned that the Tamarack shaft was now 850 feet deep and that the "Osceola mine produced last month 200 tons of Copper." The Quincy mine, he was told, produced 300 tons monthly. He "saw in Mr. Daniel's collection an oval nodule of Copper twice as large as a goose egg with a large cavity in the interior lined with crystals of Copper."

On Monday, August 6th, he "went to Calumet and thence to Cliff mine. dined with Mr. Brockway." The occasion was particularly pleasant as he "made the acquaintance of his daughter she lately pronounced Dr. of Medicine. She is intelligent lively and rather enthusiastic in her expectation of professional medical life." Dinner over, Mr. Brockway took his guest "to his new find N. of the old Cliff." Tuesday they went together to Delaware, further to the northeast.

Dr. Rominger wished very much to climb Mount Houghton, which rises nearly 1500 feet above the shore. Wednesday morning he "went after breakfeast to Helltown to engage a man for the next 8 or 10 days but could not find one. returned to Delaware and hired Wm. Schmidt a laborer of the mine with permission of Mr. Davis. bought victuals for the trip 6 Doll . . . Schmidt engaged at 2 Doll. pr diem." A note elsewhere in the diary indicates that this man was a "good woodsman and boatsman."

With everything arranged, they left Delaware at eight o'clock Thursday morning, August 9th, going by wagon to the Aetna mine:

> at the Aetna location we camped in one of the vacant Houses. After dinner examined the mine which is at the base of the north slope of the Greenstone range. . . . By going south from the Aetna mine following a good road we come on the other side of the range to an old wood road leading east along the slope to the abandoned Manitou mine. from there about 1 mile east we find the old Montreal mine in which a fissure vein is mined. . . .
>
> a ½ mile further is the Star mine which has various shafts quite remote from each other. . . . we returned along the south slope of the Greenstone bluffs. . . the road from the Star mine crosses after while the summit of the Greenstone range and follows the north slope on its western extension it passes there a shaft of the Clark mine. . . . returned to camp on Aetna location. . . .

> Freiday Aug. 10. fine clear weather but a catharr in nose and throat makes me feel somewhat unpleasant. Started after breakfeast for Mount Houghton. . . after crossing the river we followed this Sect. line southward to the top of Mount Houghton but did not find any corner or quarter post on this line. . . on the real summit no rock exposure is seen and the high timber prevents any view on the surrounding country. . . . returned to Aetna on the same way I came. arrived about noon and did not go out any more that day.
>
> Saturday Aug. 11. intend to go to Keweenaw pt. about 10 miles distant from the Aetna. . . started at 6 oclock in the morning went to Clark mine. . . old Lake LaBelle mine, thence about 1 mile further is the Keweenaw mine . . . from here to the Lake shore a distance of about 4 miles the old road is very bad almost obliterated and obstructed by beaver dams and windfalls. . . . built a hut on the lake shore for the night as it was raining in the afternoon.
>
> Sontag 12 Aug. went along shore up to Fishing station in Union bay. . . thence returned to camp and followed the shore toward mouth of Montreal river. . . .

It is confusing to read of a Union Bay and a Montreal River near the tip of the Keweenaw Peninsula as well as west of Ontonagon; Dr. Rominger must have been equally confused when he first heard of them. To continue his account:

> Near the promontory. . . I struck off from the shore in NW direction first through a bad cedar swamp then ascending high land. . . . further on constantly ascending and descending over precipitous trap hills we came in the north part of Sect 23 into a large swamp.
>
> in Sect 14 we struck in the swamp on a lumber road leading north north east and subsequeritly north east which we followed until we came on a high trap ridge. then expecting the road would soon turn we ascended the hill almost in east direction until it became evident to me it would lead constantly away from our homeward direction so I took an other old abandoned road leading west NW through a ravine north of the high trap ridge. . . Coming to the bottom of the ravine I turned off north across an other Trap ridge. . . . from here ascended the Greenstone bluffs. . . where a splendid view is opened towards the Lake and over the Montreal river valley I saw across the Lake the Huron mountains very plain. westward Mount Houghton presents itself as an isolated cone much rising above the other hills of the shore chain of mountains.
>
> from the hight of the Greenstone bluffs I had a very taedious travel across 4 or 5 other Rocky ridges until finally almost exhausted I struck the road again over which we had travelled the day before. . . and after 3 miles further walk arrived at the Clark mine where we camped. I felt sick from over exercise and not having eaten any thing from 6 oclock in the morning to 6 in the evening. Slept on fresh hay in an old house.

Dr. Rominger awoke the next morning to "fine bright weather" and, with renewed energy, spent a busy forenoon examining the strata of the Clark mine and collecting specimens. That afternoon he

> . . . went back to the Aetna location loaded with a heavy pack of rocks. I felt sick and towards night I had a severe chill headake and nausea. went early to bed hoping to feel better in the morning but I felt worse and decided therefor to

return to Delaware. Sent man to Copper harbor for a conveyance.

Thuesday 14 Aug. This morning I found Ice $\frac{1}{4}$ of an inch thick on our water cup. Monday evening the foreman of the lumber camp passed by and on inquiry told us that his camp is 8 roads [sic] east of the town line consequently we followed the town line the other day and was not on Mount Houghton at all. . . .

Poor Dr. Rominger! to learn when he was so ill that he had climbed to the wrong summit! Soon, however, a wagon from Copper Harbor took him to Delaware where he paid Mr. Schmidt the fourteen dollars owed him. The next day he "left with stage for Calumet and thence returned to Houghton."

He "was all day in bed" on Thursday taking medicines which, though they "gave me some rest," did not cure him. On Friday he "determined to go home packed up and am ready to start for Marquette." He did, the following day:

Saturday 18 Aug. travelled to Marquette arrived about 2 oclock afternoon. Procured through ticket to Ann Arbor for 20 Doll 55 cts. at Marquette every hotel was overcrowded and first I feared to have a poor chance for night quarters but Mr. Swineford* kindly offered me his house and I rested there the whole afternoon. In the evening I succeeded in obtaining a good room at the Tremont house. Mr. Osborn helped the state of my health considerably by calling for a bottle of Campaign. Had a tolerably good night rest. . . .

One hopes that he was able to leave for home soon afterwards; the diary ends without saying.

XX

1884: CONTINUED SURVEY OF THE KEWEENAW PENINSULA -- ISLE ROYALE -- UP MOUNT HOUGHTON -- TRIP TO VERMILION LAKE, MINNESOTA

In 1884 Dr. Rominger once again packed his bags, said his farewells, and departed for the Upper Peninsula, leaving home on Wednesday, May 20th. He arrived in Marquette at six the following evening and spent the next few days examining the rocks within the city and beyond it, walking out the new road towards Negaunee. He had a pleasant Sunday afternoon on Lighthouse Point, and at a nearby outcrop collected specimens "of large dark green Hornblende crystals some two inches long."

---

* Mr. A. P. Swineford published (1876 - Marquette) "History and Review of the Copper, Iron, Silver, Slate and Other Material Interests of the South Shore of Lake Superior."

Ann Arbor 13 April
1884

Prof James Hall

Dear Sir

I send you to morrow per Amer. Express a small box containing two specimens of Dictyophyton — one from Richfield Ohio the other from Crawfordsville Ind. The latter has most excellent structure, the ribs consist of bundles of straight capillary cylinders like recent spicules of Sponges. They are transformed into iron pyrites.
Please send them back after having used them for your work.

Very truly Yours
C. Rominger

Please give my respects to Mrs Hall from me and my family —

ap. 21st and D. thanking him for the specimens etc. promising to return them as soon as the paper shall be completed.

FIG. 16 -- Letter from Carl Rominger to James Hall, dated April 13th, 1884. At the bottom, Hall has penned the nature of his reply. From the James Hall Papers, New York State Library, Albany.

With his headquarters in Marquette, Dr. Rominger made a number of short excursions by train -- to Ishpeming, to the Saginaw Station and the hills across the Escanaba river, and to the Champion mine where he saw "garnetiferous chlorite schist. . . sometimes with nests of black Tourmalin," and took "hexagonal tubular crystals of brownish red color whose nature I have to examine under the microscope."

On the third of June -- a Tuesday -- he paid his hotel bill, invested three dollars in fifty cigars as he had the year before, and went to Houghton on the afternoon train. There he found old friends -- "Mr. Ames and Miss Conover which send their respects to the children."

Thursday the weather was unseasonably warm, so warm that Dr. Rominger, who seldom let anything interfere with geology, wrote in his diary: "afternoon I did not go out as it was very hot and nothing in the neighborhood which I had not seen before." Friday was better -- he visited mines and collected more specimens -- but Saturday must have been frustrating. He waited around "until late in the evening" for the Steamer Fremont, running behind schedule, to depart, with the result that he did not arrive at Ontonagon until midnight.

Though it was cold and rainy the next day, the time was not wasted. He had a visit with his friend, Mr. Peter Mitchell, who gave him some interesting information about the Gogebic area where they had been together the previous July. The railroad had been extended, a hotel built at the south end of Gogebic Lake and gold had been found in a vein of quartz; explorers were busy looking for more of it.

On the following Tuesday, the 10th, Dr. Rominger went to Rockland to inspect the National and the Minesota copper mines, going on to the Mass mine Wednesday. There he "went through the tunnel in company of Mr. Brandt and Mr. Edgar Rathbone. Saw the different copper bearing belts all dislocated by a fault on the line of the tunnel," a spectacular sight. In addition to this, he "saw in Mr. Chenoweth's collection Specimens of Heavy spar from the National mine" and "bought 5 rock specimens 5 Dollars."

The weather was cold and rainy Thursday and again Friday when the temperature at noon reached only 58 degrees. Perhaps it cleared overnight. At any rate on Saturday he went by stage to the Belt mine, where its mill impressed him:

> a very superior structure with excellent machinery for the present. one ball pump is in operation and the material for putting up an other one is on the ground. the ball stamp is 18 inches diameter capable of pounding about 200 tons of rock a day.

On Monday, the 16th, he went with several men by stage to the Nonesuch mine; this was the beginning of an expedition that was to take him into very rugged country. Late Tuesday they arrived at the camp of the Mr. Beaser he

had known the year before; there they spent the night. The going was harder on Wednesday. Leaving camp at seven in the morning, they

> followed Sect. line north at the $\frac{1}{4}$ post the land begins to rise more briskly further on red jaspery beds apparently of sedimentary origin dip under a high angle southward in conformity with the Nonesuch formation below the hill. Higher up, reddish grey more massive silicio-feldspathic rocks form the top of the hill the section corner is on the edge of the summit of such rock beds. from here we descend into a deep ravine and ascend again a higher hill range than this by following the section line further north. it took about 1 hour for travelling one mile.
>
> ... further on we ascended going north various high hills. . . we lost the section line and did not notice when we crossed the northern town line. We ascended the high hills in the east half of Sect 34. . . but found no section line to establish our exact whereabouts. from the top of these hills a good view southwards is to be had and north the next range seems to be the hills on which the Carp lake survey station is erected. we returned to camp by going according to the compass south crossed many large outcrops of the jaspery rocks and arrived at camp at 4 oclock in the afternoon very much tired. . . .

They returned to Nonesuch mine Friday, June 20th. "Sent men the old trail with the packs and went ourselfs back over the southern ridges of the Porcupine mountains. . . . the travel was very good unto the SW corner of Sect. 2 but from here following the section line the traveling is horrible and no outcrops of rock visible."

After two more strenuous days investigating the area near Nonesuch, they left that location on Monday morning, going south on the Lake Gogebic trail, and camping the second night "near the mouth of Cascade river on Lake Gogebic road." The night, he wrote, was very cold.

Dr. Rominger returned to Ontonagon Wednesday, the 25th, and found there welcome letters from home. Thursday he was relatively inactive -- writing letters, packing up his specimens, and preparing for his next trip, across Lake Superior to Isle Royale. With "fine clear weather" on Friday, he engaged a man named Jacobi to go with him, then waited "for good wind to go with Mr. Parker to Isle Royal."

He did not have long to wait; "Saturday 28 Juni. ready to sail a fair south wind." All was not well, however;

> Sunday 29 Juni. arrived at Grace bay 6 oclock in the morning. Parker failed to bring us to the head of Washington bay as he agreed to do. the locality where we landed is altogether unfavorable for explorations all dense forest with low swampland. The point to the west shows some outcrops of Trap, dip SE. the Trap contains reddish masses of amygdaloidal rocks and seams of a reddish crystalline rock.
>
> Monday 30. tried to go to the Conglomerate hills SE of us but found the woods impenetrable by windfalls and returned built a raft and passed time with catching trout which abound in the creek near camp.

> Thuesday 31 Juni. followed the shore to entrance of Washington bay. . . . At noon Mr Parker arrived and we went on board.

Again Dr. Rominger, so meticulous about geological details, had overlooked those of the calendar; only temporarily, however:

> Wednesday 2 Juli Sailed at 7 from Grace harbor had contrary wind and arrived Thursday morning at 7 in Siscowit harbor the shoreline we passed exhibited on most westerly point of the Island outcrops of a conglomerate belt, otherwise no rocks were seen. all the Island is densely covered with forest.
>
> On entering Siskowit harbor the ridge forming the south side of the large harbor consists of a hard brown well stratified sand rock dipping under a low angle to the south the opposite shore where we landed is formed of conglomerate rock dipping under an angle of about 25 degrees south this belt is very wide 1000 or more feet. . . . the Island mine is about 3 miles north of the landing a good road leads to it first crossing the large conglomerate belt then a broad space covered with drift intervenes. . . . all day contrary wind but clear sunny weather.
>
> Freiday 4 Juli. returned to Ontonagon with fair wind left entrance of Siskowit Bay at 6 in the morning and arrived at Ontonagon at 10 oclock in the evening. paid man for 7 Days wedges 14 Dollars. to Mr. Parker for boat 30 Doll.
>
> Saturday 5 Juli. the past night a thunderstorm with rain and heavy west wind came this morning a cold strong wind blows and the Lake is very rough so that had we not returned our situation on the Lake today would have been a dangerous one. received letter from home and one from cousin Joh. Rominger.
>
> Sunday 6 Juli fair weather but cold, thermometer at 10 oclock only 48 degr wrote letter home.

He returned to Houghton Tuesday on the Steamer Fremont and on Thursday "went to Osceola and Tamarack shaft." The latter was "at present 1550 feet deep" and he obtained specimens from various levels. Returning in the evening to Houghton, he "received letter from home and papers from Governor to be signed" -- vouchers, according to the entry next day when they were duly returned.

When Sunday came, he had a well-earned day of rest, with "no particular work done. made acquaintance with a number of scholars from Columbia college NY Washington college St Louis. evening and nearly all night suffered severe toothake."

He tried to ignore the pain Monday, going to the Pewabic and Franklin mines, then "over the hills on south side of Houghton" where he studied the trap belts. But on Tuesday, after going "with St. Louis students to the sandstone exposures on Swede Creek," he had the tooth pulled.

His recovery must have been rapid. The next day he went "to Summit station 8 miles from Le Anse," on Friday to Calumet and back, Sunday to the Sheldon and Columbian mine, and on Monday, July 21st, moved north to the Delaware mine.

He was fortunate Tuesday in being able to hire "Schmidt and his son for the trip to Mt. Houghton" -- the same William Schmidt who had accompanied him the previous year on his unsuccessful attempt to climb the same height. They left at once:

> Mr. Palmer agent of Conglomerate mine took me down to Lake La Belle on the Engine stopping at every place where rock was exposed along the line of the road. . . .

The ride was short but the account Dr. Rominger wrote long; he missed nothing. At the end of it he "got the promise of a boat for tomorrow from the overseer of the Stamp works" and bought $5.50 worth of provisions for the trip.

The next morning, with Schmidt and his boy, Dr. Rominger pulled away from the Stamp Mill docks at about nine o'clock. The water was so clear he could distinguish the different kinds of rock on the lake bottom:

> Leaving the canal of Lake La Belle the shore is for some distance lined with a sand beach then at the foot of Mount Houghton large red colored brecciated rock masses and conglomeratic belts project on the shore in high bluffs. in the Lake bed white and red striped Silurian sandstones can be seen. . . .
>
> high vertical bluffs rise in the background. . . further on unto the mouth of Montreal river Trappean rocks line the shore. . . Montreal river leaps over the birdseye trap ledges into the Lake.
>
> Donnerstag 24 Juli. morning at 5 Thunder with some rain lake quiet. Intend to go with boat eastward along shore to the place where I struck into the woods last year. . .

As he was slowly rowed along the shore, Dr. Rominger jotted down in his notebook what he saw -- the mouth of a small river, fishermen's huts, the color of the rocks, and the dip of the strata. The next day they followed the trail to the Clark mine, a long walk during which Dr. Rominger collected many specimens. In "fine weather" Saturday, they "rowed back along shore. . . landed on sand beach near entry to Lake La Belle and camped." Sunday, the 27th, was a "bright clear day" and they

> went to Mount Houghton after breakfeast. after some unsuccessful efforts to find the top we finally succeeded. the lakes survey has built a station there from which a magnificent view over the country is to be had in all directions otherwise the forest hinders the sight. the top of the hill is formed by a very wide belt of porphyry which shows distinct lamination. dips under high angle to the north. coming down I came unto vertical walls of the porphyry which can be observed from a distance out in the Lake. south and underlying this porphyry is a fine grained trap exposed on the slope. Further down no outcrops can be seen. returned to camp at one oclock. examined in the afternoon the different boulders on the Lake shore and collected a good many specimens. after our return Mrs Streter from the Delaware mine came in a boat to see us but did not stay longer than half an hour then returned.

Dr. Rominger and the Schmidts went back to Lac La Belle on Monday and that evening returned to Delaware. It must have been with great satisfaction

that he settled his accounts for at last he had been to the top of Mount Houghton.

He departed from Delaware by stage Wednesday, stopping off at the Cliff mine where he "remained as guest of Mr. Brockway to Thursday 31 Juli. Mr. Brockway brought me to his exploring shafts and trenches on the north cliff where he opened several fissure veins carrying more or less copper."

Back in Houghton, Dr. Rominger was faced with an important decision. Should he or should he not accept the tempting invitation to go to Minnesota and see the new iron mines at Vermilion Lake? He had heard much about them; the ore deposits there were said to be more extensive and of better quality than any others in the Lake Superior region.

On Saturday he "concluded to see the Vermillion lake Iron mines in co. with Mr. Breitung leave Houghton tomorrow with Boat Peerless." The diary has the story:

> Sunday 7 oclock morning left Hancock arrived at Agate harbor Monday morning 4 oclock went from here to Duluth came there about 8.
>
> Monday 4 Aug. Duluth is situated on the slope of a row of rocky hills about 400 feet high facing the lake. . . .

The next four pages are in German and difficult to decipher; then he wrote in English that he went by tug back to Agate Harbor where he "arrived at 7. Stayed in the Hotel."

This Minnesota port, combined with adjacent Burlington Bay, is now known as Two Harbors. It was a busy place when Dr. Rominger saw it. The first load of iron ore -- one hundred tons -- had been shipped to its new docks from the Vermilion mine's Breitung pit only a few days before -- on July 30th. He described his trip from there to the mine, 67 miles away:

> Mittwoch 6 Aug. 7 Uhr with railroad to Vermillion lake mine arrived at one stopped on the road in several places to examine the rock. . . .
> at the mining location on a range of Hills 800 feet above Lake Superior a succession of hydromicaceous quarzites, hydro mica schists of grey or reddish color intermingled with banded jasper beds at least 3 large belts of pure compact specular ore are interstratified some of which locally are over 60 feet wide with the ore and seemingly overlying it is also a belt of red jasper banded mixed ore. the Strata are all nearly vertical dip north. The ore is remarkably free of rock and the surrounding rock remarkably free of iron. . . .
> On the South side of this range of Iron rocks the village Breitung and on the north side the village Tower has been established. from Tower to the Vermillion Lake the distance is only half a mile. the river entering Vermillion Lake passes through the village.

On Thursday Dr. Rominger "with Mr. Mallman an employe of the mining co. examined the structure of the Iron range north of the mines toward Vermillion Lake." On the south slope of the hill "on which the so called Lee mine is" he noted quartzites, next "a belt of pure ore 8 or 10 feet wide, then schists and

banded Jasper rocks and with the banded Jasper a large belt of solid ore." The Lee mine hill, he explained, "is the southern counterpart of the Hill on which the Breitung and Tower mines are located."

The lake itself was interesting from the geological standpoint. "Touching the shore of Vermillion lake further north," he wrote, "a ridge of magnetic Quarz schist projects and in the Lake north of this a large number of the islands are composed of the Quarz schists and brecciated harder Quarz rocks as far as the eye can reach."

Dr. Rominger returned Friday to Agate Harbor where, he reported: "Mr. Brown keeps a good hotel." A tug boat took him to Duluth. Mr. Mallman was still with him and together they went to a number of localities in that area, at one of which he saw slates he felt were analogous to the Huron Bay roofing slates in Michigan. Sunday evening he left Duluth on the Steamer Fremont, arriving back in Houghton Tuesday morning; he returned to Marquette by train later in the day.

The stimulating excursion was over. More than that, his field work for the season was over. On Wednesday, August 13th, he went "with 2.30 train to St. Ignatz et home."

XXI

1885: REPORT ON WORK FROM 1881-1884 SUBMITTED -- A NEW STATE GEOLOGIST APPOINTED -- TWO STROMATOPORA PAPERS -- JAMES HALL ASKS FOR HELP

Home for the winter, Dr. Rominger's most pressing occupation was the writing of his report for the Geological Survey. The report, a sequel to the brief one he had submitted in 1883, was to cover his work in the iron and copper regions of the Upper Peninsula from 1881 to 1884 inclusive.

Preliminary to the actual writing he had to examine the quantities of rocks sent back from his excursions. This entailed both chemical analyses of the ores and thin-sectioning of many of the rocks; he wrote later that "several hundred rock specimens were cut into thin sheets and mounted on glass for examination under the microscope." The proper identification of these specimens, which had been numbered and labeled as to horizon at each locality, would permit him to check and perhaps amplify the descriptions in his diaries.

Reading over the diaries reminded him of so many things. Remembering his experiences in the Gogebic range, he mentioned in his report that his work

there had "depended in a great measure" on that of the explorers "as natural exposures are very limited in these unbroken forest lands," and he added his "thanks for the many favors I received from those kind-hearted woodsmen while I was among them, and without whose help I could not have accomplished much."

Dr. Rominger's report, accompanied by a geologic map of the iron and copper regions showing ranges and townships, and by two geological cross-sections -- one of the Calumet & Hecla mine, the other of the "North Tamarack Shaft, No. 3" -- "was placed in the hands of the Board March 11, 1885, and was intended for Vol. V of the Survey." However, it was not published until ten years later. The "Prefatory Historical Letter" to that volume, dated November, 1894, attempts to explain the puzzling delay:

> Referring to the first part of this report, Dr. Rominger, in 1883, said: "The description of all the results obtained comprises the space of about fifty or sixty printed pages, too small for a separate publication in book form. I respectfully suggest, therefore, to wait with it until the results of another year's work can be added and a volume can be printed corresponding with the previous four volumes." The long delay in the publication of said report has, doubtless, been caused by the feeling which gave rise to Dr. Rominger's request -- that the complete report by itself was not large enough to fill a volume. . . .

Meanwhile, in January, 1885, General Russel A. Alger had become the Republican Governor of Michigan, replacing Josiah W. Begole. With Governor Alger came new faces in State officialdom. Dr. George P. Merrill, writing about Dr. Rominger in 1924, stated that "under a new administration, he was removed to make room for another"; Charles E. Wright of Marquette, Commissioner of Mineral Statistics since 1878, was appointed the new State Geologist in May, 1885.

Dr. Rominger may have been surprised, even relieved, by the change. Years later, on November 30th, 1903, he wrote to Professor Charles Schuchert as follows:

> My original intention was to continue the work on corals I had begun under the auspices of the Michigan Geol. Survey, but the installation of Gouvernor Alger made a sudden end to my position which I had filled for 14 years, as it seems to the satisfaction of all the people concerned. . . .

The fine reputation he had acquired as State Geologist made his work important for many years. As J. A. Russell wrote in 1927

> Of the practical results of Dr. Rominger's work it may be said that no careful investments in Northern Peninsula lands of potential iron-carrying values are made even today, without reference, on the part of the investigating engineers, to the monumental work which he carried out for Michigan. And this is true, despite the fact that Dr. Rominger, a most exact geologist, really had little love for this branch of science, but was rather a devotee of paleontology and its revelations of early forms of life on the globe.

FIG. 17 -- The Rominger home at 315 South Fifth Avenue, Ann Arbor. Presumably, the gentleman on the porch is Dr. Rominger and the lady at the door is his daughter Marie. The Michigan Historical Collections of The University of Michigan.

His work for the Geological Survey had left him little time for fossils; now he could be a paleontologist again.

One of his first projects was to publish a commentary on the paper written jointly by Professor Nicholson and Dr. Murie entitled "On the Minute Structure of Stromatopora and Its Allies," published in the Journal of the Linnaean Society of London in 1878. This paper had been of particular interest to him because, he wrote, he had "gathered extensive collections" of these fossils "in most of the localities" mentioned by the authors. During the past fifteen years he had written descriptions of many of them, and had prepared sixteen plates of photographs for illustrations. He had intended to have his paper published by the Smithsonian but, because of the publication of Baron von Rosen's monograph on the subject, this had not been done.

Dr. Rominger closed his remarks as follows:

> A number of other interesting forms of Stromatopora occur in the Niagara group, but as my present intention is only a review of Messrs. Nicholson and Murie's work, I abstain from their description on this occasion.

His review, with the same title as the Nicholson-Murie paper, appeared in the January to March, 1886, Proceedings of the Academy of Natural Sciences, Philadelphia.

About the time Dr. Rominger finished this manuscript he received an urgent letter from his good friend, James Hall; his reply, dated November 2nd, 1885, tells the story:

> Your letter from Berlin duly came to my hands but as you said you would no sooner be in Albany than the 4th of this month I did delay the answer until now. If I understood you right, you wish me to come to your house and select one or several collections from your stock of duplicates. You said one or two thousand specimens have already been sent on, how large a number of specimens you think are to be selected yet from the remaining material, and how long do you calculate it will take me to finish this job? Is it possible to do the work in two or three weeks, or will it be likely longer? I have at present many things to attend at home, but in order to assist you I would be willing to spend a few weeks in Albany if that would be satisfactory to you. Please let me know, if that would suit you, or what other remarks about my proposition you have to make.

Apparently nothing developed from this interchange of correspondence until the following summer when again Dr. Rominger received a plea. He answered it firmly on August 31st, 1886:

> After reflexion about your proposal I came to the conclusion that I could not accept it, as a longer absence from home at the present time would hinder me to attend to certain of my own affairs, whose neglect would involve pecuniary losses to me. Also the approaching winter season with its short days and close confinement to the house is in a measure deterring me to undertake your work just now; I ask you therefore to have patience until next spring, when most likely I shall have time and disposition to assort your collection.

This settled the matter only temporarily. Hall had a second reason for wanting Dr. Rominger to visit him. He was working on Volume VI of his "Palaeontology of New York" -- the volume on the corals and bryozoans of the Devonian formations -- and he needed help. Dr. Rominger was the man to consult. Not only was he the author of the monograph on "Fossil Corals" but he knew much about Bryozoa. In 1866 he had published his "Observations on Chaetetes and some related genera. . ." and on several occasions had answered inquiries about puzzling specimens.

Dr. Rominger's reply of November 6th, 1886, to Professor Hall's appeal was determined but very cordial:

> Your letter dated Oct. 31 is received.
> As you are desirous to have, before the final issue of your work on Bryozoans, a review of it, by jointly talking over the subject with me, I declare myself very willing to do so, but would like you to come here for some days, as you originally intended, instead of my going to Albany, which would interfere with some of my prior arrangements. Any time therefore when you are ready to come, do so and you will be a welcome guest in our house, if you feel satisfied with modest ways of our home life.

This letter, preserved in Albany, bears the following memorandum in Hall's writing at the bottom:

> Nov. 30th ansd -- expressing doubts of being able to go to Ann Arbor and repeating my invitation to Albany -- especially on account of the large collections and numerous sections.

That was the logical place to confer. Dr. Rominger did indeed go to visit his friend -- now seventy-five years of age -- as the following excerpt from John M. Clarke's biography of Hall (pages 397-8) shows:

> Doctor Rominger was later to become the State Geologist of Michigan and to do a work on the fossil corals of her old rocks which has not been surpassed and which stands out by itself among the official reports of that State. He was a gentle spirit with microscopic eyes and analytic brain; of the older type whose names still stand for excellent achievements; and when years afterwards the venerable Albany palaeontologist, struggling over the intricacies of the fossil Bryozoa, cried out for help to Rominger, declaring in his bewilderment that he did not care whether "the pesky things were called Chaetetes or cucumbers," Dr. Rominger came on from Ann Arbor full of concern for what he called his Shytaytays, and stood by in the preparation of the monograph which was to be Volume VI of the Palaeontology.

XXII

1886-1888: THE MOUNT STEPHEN FOSSILS -- TRIP TO MOUNT STEPHEN AND THE WEST -- CONTROVERSY WITH DR. WALCOTT

In the summer of 1886 Dr. Otto Klotz, an astronomer in charge of the Astronomical Division of the Canadian Government, was at work high in the Canadian Rockies when he noticed unusual markings on the shale beside him; examining them, he could see that they were fossils of some sort. He had a friend who would know all about them -- Dr. Carl Rominger of Ann Arbor -- so he filled his pockets with pieces of the rock. Later he sent those with the best fossils to his friend, and a second batch to the museum of his Alma Mater, The University of Michigan. They had been found, he wrote, on Mount Stephen in the Northwest Territory of Canada.

That Dr. Rominger was excited when he got the fossils is evident from the following paragraph translated from a biographical sketch in a German publication:

> When he opened the parcel and saw the specimens before him his eyes shone. He took a handful, hurried as fast as he could to his wife, and exclaimed jubilantly: "Look, Frau! Life is still worth living!"

Looking over his new fossils, Dr. Rominger saw that most of them were trilobites and that, imbedded in the shale, there were some very small brachiopods. He realized he had material for an interesting -- indeed, an important -- paper, and he went to work on it at once.

Sorting the trilobites, he found that more than a dozen of them were perfect, somewhat flattened by compression but with distinct details. They ranged in length from eleven centimeters (approximately four and a quarter inches) to sixteen millimeters (about five-eighths of an inch). Study proved them to be specimens of a new species of the genus Ogygia; he decided to name it Ogygia klotzi in honor of its finder.

Five of the others were also new species; these he described and named. As for the brachiopods, several belonged to the genus Obelella.

His research completed, Dr. Rominger wrote his paper entitled "Description of Primordial Fossils from Mount Stephens, N. W. Territory of Canada," ending it as follows:

> As I intend to examine this locality myself as soon as the season allows, I expect to be able to give before long a more complete exhibition of the fauna inclosed within these slate-rocks.

Having made ten careful drawings of the fossils, he arranged them on one page, with the words "C. Rominger, del." lettered in the lower right-hand corner. Then he dispatched his manuscript and plate to the Academy of Natural Science in Philadelphia for publication in its "Proceedings," and began to plan his trip west.

It was bound to be an exciting one. The Canadian Pacific Railway's amazing transcontinental tracks -- laid across the Canadian Shield, the prairies, and four ranges of snow-covered mountains -- had only been finished in November, 1885. Dr. Rominger's diary is of particular interest since Mt. Stephen, now in a National Park, is accessible only to paleontologists with special permission. He arrived at Field (British Columbia) on Wednesday, June 8th, 1887, and he wasted no time:

> ascended about ½ past one in the bed of the creek for quite a long distance then left it and followed a goat trail on the left hand side which leads over the sharp crest of mountain spur constantly rising and sometimes leaving scarcely space enough on its summit to go on. precipitous slopes on both sides. finally having ascended not less than 2000 feet probably more we find Trilobites in the slate that has fallen down from ledges higher up. Rain and snow made us all wet and the hillside so slippery that we could not collect with proper success but we found plenty of specimens of the ordinary kind and in more or less imperfect condition. returned and arrived at the Hotel at 6 oclock very much exhausted from the trip.
>
> Thursday 9 Juni. followed the railroad west for two miles and observed the strata on the adjoining mountain slopes. The great bulk of the layers forming the upper 2000 feet of the mountains consists of sericitic harder or softer slates. lower are various belts of limestone alternating with slates of dark color. the outcrops east of Field composing the summit of Mt. Stephen are the same series before mentioned. about 2000 feet below the summit the Trilobite slates seem to have their position. lower are lighter colored sericitic slates then again hard slate similar to the Trilobite slates alternating with limestone beds.
>
> lowest alongside the railroad is exposed a succession of Quarzites of various shades from brownish red to white. the upper beds contain Scolitus but no other fossil remains. their thickness is over 1000 feet. in the upper strata the layers of quarzite alternate repeatedly with beds of dark hard slate.
> in these I found 1 broken head of Ogygia Klotzi but the richer fossiliferous beds occupy a much higher horizon.
>
> Freiday 10 Juni. Ludwig started for the Trilobite locality with Pat. Runy but soon they returned fearing rain might set in. but it did not rain.
> packed in the forenoon my specimens.
> afternoon I found in the above mentioned locality 3/4 of a mile east of Field an other fragment of the slates in which 5 specimens of Conocephalites several Obolellas and an other unknown fossil were contained.
>
> Saturday 11 rain cleared up toward noon went during the forenoon up to the mountainside west of Hotel found the lower cliffs to consist of dark blueish limestone without fossils. above are sericitic slate rocks alternating with the

limestone still higher are Slaterock of sericitic nature. the fossil bearing strata are at most likely below these beds.

in the afternoon went on railroad east beyond the tunnel had a splendid view on the Cathedral mountain. observed the glacier comming down to the railroad between the Cathedral and Mt. Stephen. the tunnel cuts through massive beds of Quarzite reddish colored. the Quarzite from here extends on high bluffs along the face of Mount Stephen. above are slates inclosing some Trilobites Obelella ectr. which layers are exposed on the railroad 1 mile east of Field. above are heavy dark colored limestone beds inclosed between the slates. but the actual position of the rich fossiliferous slates seems to be higher above.

Sunday 12 Jun. left at $\frac{1}{2}$ past 7 for the Trilobite locality ascending along in the bed of the creek which now has rather high water. after some time when the travel in the creek became taedious we ascended the hill-slope on left hand and travelled through the woods constantly ascending and winding around ravines. finally we observed that we were on a wrong hill and that we should have kept in the creek for some further distance. the hill we were on is much lower than the one we should have climbed and deep ravine is between the two. we had therefore in the end to cross the ravine and ascend the precipitous slope of the hills beyond where we came unto the trail we had followed some days before. the lower hill consists of thick bedded dark limestone above which the slates begin but their lower strata are not fossiliferous the ascent on the slope accross the ravine is made entirely over non fossiliferous slaterock partly of sericitic nature.
the thickness of the slaterocks there until up to the fossil bearing beds is much over 1000 feet.
above ths fossil bearing beds vertical rock walls ascend whose nature I can not positively affirm. it is a quarzite or a quarzose limestone. the highest part of the peaks is again slate rock principally. returned in a heavy rain at six oclock in the evening.

13 Jun. Monday. packed 2 boxes with specimens and shipped them. dried our clothes.

A diagram of Mt. Stephen and other mountains follows; then:

14 Juni Dienst. left on train for the west at one p. m. as the train was 6 hours too late. . . .
. . . all the way up to Rogers pass and farther on to the Glacier hotel on the west side. all the mountains with acute very picturesque summits are yet covered with snow and on many of them the snow appears to remain perennial. the railroad rises at Rogers pass up to the base of the snow line and had to be protected from snowslides by expensive wooden structures forming tunnels over which the snow can glide away. 35 such wooden tunnels are on the Rogers pass. descending from Glacier station the road is winding in admirable serpentine curvatures down between the precipitous sides of a ravine partly cut into the rocky sides partly supported by wooden structures extended from one side to the other. a grade of ascension $3\frac{1}{2}$ foot per 100 feet is very often necessary to overcome this difficulty. heavy pushing engines applied behind an ordinary train are necessary. at Glacier hotel we remained over night. . . .

Mittw. 15 Juni. went to see the glacier but found the path to it so full of snow that we desisted from going further.

waited in vain all day for a train.

Donnerst. 16 Juni. no train yet at 5 oclock in the evening. Met on the train coming from Victoria Capt. Tracy from Lake Superior. he came from Alaska and is full of praise of the gold mines opened there. . . . he gave me a few small specimens of gold quarz from a locality he found in Alaska. . . . left Glacier at 9.40 observed of course during the night very little except that the road wound through narrow ravines with snow covered mountains on both sides.

Freiday morning with day break the valley widened some and rounded foothills with no timber lodged at the foot of the higher Peaks. at Kamloops took breakfeast. . . .

Vancouver is as yet a small city but promises to be of importance. . . .

Saturday 18. left Vancouver at one oclock with side wheel steamer Yosemite. arrived at Victoria at 9 oclock. the scenery visible from the boat surpasses anything before seen. the Channel winds around numerous rocky Islands with mountains 800 feet high. looking backward the snowy heads of the rocky mountains are visible, and ahead the snow covered Olympian range of Washington territory presents itself in all its grandeur. Victoria is beautifully situated on rocky hights in the background of a deep bay offering a secure and deep harbor.

Sunday 19. . . in the evening went to Beakonhill on shore from which a wonderfull view of the Olympian mountains in Washington territory is to be had. they are about 50 miles distant. toward northwest Mount Ranier is visible an somewhat isolated mountain 12000 feet high covered with perennial snow. also the Olympian chain is snow covered but not over 8000 feet in elevation. the snow remains there generally during the whole year.

Monday 20. visited the shore and observed the numerous sea plants and animals to our great delight. . . .

Dienstag 21. celebr. of Queen Vict. 50 year of reign.

After a week during which he went to Tacoma and Portland, and had a trip up the Columbia River to the Cascades, Dr. Rominger took the train Tuesday afternoon, June 28th, to San Francisco. Everything he saw and did in California added to his "great delight." He marvelled at the "palms, orange trees, figs, grape, eucalyptus, agava and similar plants" in the gardens; he collected shells on the beach, noting that "starfish are abundant also sea anemones." He went to the University at Berkeley where he had "an hours conversation with Prof. Le Comte but could not see the collections as he had no key to open the museum." He saw "the Geisers" -- about 80 miles northwest of San Francisco -- and visited the Quicksilver mines which he found "highly interesting"; then he returned "by stage to Calestoga and from there to Francisco by Rail." After another busy day in the San Francisco area, he left for Michigan on July 10th by way of Reno. The diary gives no further details.

Dr. Rominger arrived home to find a storm brewing. His descriptions of the Mount Stephen fossils, appearing in July, drew immediate reaction from Dr. Walcott of the Smithsonian who had described some Cambrian fossils the previ-

ous year. He criticized Dr. Rominger's work in a paper which he read before the Biological Society of Washington in April, 1888, and published in September in the American Journal of Science. In it he objected to Dr. Rominger's failure to give the stratigraphic position of the fauna he described "by comparison with published sections and descriptions, or to compare the species with similar forms that have been described from the Cambrian strata of the Rocky Mountains." Furthermore, he found fault with the names. He questioned particularly the prize trilobite, Ogygia klotzi, which he thought was not a true Ogygia.

Dr. Rominger had ready answers and was able to get his "Rejoinder to Mr. C. D. Walcott" in print two months later, in the November, 1888, number of The American Geologist. He wrote that the specimens he had described had been "accidentally picked up by a transient traveller who had no time for examination of the stratigraphic position of the beds," that he indeed had examined all the available material, and that, of course, Walcott's paper on Cambrian fossils had not been published when he, Rominger, had sent his manuscript to the Secretary of the Academy of Science. As he had mentioned then, he intended to see the outcrops for himself as soon as possible; that he had done.

On his trip to Mount Stephen, he continued, he had found the stratigraphy of the "huge mountain mass" most complicated; it would take many weeks to work out the structure and the task was much too dangerous for one person alone. The series of rocks, located about 3000 feet above the railroad tracks, was not less than a thousand feet thick, and the fossils for the most part occurred in the highest layers.

He wrote that he felt justified in describing the fossils as he had and that he would be pleased to have Dr. Walcott examine them also. The "rejoinder" ended with this invitation:

> In order to give him an opportunity to form on all the concerned objects an independent opinion of his own he is welcome for the loan of all the specimens concerned if he should wish so.

Perhaps Dr. Rominger might be said to have had the last word. While the name Dr. Walcott had questioned was changed to Ogygopsis klotzi (Rominger) -- Walcott's genus having priority -- it with two other trilobites described in that controversial paper, Bathyuriscus rotundatus (Rominger) and Elrathia cordillerae (Rominger), are today considered "index fossils" of the Burgess shale of Mount Stephen.

XXIII

1890-1898: PAPERS ON MONTICULIPORA AND CHAETETES -- AN EXPERT ON ZINC DEPOSITS -- TRIP TO CHILLICOTHE -- THE DEATH OF JAMES HALL

In August, 1890, The American Geologist published a paper Dr. Rominger must have enjoyed writing. Entitled "Studies on Monticulipora," it was more a study of two gentlemen who had worked on that bryozoan -- Professor Alleyne Nicholson and Mr. E. O. Ulrich.

Monticulipora is a colonial form composed of minute, closely packed tubes of intricate structure; it must be studied from thin sections under a microscope with infinite patience and attention to detail. Dr. Rominger, who studied Bryozoa just that way, was not sure Nicholson and Ulrich had been quite as painstaking.

He felt that Professor Nicholson had had insufficient material, perhaps insufficient patience; He admired, however, Nicholson's concise style of writing. The case was different with Mr. Ulrich who wrote "with pompous display." On the other hand, to quote Dr. Rominger:

> Mr. Ulrich decidedly is the more accurate observer of the two, although his vivid phantasy sometimes makes him believe he sees things which do not exist (for example the pores connecting the tubes of his Homotrypa). . . .

Dr. Rominger may have had a twinge of conscience as he completed this quite amusing paper for he added that he trusted he had not offended either of these men, particularly Dr. Ulrich.

Fortunately he had not, for, according to a letter Dr. Rominger wrote to James Hall on May 26th, 1892:

> Mr. Ulrich wrote me yesterday a letter that he was willing to publish in the Juli number of the Geologist the paper I sent you on Chaetetes, as I had suggested to him that you probably would be so much occupied with your own matters of publication that I considered it a relief for you if I asked you to return the paper. Should this supposition of mine be correct I beg you to send me the manuscript and the microscopic sections as soon as it is convenient for you, otherwise of course, if you had already made preparations for the publication, I very thankfully accept this favor.

He then suggested a joint excursion:

> You intimated in your last letter, that in the spring, you might come west and spend some days with me; I would be very much pleased if you had time and inclination to do so, you will be benefited by taking a few days or weeks for recreation from your constant hard work during the past winter. How would

> you like it if we would go together to Alpena and run over the different exposures of the Hamilton group there?
> Please let me soon hear from you.

At this time Dr. Rominger was seventy-two years old and Professor Hall nearly eighty-one. It was not age nor infirmity, however, that made Hall decline the tempting invitation; he was too busy. Dr. Rominger's next note to him was written in apparent haste on the following eighth of June:

> I express my thanks for the 44 report of the St. Museum have also received box with sections and Manuscript. Considering the amount of work you have on hand, in a half finished condition, I very well conceive, that you have no time for a recreation trip; but still I am afraid you over burden yourself, it would be perhaps better for your health and for the prolongation of your capability for work, if you would allow yourself a few weeks of perfect freedom from all business.
>
> My family thanks you for the kind remembrance you had for them. we would have been really glad to have you a few days amongst ourselves. Any time you feel like comming we are very much pleased to receive you.

Professor Hall wrote on the bottom of this: "ansd June 10th 1892." What a pity Dr. Rominger kept none of the letters he received!

His paper, which was published as Ulrich had promised in the July issue of The American Geologist, has a lengthy title: "On the Occurrence of Typical Chaetetes in the Devonian Strata at the Falls of the Ohio and Likewise in the Analogous Beds of the Eiffel in Germany." It could only have been written by one as familiar as he with the internal structure of these perplexing fossils, then thought to be bryozoans but later classified as corals.

Dr. Rominger had not been limiting his geological work to paleontology. He was considered an authority on zinc deposits and was a consultant at various zinc mines. He had spent the weeks between the end of October, 1888, and that Christmas examining mines in "the Joplin district" of Missouri. In August, 1889, en route to other zinc mines in the southwest corner of Wisconsin, he stopped briefly in Madison to see a geologist-friend, Thomas C. Chamberlin, then President of the University of Wisconsin. The latter took him about the campus and showed him with pride the new Museum of Natural History with its fine laboratories; Dr. Rominger noted in his diary that these University buildings were "in every respect superior to those of Ann Arbor."

He returned to the mines of Missouri in August, 1893 -- an interesting trip but not an easy one. On August 31st he hired a wagon to take him to a place he referred to in his diary as "Mountain Home." He arrived there

> . . . at 2 oclock after a ride of 15 miles over a road of terrible roughness particularly with an ordinary farmer's wagon as I had to use White river is a very treacherous stream I tried to ford it but had to return after we almost tipped over in the middle of the river Then I was obliged to cross with a ferry on a road several miles longer. . . .

The weather was hard on him, too; one day 105°, the next morning "60 degr. Farenheit a great change compared with the previous day." But he was impressed with the quality of the ore -- the "rich body of ore lead and zink" at the Benham Company mine, and the "rich lead ore" of the Kohinor mine. He shipped by freight to Ann Arbor from one place "3 boxes weighing 200 Pds," and at the Benham mines he "collected very fine specimens of galena crystals and spar" to take home with him.

In June, 1895, after collecting fossils near Columbus, Ohio, with two men -- Professor Orton and Mr. Herzer -- he went alone to Chillicothe, where as a young doctor he had lived from 1848 to 1860. He "stopped at the Warner house the former Valley house. Warner is an old acquaintance of mine," he wrote in his diary, and mentioned other friends:

> John Kaiser the confectioner recognized me at once. I visited Mrs. Tritscheler but found only her younger son who guided me round town and brought me to numerous old acquaintances Wisslers Sons, old Braendle, Jacob Jacobs formerly a laborer of Clemson. Poland, Clark judge, merchand on Waterstreet et numerous others. Lansing I did not see. Safford is dead.

The day must have been both heart-warming and sobering.

Writing to Professor Hall the next spring, on March 21st, 1896, he described some of the fossils he had collected on that trip with Orton and Herzer -- "fine specimens of Psaronius, which exhibit the minutest details of structure. I have a trunk 2 feet in diameter and several smaller ones."

The object of this letter, however, was to thank Hall for the gift of his newly published work on Paleozoic brachiopods, and to tell him how pleased he was to have a genus named for him:

> I see you made of Winchells Centron. Julia a Romingerina which honor bestowed onto me I acknowledge as a great kindness from you. . . .
>
> Of the Trilobites from Mount Stephen I sent most all I had to the U. S. Geol Survey at Washington, a few specimens left in my possession I packed in the little box with the other specimens. I am sorry that I could not give you more.
>
> During this winter I went over all the old boxes set aside with duplicates and tried to determine and label them, so that after I am gone, some body might be able to make good use of them, amongst these, different things occurred to me, of some interest, which formerly had escaped my attention. . . .
>
> Presently I write out descriptions of all the Stromatoporas I have, in the expectation, that perhaps the State Geologist of Michigan will publish them and the annexed photographic plates, in a forthcoming volume of the reports. . . . This Spring or Summer I have an other engagement for a trip to the Zink mines of Joplin in the interest of H. . . et Co. in La Salle. I shall use this occasion to make additional collections in the Subcarboniferous strata of that locality. . . .

Again he urged Professor Hall to come visit him and his family -- "to rest yourself from work. it will do you good to make such a short interruption."

Neither of these men ever gave in to age. Dr. Rominger's field work continued in 1896, 1897, 1898, and even 1900 when he went to see mines near Birmingham, Alabama. As for James Hall, at 86 he traveled to St. Petersburg, Russia, in the summer of 1897 to the Seventh International Congress of Geologists. His biographer, John M. Clarke, wrote that

> Everywhere among the circles of geologists on the long route thither and back he was royally acclaimed by ancient colleagues, of whom alas! but few were left; by the younger admirers and by the novitiate of the science who must have regarded him as a priest after the order of Melchisedek, without beginning or end. . . . The meetings over, he went to Moscow, and from there, abandoning a proposed journey to the Caucasus, he traveled to Vladikavkaz and on horseback across the mountains to Tiflis, thence to Batum and by Russian steamer to Odessa and Sebastopol. . . .

Professor Hall came home by way of Turkey, Italy, France, and England -- "in excellent physical condition and spirits," according to Clarke; during the coming winter "he lived upon the memories of his tour." It was his last gala trip. He settled down quietly to enjoy his fossils and his correspondence in Echo Hill, New Hampshire, and there he died on August 6th, 1898, shortly before his 87th birthday.

Dr. Rominger must have felt keenly the loss of this old and stimulating friend; his even older friend, Professor Quenstedt of Tuebingen, had died in 1889. Perhaps the realization that his own years of activity were limited was the reason he kept himself so busy.

XXIV

TO APRIL, 1907: THREE ROMINGER COLLECTIONS -- GOLDEN WEDDING ANNIVERSARY -- LAST YEARS IN ANN ARBOR

It will be remembered that in 1864, while Dr. Rominger was practicing medicine in Ann Arbor, he offered his collection of European fossils to The University of Michigan, hoping the University would soon have enough surplus money to pay him the $1500 he asked for it. The collection was accepted eagerly; cases were made for it, and that fall it was moved into the museum, then the North Room of Mason Hall. The question of buying this collection came up repeatedly during the following years but each time the Board of Regents had to postpone the purchase until some later date.

This was still the case on February 7th, 1881, when Dr. Rominger, writing to Professor Hall, mentioned the matter:

> I have offered to the Michigan University my collection for sale, but they have no money to buy it with and will try first to get an appropriation of the necessary money from the Legislature. I shall probably bring the collection to the New Museum for exhibition until they are ready to make the purchase. My price I asked them for it is 3500 Dollars which is much less than the collection actually cost me not considering the work bestowed on it.

The price had risen but the collection had been greatly augmented. The following March he set about listing the fossils it then contained, and in a large ledger he lettered in shaded script its title page: Petrefactorum Catalogus Merz 1881. This was expanded on page 171:

Catalogue of collection
deposited in the University Museum
as a loan with the view of
selling it to the Museum if the
necessary funds are appropriated
for the purpose

The fossils, listed categorically on succeeding pages, include some from the Falls of the Ohio, from Crawfordsville, Indiana, and from Keokuk, La Grange, and Burlington, Iowa. Many are from the Hamilton Group (Middle Devonian) of northern Michigan, southwestern Ontario, and Eighteen Mile Creek in New York State.

In 1881 the collection was moved from Mason Hall to the first Museum Building. Four years later he made another list: "Catalogue of Palaeontological collection deposited in the University Museum of Ann Arbor October 1885." Then it contained over 6000 specimens of corals, 500 specimens of Stromatopora, and 1160 crinoids as well as other fossils.

The Regents in 1888 appointed a committee to make a contract with Dr. Rominger whereby the University would in effect "rent" this collection, paying semi-annually $125. In return for this sum Dr. Rominger would leave his collection in the Museum, never selling it to any one else without giving a year's notice.

At the December, 1891, meeting of the Regents, the Executive Committee was finally authorized to buy the Rominger Collection for five thousand dollars; this was done the following January, nearly thirty years after its acquisition. It was an important collection. In addition to the European fossils and those from many parts of the United States and Canada, it now contained all the type specimens of corals described and illustrated in Dr. Rominger's monograph "Fossil Corals" -- Geological Survey of Michigan Volume III -- and the mineralogical thin sections he had made while preparing his report on the iron and copper districts of the Upper Peninsula.

FIG. 18 -- Silver medal presented to Dr. Rominger by the Bavarian Academy of Science. The University of Michigan Libraries.

Dr. Rominger sent several thousand specimens of North American minerals in 1893 to the mineralogical collection of the Bavarian Academy of Science in Munich. In appreciation of his gift, the Board of Directors of the Academy unanimously voted on November 9th, 1895, to bestow its Silver Medal BENE MERENTI on him.

With the full approval of the Imperial Ambassador in Washington, who had been consulted, this handsome medal was presented to Dr. Rominger in February, 1896. It bears on one side the inscription "ACADEMIA LITERARUM ET SCIENTARUM REGIA BOICA -- BENE MERENTI" and on the other a bas relief of Plato. Along its edge is inscribed ARB CAROLO ROMINGER DD [Academia Regia Boica dono dedit]. The medal, given to The University of Michigan by Dr. Rominger's daughter Marie in 1936, is preserved in the Rare Book Room of the Graduate Library; a plaster replica is framed beneath Dr. Rominger's picture in the library of the Museum of Paleontology.

Early in the 1900's Dr. Rominger assembled a collection of fossils for the United States National Museum, part of the Smithsonian Institution. It is described in a letter there on file written by Dr. George P. Merrill, Head Curator, Department of Geology, on February 5th, 1904, which begins:

> To Mr. Geare:
>
> With reference to the Rominger collection, concerning which you telephoned me this morning, I will state as follows:
>
> The collection was divided into two parts, one of which, comprising the larger and showy material for exhibition purposes, was purchased for the St. Louis Exposition, and the other by the Museum. Both portions were purchased prior to June 30, 1903, but, owing to Mr. Schuchert's absence in

FIG. 19 -- The Rominger family on November 30th, 1904, the occasion of Carl and Mrs. Rominger's Golden Wedding Anniversary. The family included Dr. Carl L. Rominger (seated left), Mrs. Carl Rominger (seated center), daughters Julie and Marie (standing left), son Dr. Louis Rominger (seated right), Mrs. Louis Rominger (standing right), grandson Carl (standing right center), and granddaughters Alice (at her grandfather's lap) and Louise (next to her father). It was from this photograph that the frontispiece of Dr. Rominger was prepared. The Michigan Historical Collections of The University of Michigan.

> Europe, the accession was not made and the account not closed until after the beginning of the fiscal year 1903-04. . . .

There were 38 boxes of specimens destined for the Louisiana Purchase Exposition in St. Louis; the Museum's "Accession Card" lists them as

> The Carl Rominger collection of corals, crinoids, and trilobites representing the major part of the Paleozoic formations of the Mississippi Valley, (i.e. Upper Silurian, Devonian and Carboniferous).

It is interesting to note that the freight on these 38 boxes from Ann Arbor to Washington was $8.20, and that Dr. Rominger was paid $619.50 for the lot. He seems to have been quite content. He wrote Dr. Merrill on June 24th, 1903, to say that he had that day taken "one light box with microscopical sections to the Am. Express office," and that the remainder of the boxes, "all numbered and the contents indicated on the cover," would go by freight "in a very few days."

> By sending off these boxes, which are packed so that I expect they will arrive at Washington safely, without being damaged, I will get my working room emptied and can to better advantage continue to pack the remainder of the collection which most likely will fill another set of 40 boxes.
>
> I send you everything I have; certain forms will therefore be represented by very numerous specimens, which are considered by me as valuable, and still sometimes a number of other specimens of the same kind remain, which you might consider too imperfect. For the present I do not send those, but if you wish to have them I shall be glad to send all this material of inferior grade.
>
> Please inform me of the arrival of these boxes at Washington.

The second part of this collection containing "bryozoa and mollusca" from the same general horizons and areas, packed in 42 boxes, was shipped to Washington by freight for $7.50. These boxes of non-showy specimens were purchased by the Museum for $580.50.

Dr. Rominger was pleased to have his fossils in the National Museum and his workroom cleared out except for fossils of "inferior grade." Mrs. Rominger was doubtless even more pleased to get eighty boxes of stones out of the house.

The two Museum memorandum slips are signed by "Charles Schuchert, Ass't Curator" -- later Professor of Paleontology at Yale. One of the Accession Cards bears the signature of R. S. Bassler who was to become Head Curator, Department of Geology, at the National Museum and the nation's leading authority on Bryozoa.

Dr. Rominger's collecting days had not ended. Among his notebooks is one labelled "Register of fossils collected 1904 and 1905 Environs of Louisville Ky." It contains a number of lists, one the "Register of Fossils collected during my visits in Louisville, Ky. in the vicinity of the city." Below this heading he named and numbered 177 species.

Fossils were still important to him but not as important as his family. He and his wife, Rickele, celebrated their Golden Wedding Anniversary on November 30th, 1904 (see figure 19). With them on that great occasion were their two unmarried daughters, Julie and Marie, and their son Louis, a physician of Louisville, Kentucky with his wife and their three children -- the grandchildren of whom the elder Romingers were so proud. A photographer was called in to make a record of this memorable family reunion (figure 19).

Now that he had more leisure Dr. Rominger, accompanied by one or both of his dachshunds, became a familiar sight in Ann Arbor. One old friend remembers that the dogs answered only to German; another remembers as a child seeing Dr. Rominger out for a walk "with two dachshunds running in front of him or behind him."

In his biographical sketch of Dr. Rominger, Dr. A. C. Lane, State Geologist of Michigan from 1899 to 1909, tells a story about one of these dogs:

> I shall never forget the first time I saw him. I was standing on the steps of the wrong house when a dachshund came down the street followed by a bent and grizzled form which I knew at once must be Dr. Rominger. I had no hesitation in leaving the porch and going to the house in which he turned.

Dr. Rominger had passed his eighty-sixth birthday when he slowed down. Bed-ridden only a short time, he died on April twenty-second, 1907. The funeral service in his home was a private one, conducted by the pastor of the Bethlehem Church. Then his body was laid to rest in the Forest Hill Cemetery of Ann Arbor, appropriately high on a wooded slope.

A great man had gone. The Ann Arbor Daily Times described him as "a profound scholar, a physician of note, and a geologist of wide reputation," adding that "almost up to the day of his death he maintained a mental and physical vigor unusual to his years."

Dr. Otto J. Klotz, who long ago had sent him the rare fossils from Mount Stephen, wrote the German obituary for the Detroiter Abendpost. Referring to Dr. Rominger as "unquestionably one of the foremost geologists of the country," he paid him this fitting tribute:

> For 47 years Dr. Rominger was counted one of the best known and best loved citizens of Ann Arbor. He was a friendly gentleman and his frankness was somewhat refreshing. Every one who saw him perceived at once that before him was a remarkable man.

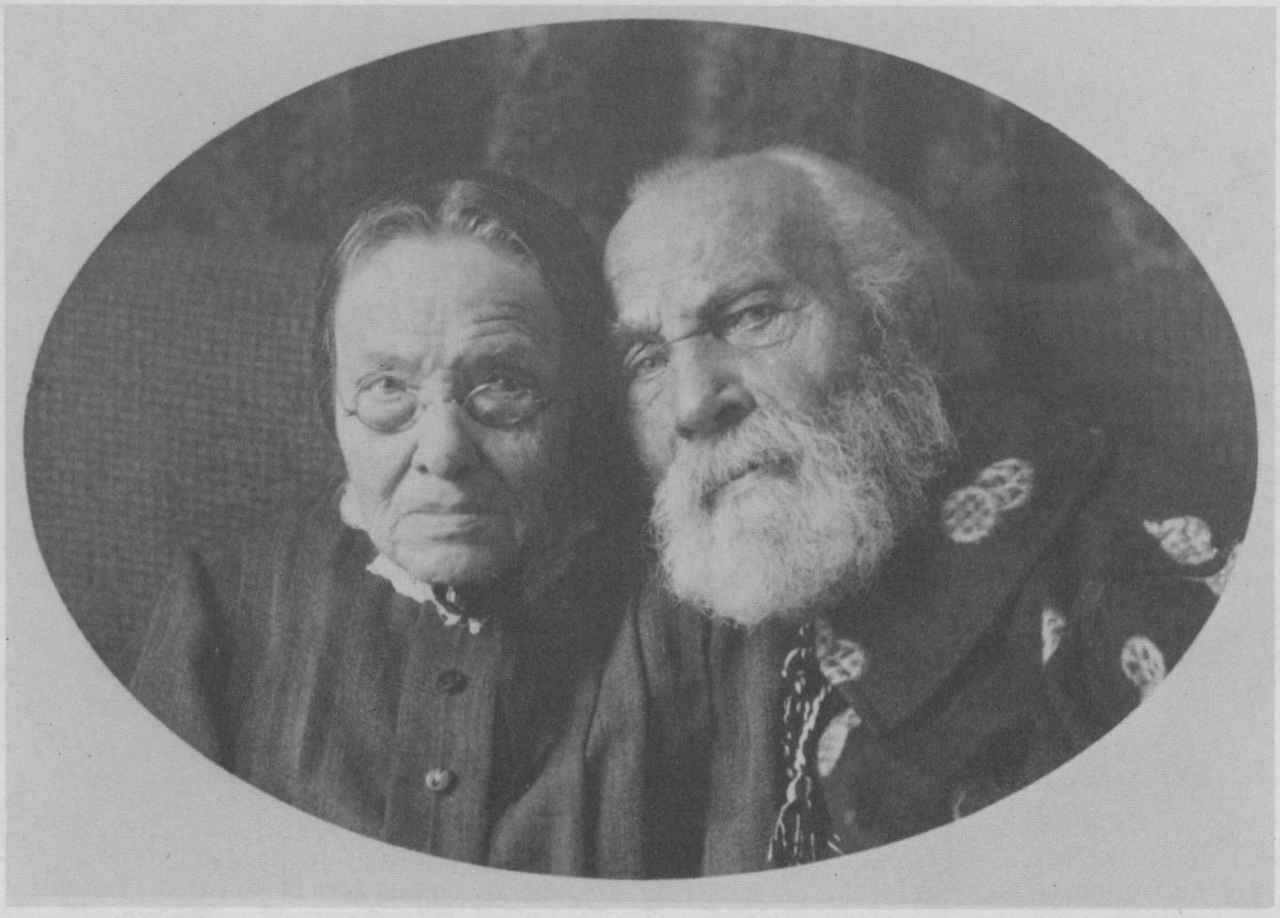


FIG. 20 -- In the twilight years. Carl and Friedericke Rominger at about the time of their Golden Wedding Anniversary. The Michigan Historical Collections of The University of Michigan.

ACKNOWLEDGMENTS

Reading the diaries Dr. Rominger kept while State Geologist, I found it hard to detach myself from the experiences he described -- tramping through dense forests in the Upper Peninsula or venturing in a small open boat on the rough waters of the Great Lakes. Fifty of his diaries and field notebooks as well as family correspondence and photographs were made available to me at the Michigan Historical Collections of The University of Michigan.

To this material Mrs. Alice Rominger Covell added important information about her illustrious grandfather. Friends of the Romingers told me about them and their hospitable gray house on South Fifth Avenue, torn down to make a parking lot for Ann Arbor's library.

Dr. Donald W. Fisher, State Paleontologist of New York, arranged to have photocopies made of letters written by Dr. Rominger to his friend Professor Hall -- part of the James Hall Papers in the New York State Library, Albany. Through the kindness of Dr. G. Arthur Cooper, Paleobiologist Emeritus at the National Museum of Natural History, Washington, I received copies of correspondence relating to the Rominger Collections in the Smithsonian.

My sincere thanks are extended to all these people, both for the material and for permission to publish it.

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The important papers I accumulated during two years' research have been deposited in the Michigan Historical Collections.

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