

## ON THE GREAT CONTINENTAL DIVIDE.

THE WILDERNESS AT THE HEAD OF THE MISSOURI, COLUMBIA AND THE COLORADO RIVERS.

We take the following interesting description of the great Yellowstone region from a recent issue of the *Mining and Scientific Press*, written for that journal by Chas. E. Blackburn:

Having spent the greater portion of the past two years prospecting in the country lying about the head waters of the Yellowstone and the other great rivers that have their sources in the Wind River mountains, I send herewith for publication in the *Press* some hastily prepared remarks on the region so traversed and explored, and some portions which had probably not before been passed over by any white man. Though mainly in search of metalliferous deposits, I found much in the other natural products of that vast wilderness as well as in its geology, scenery and other physical features, calculated to interest both the practical and the scientific mind.

## THE BIG HORN MOUNTAINS—GEOLOGY AND TOPOGRAPHY.

Touching the geology of the country in the vicinity of the Big Horn mountains, it may be observed that the usual calcareous and arenaceous rocks are here found, varying in geological ages from the azoic to the tertiary deposits. Many of these strata are highly fossiliferous, including a great variety of fossils of aquatic origin. No fossil fauna was seen near the base of the range, but east of the mountains in the lignitic tertiary beds, the remains of petrified mammals were noticed. The stratum of the carboniferous age occurs on both sides of the range near its base, both anthracite and bituminous coal being found in abundance. Mountain limestone or the sub-carboniferous strata envelops the mountains to an elevation of 2,000 feet above the base, where they break down abruptly to the azoic rocks, thus the crystalline rocks appear at an altitude of 2,000 feet above the ocean, and compose the more elevated parts of the range. Near the summit a compact, fine-grained grayish granite predominates, which is occasionally varied by belts of gneiss and patches of mica schist. At the south end of the range at its junction with the Rattlesnake range, mica and talcose slate are found traversing the granitic rocks. But little quartz occurs on the western slope, either *in situ* or as float. The eastern slope, however, shows considerable quartz in well-defined ledges, usually of a gray color and often ferruginous. Some of these ledges proved to be auriferous, but the gold was in such small quantities generally as to not defray expenses of mining. The highest elevations in the Big Horn range are Cloud peak and Hayes peak, which reach an altitude of 13,500 feet. Several other peaks reach an altitude above 13,000 feet. The length of the crystalline rocks of this range is 200 miles, their greatest width which is at Cloud peak, being 25 miles. The range is severed at the north end by the grand canyon of the Big Horn river, which presents a scene of rugged grandeur, with its walls standing vertically fully 3,000 feet high. The length of this canyon is nearly 40 miles, and for sublimity and pictorialness of scenery, it rivals that of the famous grand canyon of the Yellowstone, in the National park. In the Big Horn mountains colors of gold can be obtained from nearly all the streams, especially from an alluvial deposit of quartz wash around the foothills. This deposit shows infinite attrition, and is evidently not indigenous to the crystalline rocks of the Big Horn range. This foreign deposit in all cases proved to be auriferous, which is not always the case with the original deposits from the crystalline rocks of this range. Taking these facts into consideration I arrive at the conclusion that the gold found about the Big Horn is not all from that range, but that most

of it is derived from this ancient wash, which I subsequently traced to the head of Wind river through Union pass and down the Snake. The idea was generally entertained by our prospecting miners that the fine colors of gold found around the base of the Big Horn range came originally from some auriferous belt in those mountains. We are now in possession of geological evidence, however, that disproves this theory. Gold in small or even paying quantities may yet be found in these mountains, but extensive deposits can hardly exist there without showing some indications of its entity.

## METAL DEPOSITS OF THE SNOWY MOUNTAINS.

In the Snow mountains, between Clark's fork and the Yellowstone, indications are more favorable for both gold and silver. The original rocks here are as follows: Gneiss, granite, syenite, trachyte, porphyry, mica and talcose slate; while along the southwest base volcanic tufas occur. At the head of Soda Butte creek argentiferous galena is found, which yields a fair percentage of silver. Some of these deposits are being developed by Judge Annis and others. Auriferous ores are found *in situ* on Emigrant and Bear gulches, also fair indications on Hell-Roaring creek. On the northern slope extensive deposits of native copper occur near some trap dikes. Below the canyon of Clark's fork some interesting fossiliferous deposits exist in the calcareous sedimentary rocks. The strata here upturned vertically presents to view the organic remains of past ages in such bold relief, as should make this an entertaining field for the geological scientist. Both vertebrate and invertebrate remains were noticed here at various points. Several peaks in this Snowy range reach an altitude of 13,500 feet. Conspicuous among these, towers the Russian Crown, with its snowy crest bearing incipient glaciers, and veiled in the shroud of perpetual congelation; a fit home for the ice king.

## SIERRA SHOSHONE MOUNTAINS.

The Sierra Shoshone range begins at the head of Soda Butte creek and extends south to the head of Wind river, a distance of about 150 miles. Pretty thorough observations and prospecting were made here. The geological formation consists principally of volcanic rocks, basaltic and doleritic lavas, andesite and lava tufas, or a kind of volcanic conglomerate. On the South fork of Stinking Water a belt of gneissoid granite exists, containing many ledges of base ores, but no metalliferous deposits of value. At the mouth of the lower canyon near an offensive smelling sulphur spring (from which the name Stinking Water originated) I found as much as 25 cents to the pan on bed-rock, but only in very limited quantity: origin evidently in the lower canyon range from quartzose, granitic rocks or siliceous granite.

At the head of the Middle fork of Clark's fork some cuperiferous ores were obtained *in situ* near an extinct volcano. The deposits are argentiferous, and seemed inextensive. On the North fork of Stinking Water colors of gold can be found: origin either from the trap rocks or the crystalline rocks, prior to the great trap eruption which has intruded on or capped the primitive rocks. Petrified wood was also found on this stream containing grains of iron (sideroferte). In this vicinity the mountains present a unique and striking scenery, the geological formation consisting of trap dikes, resulting from a great outflow of lava which has here accumulated in mountain masses. Floods of water have subsequently cut through these with irresistible force, leaving isolated pinnacles and towers standing like great sculptured images. Showers of volcanic sand containing much oxide of iron have covered the tops of the strange objects, which viewed from a neighboring high look like gigantic columns standing amidst the ruins of a great city.

On the western slope of the Shoshone range volcanic glass is common, this substance being also found extensively in the National park. Standing in this range are several peaks having an elevation above 13,000 feet. Four extinct volcanoes were here discovered, from some of

which the sulphurous gases are yet escaping; native sulphur being abundant in their craters. Among the noted elevations of this range are Index and Pilot peaks, and Mt. Langford and the Washakie Needles. The Owl Creek range is a spur of the Shoshone mountains, which, with the Rattlesnake range, connects the Big Horn with the Shoshone mountains. These two spurs are divided by the canyon of Wind river, their summits being only 9,000 feet high. Their trend is east and west, but the rocks are stratified in a northerly and southerly direction. The formation consists principally of metamorphic schistose rocks, quartz being also found in abundance. In panning the alluvial deposits colors of gold were obtained; also garnets, rubies, rutile, crystals of zircon, fragments of itacolumite and other associated minerals found generally with diamond deposits; none of the latter crystals were, however, found, though their existence in this vicinity is not a geological impossibility. Owing to the inclement weather thorough explorations could not be made, but I shall resume operations in this field in the near future.

## THE WIND RIVER MOUNTAINS.

The Wind River group of mountains may properly be termed the American Alps. This region is one of great interest as illustrating the marvelous effects of the dynamical force when used in mountain making. All along the range occur sharp spurs narrowing as they rise till they seem as thin as a knife blade. Isolated peaks inaccessible to man; deep chasms filled with snow and ice which never melt; alpine heights, awe-inspiring and wearing their glacial crowns in majestic silence; huge blocks of gneiss and granite hills are seen on every hand. The crystalline rocks at the north end of the range are composed principally of granite, gneiss, trachyte, syenite and feldspar, while at the south end the slates appear. Here quite an extensive auriferous belt exists which has afforded fair mining ground for several years. Gold also occurs on the numerous streams of the Wind River drainage. The water at the head of Green river is slightly tinged with a fine powder produced by the moving glaciers crushing the rocks near the summit of the range. No gold was found on this stream in the mountains. The altitude of Union peak is about 13,000 feet.

## GREEN RIVER—AN EXTENSIVE HYDRAULIC GOLD FIELD.

Although their elevation is not very great, these Wind River mountains constitute the grand divide of all our great continental rivers. Their southern slope is drained by Green river, while at their western base the Grosventre fork of Snake river gathers a great mass of water to be carried forward and emptied into the Columbia. Their northern slope is drained by Wind river, which, through the Big Horn and the Yellowstone, becomes tributary to the turbid Missouri. The greatest elevation in the Wind River mountains is a peak lying southeast from Union, its height being a little over 14,000 feet above the ocean level. Several others near this one have an altitude nearly as great. Immense glaciers were discovered here, also perpetual frozen lakes, the ice being still firm in the month of August. Between the Grosventre and Buffalo fork of Snake river auriferous gravel exists, probably in paying quantities. The area of this auriferous tract is 20 miles wide and 40 miles long, and extends as far west as the Teton range. Being evidently an oceanic deposit, this wash shows infinite attrition, even the boulders being polished by long transportation from their original situation—origin unknown, but evidently in the northwest mountain ranges. This wash is of variable depth and is wholly composed of quartz. The nucleus, or the rocks from which this quartz originated, especially that which accompanies the wash, has been reduced to sand by attrition, only the quartz having resisted pulverization. From the prospects obtained here I judge that much of this ground might be profitably worked by the hydraulic process, as water is plentiful, but it