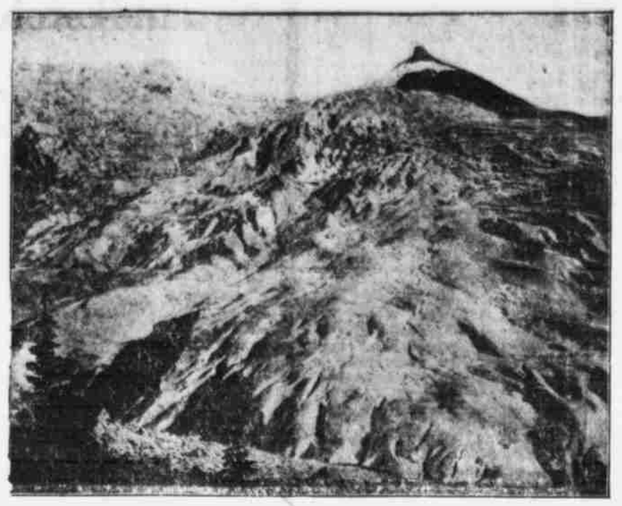
Canadian Mountains and Glaciers Seen Through Scientific Eyes

FORESTS OF HEMLOCK, SPRUCE AND CEDAR, WITH GREAT GLACIER IN THE BACKGROUND.



NEAR VIEW OF THE GREAT GLACIER OF THE SELKIRK MOUNTAINS, IN BRITISH COLUMBIA.

CATHEDRAL PEAK, NEAR THE CONTINENTAL DIVIDE, IN THE HEART OF THE ROCKY MOUNTAINS.

AFTER rattling across the Canadian plains for a couple of days we catch sight of the peaks and crags of the Rocky mountains a short distance west of Calgary. We go up the Bow river, rising rapidly and penetrating deeper and deeper into outlying foot hills. We study the contorted strata which are here of gigantic proportions, testifying to the tremendous forces which once played with these mountains as a child plays with fragile toys, folding and bending them at will. Now we find trees, but the forests are not dense, as the rainfall is not heavy on the easterly slope of the mountains. Spruce and aspen are the principal species, occurring in the valley and running up its steep sides.

We soon begin to see snow-capped peaks, and as the train passes we strain our necks in the effort to see their lofty summits. We pass Banff, one of the famous resorts of this part of the Rocky mountains. Here are hot springs reputed to possess medicinal properties, and near here are mountain peaks which invite the climber, and beautiful valleys and lakes to attract the lover of the beautiful. Not far away are mines of anthracite coal, and what is of equal interest to the scientific man, great beds of fossil remains of prehistoric animals. Up the grade we continue past the bases of giant mountains, until we reach Laggan, where some of the party leave the train in order to see the "Lakes in the Clouds." These three lakes—Louise, Mirro and Agnes—are justly ranked as among the prettiest bodies of water in the world. Here are mountains without number, and many of them bearing glaciers on their rugged sides and summits.

We soon leave the Bow river and wind up to the source of a little tributary. Here is a small tract of nearly level land at an elevation of exactly one mile above sea level, from which the water on one side runs into Hudson bay and on the other into the Pacific ocean. We follow the latter and go down the valley of the Kicking Horse river, which soon becomes a roaring, tumbling torrent, fed every few rods by other torrents from the glaciers far up the mountain sides. We pass the base of Cathedral peak, fitly so named, and under the shadow of the somber giant, Mount Stephen, on whose almost vertical front are seen the cabins of a silver mine more than 2,000 feet from its base, while several thousand feet higher there hangs a giant glacier on the very shoulder of the great mountain.

Beautiful Mountain Scenery.

A few miles farther down we stop at Field for luncheon, and afterward feast our eyes on the beautiful mountains. The valley sides are covered with a forest of pine and spruce, although here and there it has been burned away by forest fires. Now and then we pass a sawmill whose big piles of lumber attest their efficiency as lumber producers. On the steep valley sides we see many narrow streaks marking the paths of avalanches which swept down every tree and bush into a crushed and confused mass at the bottom. With the narrowing of the valley the river becomes more tumultuous, until it resembles the rapids in the great gorge below Niagara Falls, but at last we emerge from this valley into a broad valley of the stately Columbia, upon whose bosom steamboats safely ply as far as the bustling mining town of Golden. The river's course here is almost due north, and we follow it for a time and then turn up the Beaver river, in order to shorten our course.

On looking at a map one sees that the Columbia river runs far north in this part of its course, and then bends westward, and then southward, making an immense loop. Between the two sides of this loop are the Selkirk mountains and these we now enter. We follow the Beaver, climbing high upon the slope of the valley, at last entering Bear creek valley, with its long line of massive snowsheds. Here and there the destructive path of an avalanche crossing an unprotected stretch of track shows how necessary these sheds are.

The Great Selkirk Glacier.

We round a sharp curve and up the valley of the Illecillewaet we catch a glimpse of the Great Glacier of the Selkirks. We leave our train here in order to stop over twenty-four hours at the Glacier house, right in sight of the glacier. The valley sides are very steep, but they are densely wooded from bottom to top. At one point a torrent dashes down from the top of the wall, looking like a white thread against the dark green background of spruces, firs and cedars. Looking up the canyon to the glacier, one sees Mount Sir Donald on the left, bearing aloft near its snowclad summit a hanging glacier. What glorious sport it would be to climb this great peak! In the morning we walk over the easy trail of a couple of miles to the foot of the glacier.

We note as we approach the ice front that since the first records in 1887 the point of the glacier has receded 600 to 700 feet. This appears to be at an average rate of from thirty-five to forty feet per year, but a close examination of the recorded marks indicates that in the eleven years from 1887 to 1898 the recession was at an average of about fifty feet per year, while in the years from 1898 to the present the average is but sixteen feet. In fact there is evidence that it is now advancing slowly. At one point it is plainly pushing a heap of boulders before it.

While making these observations and calculations we took in some of the principal features of the great ice mass and felt of it, patted it, and knocked off a little piece and ate it. Then we stood off and peered into its great cracks, showing green-blue ice. We looked up the great slope of ice, and tried to realize that this is a gigantic waterfall, whose height and breadth so far exceed those of Niagara as to dwarf the latter to insignificant proportions. Think of a cascade 2,000 to 3,000 feet high and half a mile or more wide!

What a Glacier Looks Like.

"What does a glacier look like?" some reader asks. Well, at first it looks something like a bank of old snow on a hillside. A closer inspection shows that it is solid clear ice, all except a few inches on the surface, where it has melted and become loose and crumbling. Then in many places dust has gathered upon it and made its surface dirty. When this dirt mass is considerable, and especially when it is composed of stones and gravel, it is called a "moraine." By the more rapid movement of the center of the glacier than its margins this moraine material comes to form a line down the center. In this Selkirk glacier there is no distinct central moraine, for the very good reason that there are no nearby rocky heights from which such material could fall upon it. At the extreme lower end the ice thins down to an edge which is usually a foot or two above the ground and more or less hollowed out underneath. Ice cold water runs from beneath the edge and dashes down over the rock and gravel

But we must not tarry longer at the foot of the glacier. Back we go down the pretty trail as it winds in and out among the trees and rocks. We note the profusion of ferns and mosses, and the lichens on the trunks of the trees, or hanging from their branches in beautifyful gray-green pendents. Here and there we stop to admire some patch of wild flowers or some rare shrub or tree and at last we reach the hotel and its cheerful fireplace and crackling fire.

Down Grade to the Columbia River.

On the train again and down the grade we go around the sharp curves of the loop a few miles below. We follow the stream which issued from the glacier until it becomes a roaring river, the Illecillewaet. It is fed by countless streams from other glaciers on the encircling mountains. At Revelstoke we reach the Columbia river again, here running south. We cross it, and now find ourselves in the outlying foothills of the Selkirks. From here we pass downward by easy grades out of the beautiful mountains to the lower and richer agricultural country of the west coast.

Looking back we recall the scarcity of trees on the east side of the great mountain country, the Rocky Mountains proper, increasing here and there, but never forming very dense forests, and contrast this condition with that of the Selkirks, which are covered with a heavy forest growth. In the former we find distinctly smaller species representative of the eastern flora or at most of the Rocky mountain flora. In the Selkirks on the other hand we find larger species, all characteristically far western, and forming forests which are capable under rational management of furnishing lumber to the west coast for all time. If the Canadian government is wise enough to adopt a far-reaching system of forestry for this country it will never find these mountains denuded of their covering of trees, nor will it have to face the problem of adequate lumber supply. Let the Canadians take warning from our folly in dealing with our great forests, and enact protective laws before it is too late.

CHARLES E. BESSEY.

Nikola Tesla's New Discoveries Which May Revolutionize the World

(Copyright, 1904, by Frank G Carpenter.)

NEW YORK, Dec. 15.—(Special Correspondence of The Bee.)—I give you today the substance of two remarkable talks with Nikola Tesla. The first I had in his laboratory on East Houston street nine years ago last September. The second was held in the Waldorf tonight.

The first interview was most interesting, giving a wonderful insight into Tesla the inventor and Tesla the man, but it was never published, for Mr. Tesla at its close, on the ground of business reasons, begged that I say nothing about him for months to come. I wrote out the notes, however, and laid them away, and when I met Mr. Tesla tonight I told him I now intended to use them. At the same time we had the extraordinary conversation about his recent discoveries and inventions as to the transmission of force, which I reproduce in the latter part of this article.

Tesla the Man.

First take a glance at Tesla the man. He looked more like an Italian savant than a hard working inventor when I saw him in the Waldorf tonight. He was in evening dress and was the most striking figure of the score of public men who stood about the lobby. Mr. Tesla is now 47 years of age and is in his physical and intellectual prime. He is tall and slender, his head is long, thin and intellectual, with a forehead high and full. He was born in Hungary and educated there, but he speaks English perfectly and is one of the most charming conversationalists I have ever met.

During my chat of some years ago he talked of his boyhood. His father was a clergyman of the Greek church, and Nikola was intended for the priesthood. He had a brother older than himself, whom the rest of the family considered much brighter. That brother died young, and this so crazed his father and mother that it took them long to realize the genius of Nikola. If he stood well in his studies his father's eyes would fill as he thought how much better, perhaps, the other son might have done, and whatever Nikola did was always compared with the possible work of the boy who had passed away. His first education was in the public schools of Gospich, and after that he went to the Real Schule at Karlstadt. As he went on with his studies he liked mathematics so much that he intended to fit himself to be a professor of mathematics and physics, and with that view studied at the Polytechnic school at Gratz. He changed to the engineering course, and later on studied philosophy and languages in the colleges at Prague and Buda Pest. He has since been made a doctor of laws by Yale and Columbia.

Shortly after completing his studies Mr. Tesla was associated with the government of Austria-Hungary in the telegraph engineering department, where he invented several improvements. From there he went to Paris to be engineer of a large lighting company, and thence to the United States, where he was employed by Thomas Edison in his laboratory. His next position was that of electrician to the Tesla Electric [illegible] company, and at the same time established the Tesla laboratory here, from which his great inventions have come.

Tesla the Inventor.

During my chat with Mr. Tesla I asked him when he first realized that he had inventive faculty, and he told me he always been inventing something or [illegible]. When he was quite a small boy he made toy guns, which would shoot [illegible] and as he was the only one who could make them he supplied the boys of his neighborhood. He made clocks at 8 or 9 years and began to dabble in electricity before he was in his teens. His first determination to devote his life to invention came shortly after he went to London to deliver a lecture before a scientific society there. At this lecture he met Lord Rayleigh, the great physicist, and showed him some of his experiments. Rayleigh said that he had undoubtedly the faculty of discovery and that he would succeed as an inventor.

"Shortly after this my mother died," said Mr. Tesla, "and I concluded to exert this faculty. Lord Rayleigh had said I possessed it and, upon examining myself, I believed him correct. I did not want to waste my powers on small things and I decided to strive toward something that would benefit humanity. I am working on an invention for the transmission of force. This invention will, I believe, revolutionize the world of labor. I am also working on electricity and I cannot remember when I was not working more or less in the direction of a successful flying machine. My idea as to that is along different lines than any yet proposed and I expect to see it realized. Indeed, we shall eventually have flying machines that will be large enough to carry crowds through the air. They must be large in order to succeed."

These words were uttered by Mr. Tesla nine years ago. Today he says he has completed his force transmission invention, as will be seen by my Waldorf conversation, which follows. He has also done other things which he proposed in that interview. Remember it was before the time of the wireless telegraph, but he then said to me the following:

"I tell you, we are on the threshold of a new era. We have only begun to master the great forces of nature, and the inventions of the next few decades will be far superior to any of the past. What would you think of standing on the shore and telephoning to your friends in mid-ocean? What of being in the center of a room and making your whole body blaze with light? What of sending power to and fro over the earth at will and making it do its work anywhere and almost anyhow?

How it Feels to Invent.

Mr. Tesla told me that his greatest pleasure was in his work, and that he could conceive no moment so exciting and rapturous as that connected with the discovery of a new principle which, when put into use, would revolutionize the work of the world. Take, for instance, the invention which brought forth the apparatus used in the transmission of power at Niagara Falls. Said he, as he took me to a great coil of wire wound about a stationary magnet, which was connected with the dynamo, and held above it a little glass globe in which was a steel wheel moving on a pivot: "I had been working upon that experiment for a long time, and this was the test. I knew that if I were correct that the wheel in this globe would revolve as soon as I turned on the electricity. It did revolve, and I knew I had discovered what would revolutionize the labor of the world. You can run all sorts of power by that principle. You can take power from Niagara and bring it to New York. The cars can be pulled by it, factories run, houses heated and dinners cooked. I cannot describe my sensation when I saw the wheel revolve. I thought I should go crazy, and I went to my laboratory and took some bromide of potassium to quiet me.

"It has been the same in some of my experiments with electric lights and other things. No! the greatest rapture one can have is to discover a new force or series of forces, which will reduce man's working necessities to the minimum. I do not believe in laziness, and I should like to see the loafer wiped from the face of the earth; but I want that those who are willing to work should accomplish their results with the least labor and in the best way."

How Tesla Works.

As to Mr. Tesla himself, there is no harder worker known. He told me that he seldom slept more than four hours of a night, and during some periods not more than three. When in the thick of a new invention it is hard to sleep. His work is always with him and he says that his mind sometimes works in his sleep. He awakes in the morning to find that the problem which had worried him when he went to bed has been practically solved over night. He has always been a light sleeper. His mother died at 70 and she never took more than four hours' sleep. His father was a light sleeper.

Tesla is a peculiar worker. Failures do not trouble him. After he undertakes a thing and decides that it should come out a certain way, he keeps on experimenting and experimenting, believing in his success. He says that if he doubted his ability it would make him crazy. He seems to have a dual mind. He told me that he often found himself carrying on two trains of thought at the same time, and said that while he was talking to me he could see the figures of some of his calculations behind me and could carry them on at the same time. He is always figuring. His scrap basket is filled with the calculations which he has torn up and thrown away. He keeps a record of his experiments, and when his laboratory burned some years ago he lost the work of years in ideas and suggestions which had been thus recorded.

Tesla's New Inventions.

And now to Mr. Tesla's latest discoveries. If he has what he thinks he has he will revolutionize labor and give man greater benefits than have come from any inventor since the world began. Indeed, the statements made me tonight in the mouth of any other man would be a fair test of insanity. But many of Tesla's wild statements of the past have been verified by great working inventions. He said he could harness Niagara, and through his experiments in the rotary magnetic fields Niagara is now furnishing a power equal to that of tens of thousands of horses, and electrical works are being run by the same principle all over the globe. The New York subway, for instance, is founded upon it. Tesla demonstrated that wireless telegraphy could be done in 1893, and it is a question whether his inventions in that field are not prior to those of Marconi or De Forrest.

Tonight he told me that he had almost completed inventions by which he could send electrical power to any distance without wires, and that in any quantity, small or great. Said he:

"I have proved that power can be thus transmitted. Let us suppose I have my plant at Niagara and you are running a sugar factory in Australia; by my discoveries it will be possible to send you 100, 500 or 1,000 horsepower for your factory, and to supply the same regularly by the force furnished from Niagara Falls. Suppose you are traveling in the wilds of the Andes and make your camp on the shores of Lake Titicaca. By the outcome of this principle you may have telegraphed to you there instantaneous reports of the news of the world as it happens from time to time. You may cook your dinner over an electric fire thus transmitted, and you may have the same at will on any part of the globe. We shall be able to send power from place to place at will, and that at such a small cost that it will be industrially profitable."

Transmitting Energy Without Wires.

"How did you discover that this might be done, Mr. Tesla?" I asked.

"I have for years been working on the transmission of electrical energy, and in 1898 established a laboratory on the edge of the Rocky mountains near Colorado Springs. My laboratory there was over 6,000 feet high, higher than the top of Mount Washington, and I had extraordinary conditions for my experiments. Colorado is famous for its natural displays of electrical force. The earth at times is alive with electrical vibrations and the air is full of electricity. I have seen 12,000 lightning discharges within two hours and all within a radius of thirty miles of my laboratory. These discharges were of great violence, some of them looking like trees of fire on the heavens. It was among such discharges that I had my electrical instruments and studied the principles of electrical transmission through the earth and air. One day while watching the lightning I noticed that the discharges afar off often affected the instruments in my laboratory more than those near by. Upon examination I found that this could not be caused by the difference of intensity in the individual discharges.

"What could it be?

"Through instruments made for the purpose I tested the matter from time to time and finally came to the conclusion that the vibrations caused by the lightning moved around the world and that there were stationary waves. I could gauge the discharges near the laboratory and see them fade away and after a certain fixed period find them returning with almost no loss of power. In short, this planet, as big as it is, was acting as a conductor, and I became convinced that upon it not only telegraphic messages, but also the modulations of the human voice and electrical power in unlimited amounts could be carried around the entire globe and sent to any part of it with hardly any perceptible loss. With my transmitter I actually sent electrical vibrations around the world and received them again, and I then went on to develop my machinery. I had, as I have told you, been studying and inventing along the line of electrical transmission and was ready to take advantage of my discovery. I have since so improved the means of individualization and isolation that such energy may be sent in any amount to any fixed place without danger of its going elsewhere or affecting others, and I believe the individualization can be carried out to almost any degree."

Niagara for the World.

"Will this enable the power of Niagara to be sent anywhere over the world?"

"Yes. I have been experimenting at my laboratory on Long Island. I have machinery and buildings there which have cost in the neighborhood of $350,000, and the results show me that a plant could be erected at Niagara which can transmit its force to any place desired. I am designing such a plant now at my laboratory, and would have had it completed had it not been for unforeseen delays, which have nothing to do with its technical features. The design which I have adopted will have a transmitter which will emit a wave complex of a total maximum activity of 10,000,000 horse power, 1 per cent of which is enough to girdle the globe. This enormous rate of energy delivery—it is twice as much as the force of Niagara Falls—is obtainable only by the use of certain artifices which I shall make known some time in the future.

"We have been offered 10,000 horse power from the Canadian Power company. What I want to do is to build machinery there and transmit this power to different parts of the globe. The value of that amount of horse power would be about $200,000 per year, and a plant erected to take advantage of it will pay large dividends."

"How much would the plant cost?"

"It might cost in the neighborhood of $2,000,000, but its value would be enormous, and its success would revolutionize the working forces of the globe. It would result in other plants being erected otherwheres and in the utilization of all the great water falls for the work of man."

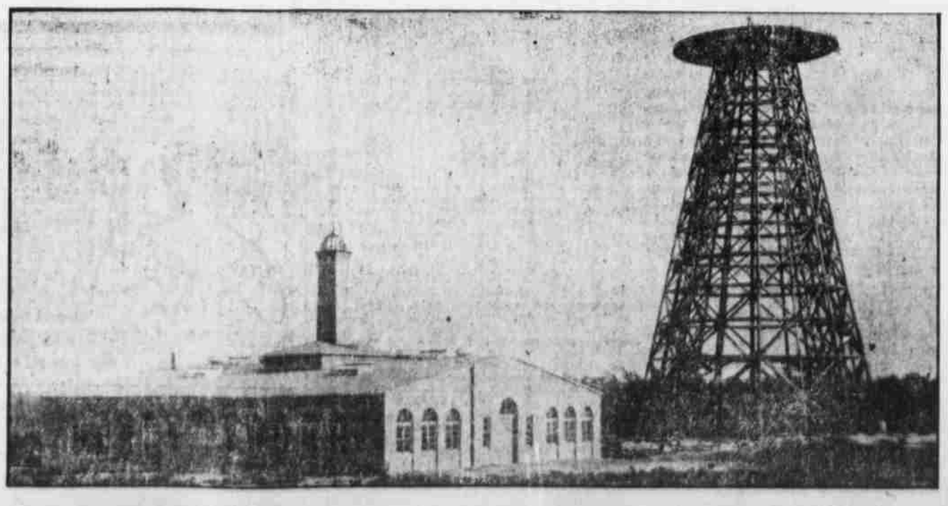
Mother Earth Put to Work.

"By this invention every live part of Mother Earth's body would be brought into action. Energy will be collected all over the globe in amounts small or large, as it may exist, ranging from a fraction of one to a few horse power or more. Every water fall can be utilized, every coal field made to produce energy to be transmitted to vast distances, and every place on earth can have power at small cost. One of the minor uses might be the illumination of isolated homes. We could light houses all over the country by means of vacuum tubes operated by high frequency currents. We could keep the clocks of the United States going and give every one exact time; we could turn factories, machine shops and mills, small or large anywhere, and I believe could also navigate the air.

"One of the most important features of this invention," said Mr. Tesla, "will be the transmission of intelligence. It will convert the entire earth into a huge brain, capable of responding in every one of its parts. By the employment of a number of plants, each of which can transmit signals to all parts of the world, the news of the globe, will be flashed to all points. A cheap and simple receiving device, which might be carried in one's pocket, can be set up anywhere on sea or land, and it will record the world's news as it occurs, or take such special messages as are intended for it. If you are in the heart of the Sahara, your wife can telegraph to you from Washington, and if the instrument is properly made you alone will get the message. A single plant of a few horse power could operate hundreds of such instruments, so that the invention has an infinite working capacity and will cheapen the transmission of all kinds of intelligence."

FRANK G. CARPENTER.

NIKOLA TESLA IN HIS WORKSHOP.



TESLA POWER PLANT FOR TRANSMITTING ENERGY WITHOUT WIRES.

Quaint Features of Life

Profitable Treatment.

An Idaho judge announces that he is better prepared than ever to tie the hymeneal knot with neatness and dispatch. The prices have been arranged as follows: Plain ceremony, 50 cents; plain, with osculation on the side, $4. It might be well to state that the judge prefers giving the $4 treatment.

Coming to the Front.

The Tombstone Epitaph is confident that Arizona is bound to have a front seat in all the world competitions. "Last Friday," it says, "Clay McGonagil, at the steer tying tournament at El Paso, roped and tied his steer in twenty-eight seconds flat. Our Arizona cowboys, like all other Arizona institutions, are strictly in the lead. They may not have that quality of stove polish on them that distinguishes eastern society, but they simply have the 'stuff' in them to 'get there.'"

Value of Good Teeth.

Thomas Quinlan of Waterbury, Conn., has reasons to be thankful that nature endowed him with a set of sound teeth. He and a friend were skating on a big pond when both went through the ice. The other man got out immediately, but Quinlan floundered about until he was becoming dangerously weak. Someone threw him the end of a long tourist coat, but his hands were so cold he could not hold it. In desperation he caught a good mouthful of cloth between his teeth and hung on until he was hauled to safety.

Boomer of Matrimony.

Justice Harry Barnes, recently elected in Asbury Park, announces that for two months he will marry all couples free. He also promises, in addition to remitting the usual fee, to give a pair of baby shoes to every child born to every couple he unites in marriage in the two months. He does not draw the line at twins or triplets, but generously provides for whatever may come along and without reference to race or color. The only requisite is that when the time comes the happy mother shall display a certificate proving she was married by the justice in the period named. It doesn't matter how many years hence the promise has to be fulfilled, baby will get the tootales.

Why He Made Signs.

In Guthrie, Okl., every man belongs to some secret society. Recently a new man came to Guthrie and located just across the street from H. T. Swearengin, a prominent Scottish Rite Mason. One day, about a week later, Swearengin saw a 5-year-old boy of the new neighbor, as the lad was passing, and after a few preliminaries, asked if his father was a Mason. "No, sir," answered the boy. "Probably, then, he is an Odd Fellow," suggested Swearengin, but the boy again denied it. "Then he must be a Pythian," said the Scottish Rite man, but the boy said "No." "Isn't your father a member of any lodge?" asked Swearengin, incredulously. "Not a one," answered the lad. "Then why does he make all of those signs when he comes out in front each morning?" asked Swearengin. "Why, that's easy," said the boy, "Pa's got St. Vitus dance."