A COMPLETED SURVEY

GEOLOGICAL HISTORY OF PUGET SOUND DEFINITELY SETTLED.

Bailey Willis Says It Was Once a Level Plain With a Tropical Climate—He Finds the Impression of a Fig Leaf on a Mountain Peak—The Coming of the Glaciers.

The geological survey, under Bailey Willis and George E. Hyde, has completed its labors for this season. The results have exceeded in the importance of the data gathered like researches of previous years and form a basis for an accurate geological history of the Puget sound basin. Bailey Willis was seen at the Butler hotel last night and gave the following comprehensive statement as to the work of the survey and its results:

"The survey has maintained this year, as it did last, two separate parties in the state of Washington. One under George E. Hyde made a topographical survey of the district north and west from Ellensburg, including the well-known Peshastin gold region, the Roslyn coal basin and the Cle-Elum lakes. Mr. Hyde's party has been in the field since the middle of May, and in the course of the summer's work he has extended his observations for triangulation into the high Cascades with a view to pushing the surveys into that portion of the range north of Snoqualmie pass, where extensive mineral interests will be greatly aided in their development by a good map. The surveys made by Mr. Hyde this summer will be platted during the winter, and a map will be completed by spring. The other party, of which I was in charge, has been engaged in geological work in the district comprising 1,600 square miles, from Seattle southward beyond Tacoma, and eastward as far as Black Diamond. The greater part of this area is included in one map known as the Tacoma sheet, which lies south of, but continues with, the Seattle sheet. The geological work was begun in June by I. C. Russell, of Ann Arbor, Mich., who examined the shore of the Sound from a sailboat. On one occasion, being deeply interested in the geological phenomena, he failed to observe the rising tide, and had to swim three-quarters of a mile to catch his boat. He weathered one storm that kept him at the tiller for over fifteen hours.

"I had been detained in Washington City by duties connected with the publications of the survey and did not join Prof. Russell until early in July. We made a trip to Mount Rainier by way of Carbon river and its glacier. On the northwestern flank of the mountain overlooking Puyallup, there is a sheer cliff, 2,600 in height, whose jutting corner commands a view of two great glaciers, and the towering summit of the Liberty cap. Prof. Russell, whose experience in Alaska and in all the great scenic regions of this country and Europe, well fits him to judge, sat gazing in rapt attention at this view for nearly an hour, and then, in his quiet manner, said: 'It is one of the three great views of the United States, comparable only with the view into the Yosemite valley and with that into the grand canyon of the Colorado, and it differs from both of them.'

"The party made its way around the mountain to its eastern side and made the ascent over the White river glaciers to the summit. The observations of Prof. Russell upon the character of the glaciers will probably form the subject of a special report in the forthcoming volumes of the survey. From the 1st of August to October 20 my assistant, George O. Smith, and I have been engaged in studying the geological history of Puget sound as expressed in the glacial deposits of gravel, sand and clay, and in examining the distribution and structure of the coal fields from Wilkeson to Issaquah. This is the first detailed geological work that has been done in the Sound country, and its result is the development of new ideas with reference to the past history of the Sound, as well as the gathering of material for an accurate map of the various deposits which make up the soils and the resources in sands, clays, building stone and coal.

"Now, I don't think the people want a lecture on geology," said Mr. Willis, pausing, "or I might say something of the historical deductions to be drawn from the findings of the survey." Being urged to continue, he said:

"The geological history of Puget sound, so far as it is represented in the rocks of the region, may be summed up somewhat as follows: In one of the more recent geological periods, known to geologists as the Eocene period, this region was an extensive plain which from age to age sank slightly below sea level and again rose slightly above sea level. Upon the land areas grew rich forests, whose dense foliage is now represented in the fossil leaves contained in many beds of sandstone and clay-shale. Many of these leaves have been studied, and are known to represent sub-tropical plants, indicating a somewhat warm and moist climate. Where the plain extended beneath the waters of the shallow sea, deposits of sand and mud gathered, and around the shores extended at different epochs wide marshes, in which decaying vegetation accumulated to form coal beds. The total thickness of strata is probably about 10,000 feet, or nearly two miles, and the greater proportion of valuable coal is apparently contained in the lower third of this great thickness. It is therefore possible to have extensive areas of sandstone similar to that in which the valuable coal mines are developed and yet have no workable coal beds. During the period of deposition of the coal-bearing rocks there was no Cascade range and no suggestion of the great volcanic pile, Mount Rainier. But during long ages following there was a gradual upheaval of the Cascade range, which was accompanied by volcanic activity. The ultimate result after a very long sequence of events, covering a time that must be measured not only by hundreds of thousands, but by millions of years, was the elevation of the former plain to about 7,000 feet and the building of such stupendous monuments as the great volcanic peaks that dominate all the mountain views about the Sound."

In giving this account of history he remarked that he had taken from the summit of the Cascades the impression of a fig leaf which must have grown in the warm, moist climate already referred to.

"The basin of Puget Sound," he continued, "was thus formed by the elevation of the Cascade range on the east and the similar uplifting of the Olympic range on the west. It was a wide valley with low ranges of hills dividing it into several water sheds. Luxuriant forests grew upon its slopes, and the creatures which were the ancestors of more modern forms roamed over its hills and swam in the waters of its streams. By degrees the climate changed. From the north the area of cold winters expanded; the summers grew shorter and shorter, glaciers spread downward from the mountains on the east and west, and the great glacier extended southward from northern regions. The Sound was a cul-de-sac into which from three sides great ice rivers flowed, submerging the former sunny landscape and expelling all the forms of life, which either became extinct or sought refuge in more southern climes. That was the first invasion of the glacial period. In time it somewhat retreated in consequence of longer summers and shorter winters, and then again, the climate becoming more severe, the ice readvanced. Such retreats and such advances of the vast ice mass that filled the Puget Sound basin recurred a number of times. As yet we do not know how often. In each advance the ice carried in its lower layers quantities of gravel and blue clay, which it deposited in extensive sheets now commonly known as cement gravel and hard pan. In retreating the ice left between its southern face and the hills to the south and east, areas which were filled with water, since the ice formed a dam across the northern outlet. In these temporary lakes there were deposited extensive deltas of sand and gravel and beds of fine clay which are often entirely free from pebbles. Thus by alternately advancing and retreating the ice built up a succession of deposits of various kinds, which more particularly occupied areas around and between the tongues of different ice rivers. These tongues extended in a general way north and south, being narrower from east to west, and when with the final return of a milder climate the glaciers disappeared, they left their vacant beds to be occupied by the waters of the ocean. Thus the different channels of Puget Sound are beds of the vanished glaciers, while the plateaus between them are built of the debris which the ice brought from the distant mountains.

"Since the retreat of the glaciers some of the depressions left by them have been partially filled by the rivers. Such, for instance, is the valley which extends from Lake Washington southward to the Puyallup, which was once, like Lake Washington, occupied by water. The study of these glacial deposits is in itself of interest simply as an addition to our knowledge of the latest chapter in the earth's history, and inasmuch as the character of the soils depends entirely on the character of the latest glacial deposits, the map showing their distribution will be a map of the soils of the region. A hint of some of the most recent changes that have occurred may be gathered from the statement that the sterile gravel plains of Meridian prairie and Jenkins' prairie, which lie some miles east of Kent, represent the old channels of Cedar river at a time when that stream was dammed on the north by a wall of ice and flowed southward into an extensive lake that occupied the region of the Green river valley. There have been many such changes from the former courses of the rivers, and the student of geology will find a fruitful field of interest in such studies."

In the examination of the coal fields Mr. Willis said he had everywhere been received by the owners and superintendents of mines with the greatest courtesy. "Every facility for pursuing my investigations has been afforded," he said, "and I have gathered a very much larger amount of detailed information than I had deemed possible. The responsibility of making a detailed and accurate report is thus laid upon the geologist, and it may be hoped that some of the difficulties with which the miners contend and which arise frequently from a failure to understand fully the character of the coal deposits and their underground relations may in part be removed. The various results of the season's work will be put in shape for publication during the coming winter, but the precise form in which they will appear will be determined only after they have been laid before the director of the survey."

THE NEXT COMMISSIONER OF PUBLIC LANDS.

W. T. FORREST.

Election Wagers.

If, for instance, you have wagered a hat upon the result of the election and should have the misfortune to lose the same (which we hope will not be the case), it is well to bear in mind that it is considered the correct thing to give your lucky opponent an order for a Dunlap hat. There are others, but only one Dunlap agency in Seattle. Cheasty's, Second avenue and James street.

We Put It Very Modest.

It is bad taste for a manufacturer or a producer of a high class product to praise his own wares and run down others; hence we leave it to your own judgment and the taste and appetite of the most fastidious. Everard's, the New York-Canada Malt Red Star beer, in bottles only and bottled at the brewery.

Also the Celebrated old English 'Alf and 'Alf.

This celebrated beer will be found in the first-class resorts of Seattle and by dealers who give you 100 cents on the dollar. Ask for Everard's 'alf and 'alf and Everard's beer, in bottles only.

R. Sartori, Wholesale Agent, Seattle, Wash.

Political excitement cannot cause people to forget that F.-B. Co.'s hams, bacon and lard are the best.

Mrs. Frank Mayo, widow of the actor, is dead at Canton, Pa., from the effects of an operation for tumor.

THE WEEK IN EUROPE

RISE IN THE PRICE OF BREAD INVITES LABOR DISTURBANCES.

Not Only Is There Distress in India, but Ireland Is on the Verge of a Famine—Parliament to Investigate the Tynan Affair—Bismarck Accused of Trying to Wreck the German Empire.

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London, Oct. 31.—The wheat and currency questions are still attracting great attention here. The Spectator this week publishes an interesting article on the rise in wheat and its bearing upon protection and bi-metallism, in the course of which it says:

"The rise in the price of bread is likely soon to lead to unrest in the labor market. The present activity in trade gives labor organizations a favorable opportunity for pressing demands for higher wages; but it remains to be seen how far the recent improvement in trade can be maintained, if a material rise in wages is insisted upon. There are endless possibilities of friction if the price of bread becomes a serious question. We can only hope the politicians who are coquetting with the various forms of protection will learn to digest the lessons that will be expounded by events if the price of bread is materially affected during the coming winter. How should we fare now if the establishment of an imperial zollverein forced us to look to home production and the Canadian surplus to fill our own mouths and for the needs of India? From a financial point of view, the rise in cereals shows a strong case for further large movements of gold to the United States, while, regarding politics, whatever the result, shipments of gold from here are still probable in the one case, because the panic and scramble for gold will make Americans sell gold faster and pay a premium for the metal, and in the other because a revival of industrial activity and a return of confidence will attract British bullion. Lastly, the rise in wheat and the accompanying weakness of silver have an instructive bearing upon economic theory. Not only Bryan, but the English bimetallists also, are deprived of one of their most effective arguments."

Indian advices show that now, whether rain falls or not, there must be keen distress in the Northwest provinces and in Oude, and the Indian government must be prepared to succor the population by relief operations conducted according to the so-called famine code. Orders have already been given to these officials to prepare for an immediate enforcement of famine measures. While a famine is threatened in India through the drouth, the west of Ireland is declared to be face to face with famine owing to heavy rains, which have caused a failure of the crops, especially of potatoes. Throughout September and during the beginning of October there was an almost incessant downpour of rain. There have been great floods in the northwest of the island, and many of the inhabitants must feel the pangs of famine before Christmas. The situation is compared to that of 1879, when a disastrous harvest led to a revival of political disorders in Ireland. However, the chief secretary of Ireland, Gerald Balfour, during his recent tour of the affected districts, secured information which he says will enable him to cope with the distress which he is now ready to meet.

James O'Connor, anti-Parnellite member of parliament, for the West division of Wycklow, who intends to ask parliament to order an inquiry into the Tynan affar, bases his demand on the past history of a mysterious Mrs. Tyler, who, he asserts, acted as a medium between Tynan and the British police. It appears that when Sir George Trevelyan was chief secretary for Ireland, the Dublin police learned that Mrs. Tyler offered bank notes to the amount of £20 to a sporting man who was supposed to be a Fenian, to buy dynamite with which to blow up the house of parliament. The sporting man, it is added, informed the police of the offer made to him, and the detectives afterward searched Mrs. Tyler's room, and found, it is alleged, a telegram addressed to her from the home office. The bank notes, it is further stated, were afterward sent to the treasury. Sir William Harcourt, who was then home secretary, is said to have acknowledged that this story would show that Mrs. Tyler was an English spy.

A letter has been received at the London office of the Associated Press from Harry Windt, dated St. Michael's, Bering sea, August 20, in which he says:

"I have safely crossed Alaska, and am now only 200 miles from Bering straits. I have been stuck here a month but shall go on in a few days, and hope to be in Siberia by the end of September. I hope if all goes well to reach Yakoutsk by the new year and Paris early in the spring."

Mr. Joseph Chamberlain, secretary for the colonies, was today elected lord rector of Glasgow university.

The English newspapers have been commenting most cheerfully upon the Bismarck revelations in the Hamburger Nachrichten, everything detrimental to Germany being hailed with the liveliest satisfaction. At the present moment Prince Bismarck is abused all around.

The Speaker says: "Prince Bismarck's last act is in harmony with his general character. Rather than lose a chance of striking those who supplanted him, he would shatter the fabric of the German empire. He has shown them the German empire, while he was in power, was guilty of the most heinous treason as an ally. There never was a more colossal piece of perfidy."

Seller & Co.'s LEADERS

FOR THIS WEEK.

DECORATED CHINA TEA TILES, IN DRESDEN AND OTHER FINE DESIGNS ..... 15c, 20c, 25c Each

DECORATED CHINA SUGARS AND CREAMS ..... 20c, 25c, 35c a Pair

DECORATED CHINA TEA SETS, TEA POT, SUGAR AND CREAM ..... 80c, $1, $1.25 a Set

DECORATED CHINA MUSH SETS, PITCHER, BOWL AND PLATE ..... 50c and 75c a Set

DECORATED CHINA FOUR-PIECE SETS, SUGAR, CREAM, SPOONER AND COVERED BUTTER ..... $1.25 Per Set

WATLAND DINNER WARE.

THIS IS THE VERY LATEST THING IN DECORATED SEMI-PORCELAIN, BOTH IN DECORATION, SHAPES, DESIGNS AND COLORINGS. IT EXCELS MANY OF THE CHINA SETS.

Jardiniere Sale Continued This Week

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A False Statement Corrected.

The Times stated last evening that the Women's Bryan Club of Brooklyn had 480 members. F. S. Stint, a well-known resident of Brooklyn, said last night that the statement was not true. There are only 170 women, all told, in Brooklyn, and of this number 90 are members of the McKinley Club of that place. The statement that there were 480 members of the Bryan Club is palpably false.

Worth its weight in gold, is the old Jesse Moore Whisky. Meyer Bros. Co., sole agents for the Pacific Coast.

The circuit court of Ohio has held that the collateral inheritance tax law is unconstitutional. The case will be appealed.

BEFORE I could get from a terrible blood disease I had spent hundreds of dollars trying various remedies and physicians, none of which did me any good. My finger nails came off, my hair came out, leaving me perfectly bald. I then went to

HOT SPRINGS

Hoping to be cured by this famous treatment, but very soon became disgusted and decided to try S.S.S. The results were truly wonderful. I commenced improving at once, and after I had taken a few bottles I was entirely cured—cured when the world-renowned Hot Springs had failed.

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Our Book on the Disease and its Treatment sent free on application. Address, SWIFT SPECIFIC CO., Atlanta, Ga.

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GOLDEN RULE BAZAAR CO.

Desires to announce to its patrons and the public that it has decided to go out of business and will

SELL OUT ITS STOCK

At a great sacrifice. We do not propose to use extravagant expressions regarding the way we will sell our goods, but will leave the public to judge how genuine is this sale.

Sale Will Start on Wednesday Next.

Our store will be closed from Saturday night until Wednesday morning at 9 o'clock.

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