ants before the end of another year. It is time, therefore, that it should be incorporated.

The feverish rush to Alaska has had a set back. The first instalment of the "sadder and wiser," to the number of seventeen, returned to San Francisco on the steam schooner Excelsior, on the 18th of last month. In the course of a lengthy report the *Examiner* says:—Sitka and Juneau are both crowded with miners who have got that far in their journey homeward, but can get no further. There is no employment for them in either of the cities, and many of them are begging for food and clothes." One of those who returned to San Francisco, a placer miner, said to the *Examiner* reporter:—"The whole thing made me disgusted with life. I had a few hundred dollars saved up when I was induced to take that trip. Now I haven't a cent. I had to borrow 25 cents from one of my companions to buy dinner with to-night, and, unless they help me out, I have nowhere to sleep." It is needless to make lengthy comments on the above—it speaks for itself. We have to chronicle no such experience for miners in the gold fields of British Columbia.

The success which has attended our efforts to establish this journal under trying difficulties is really wonderful. Letters reach us daily from all parts of Eastern Canada and from every state in the Union, as well as from England, from parties who sav they have seen and read the RECORD. Very few of those parties received the paper direct from us, which goes to show that our numerous subscribers are passing it along to their friends at a distance. This is as it should be, and thus the good work goes on of making known the vast resources of this Province.

Fourth Lecture on Chemistry.

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BEFORE I proceed to show you some of our practical methods of analysis, as I promised to do in this lecture, I would like to draw your attention for a little while to the great chemical changes which are taking place in nature.

Water is the substance which more than any thing else gradually changes the aspect of our landscape. It acts in two ways: First, as a mechanical agent or as a solvent of various matters; second, as a medium by which carbolic acid and oxygen in a dissolved state are applied to the substances undergoing the change. The mechanical action is easily seen in the beds which our rivers and streams cut for themselves in our valleys and down the sides of our mountains. Its solvent powers are not perhaps at first sight so apparent, but water is in all probability the most universal solvent known.

One of its most remarkable uses as a vehicle from a commercial point of view is in its solution of the underground strata of salt in some of the brine springs of the world. In Cheshire, England, an enormous quantity of salt is used annually in the production of soda and hydrochloric acid, and all this salt is pumped up from the salt strata below in the shape of brine which is then put into shallow pans where the water evaporates leaving the salt behind. That this is an economical way of conveying salt will be seen from the fact that although Germany has some enormous salt beds, one through which they have bored 3,940 ft. and have not struck the bottom yet, notwithstanding these immense solid deposits, England has been able to compete with her with her brine springs. I believe that one mining company in Germany abandoned mining rock salt in the usual way and turned a stream of water into the mine, which, when it had dissolved the salt, was pumped to the surface and thence carried a long distance to the crystallizing pans.

Water has also performed a curious office for the rocks of one of the islands of the Southern Pacific. The rocks are composed of crystallized carbonates of lime, perhaps originally coral, but by exposure to the air and by the percolation of the water the loose particles of calcarious matter have been washed away and the whole mass presents in consequence a very brilliant crystalline appearance.

As I mentioned before water holds in solution carbonic acid and that sometimes naturally to a great extent. You are all no doubt familiar with this gas but I hope to bring before you some features which may be novel. I have in this flask a few pieces of marble, which is virtually pure carbonate of lime or calcium carbonate, and when I pour on this some dilute hydrochloric acid you see by the brisk effervescence which takes place that some gas is being evolved. This is carbonic acid gas or carbon dioxide, and I can collect it by passing the delivery tube into this beaker. The gas is invisible but I can show its presence by putting a lighted taper into the beaker, when the light immediately goes out, while in a vessel containing air only, the light continues to burn as brightly as ever. The reaction which has taken place here and resulted in the production of carbon dioxide is represented by the following chemical formula:

$$CaCO_3 -- 2HCl = CaCl_2 -- H_2O -- CO_2$$

That is to say the combination of calcium carbonate and hydrochloric acid results in the formation of calcium chloride, water and carbonic acid gas.

We have here two jars already filled with the gas as we see by thrusting the taper into them, the light being immediately extinguished, for carbon dioxide neither burns itself, like hydrogen, nor supports combustion of other substances, like oxygen. Carbon dioxide is a very heavy gas one and a half times as heavy as air, so that I can take this jar containing nothing but air, as the taper will burn in it quite readily, and by carefully inverting over it one of the jars of carbon dioxide pour all of the gas into the lower jar, so that the taper is now extinguished in it and burns freely in the other which now contains nothing but air. Let me now pour into this jar of CO_2 a little of this liquid which is a perfectly clear solution of slaked lime in water. On shaking this up with the carbonic acid gas we have a white precipitate formed in the water, which if allowed to settle and collected, we should find to be calcium carbonate or chalk, the same substance which we started with in the form of marble, to prepare our carbon dioxide.

This gas being so largely dissolved in water becomes peculiarly applicable to fulfil the duties of a chemical agent, since such bodies generally act most readily in solution. It has been found that felspar, which forms a great part of the hard rocks granite and porphry, will withstand for some time almost without injury the action of cold hydrochloric acid which is a powerfully corrosive, fuming liquid, but water charged with carbolic acid gas