they, "hill" claims not shown in the diagram. there are five different horizons in which they are find-Thus in sold, and this is a splendid example, showing both the veins, or source of the gold, and the ancient and andern placers. These sandstones have been considerby contorted and cracked, in places igneous rock breaks through, influencing a further deposit of gold ore, and these ores from this rock are being treated most successfully by the chlorination process. In places they are putting up large cyanide plants to treat ores of this character, and metallurgists are watching the results of both of these processes. Low grade ores are not the bug-bear they were in the past. In the great Alaska Treadwell the gold is deposited in a great mass of eruptive granite, forming a low grade ore yielding \$3.50 per ton, yet the company paid a dividend of \$600,000 in Of late years there has been a great improvement in gold milling, larger and simpler mills are built with concentrators to save the sulphides, now treated in one of four ways. The product of the mines in the United States last year amounted to over \$600,000,000 in value at the mine, and this year it will be greater than ever before, as they are opening up many new properties, and _, as they are opening up many new properties, and many of the old properties once abandoned as too refractory to mine with a profit, can be and will be now worked successfully.

The different processes for treating gold ores may be counted on the fingers of one hand: amalgamation, successfully, chlorination, or by cyanide; any process outtide of these has not yet been put on a sound practical basis.



I will now refer to a very interesting diagram, one that I have copied from a section by Mr. Hobson, manager of the Horse fly mine, Cariboo, B. C., of one of their property worked out. A considerable area of gravel has been It was worked down as far as the cut shown when the holders got afraid of it, dropped it and the present company with a large amount of capital besan their now extensive operations. There are many acres of paying gravel, the upper layer of gravel is the one that that is being worked by hydraulicing at the present time. In hydraulic claims the sluice must be run in to the bed of gravel so as to touch the lowest part, as whatever lies below the sluice is practically valueless, while everything on a level with or above the sluice may be hydrauliced out. This lower gravel will be worked as many of the great hydraulic properties have been Works of the great hydraulic to been carefully worked in the United States. It has been carefully prospected and the lowest point of the bed-rock found before running in the tunnel. This is of vital importance. This tunnel will be run in below the gravel and then a shaft will be brought up through the bedrock and the gravel to the surface, into which all may be hy-Grauliced, but if the tunnel should strike 5 or 8 or 10 feet too high, it would be impossible to work out the west and probably best part of the bed. I have in mind one tunnel that reached the gravel 22 feet above

the lowest point and \$60,000 was thus thrown away. Another company ran a tunnel lower and made large returns. After tapping the lowest part by tunnel a shaft will be made to connect with the surface, water will be brought down and turned on through the monitors and the gold bearing gravel will be completely washed out, the gravel being carried to the dump and the gold caught in the sluices of the tunnel.

This gives an idea how some of these gravel deposits in the old river basins may be worked out where a tunnel can be run from the valley to tap the lowest point of the bed. Hydraulic mining was carried on to a great extent in California before the law forbade it, as they were filling up and destroying whole valleys with the washings of gravel.



A section is here taken from one of the famous mining regions, from Table Mountain, California, which will lead up to another method used in mining these old placers. In this case it is impossible to suspect that any old buried charnel exists here, but somewhere further along it has cropped out, and by further exploration by drilling they have determined where to work in this particular region. The underlying shales have been tilted up on end and have been covered with the sandstones and capped over with basalts of the same geological age as shown in the Stickine section, in Australia, and at Cripple Creek.

Cement or hard-pan has caused much trouble to many properties. Hard-pan is gravel hardened nearly into rock, and this has been caused by circulating waters carrying in solution a great deal of lime or silica which has precipitated and solidified these gravels into hard, rock-like masses. In some places they have overcome this difficulty altogether by running in tunnels and putting in and exploding enormous charges of powder to shatter the mass. 100,000 pounds have been used at one blast for this purpose. Where Mr. Hobson tried it in Cariboo, he found it did not shatter the gravel as much as he had expected, and the monitor had practically little power to knock up such material.

At Table Mountain the gravel is not worked by hydraulicing but by regular underground mining. In some of the large California deposits they have run in large tunnels with double tracks for a mile or more, using cars and locomotives for bringing out the gravel. By careful calculation they have struck below the gravel which is then stoped or breasted out. If they find it cemented the gravel is run through stamp mills and crushed, otherwise it is sluiced on being brought to the There may be some here to-night, to whom surface. much of this talk will be A. B. C., but to others it may, I hope, be interesting.