that in many instances the strata had been destroyed by fire; and the coal being burned out, the roofs had caved in by a succession of faulting, or had collapsed under the pressure. That the destroying agent was fire is attested not only by the clay accompanying the seams being turned to brick, but also by heaps of slag composed of silicates of iron and aluminum. This coal is bituminous and Fort Union, or Laramie. It is very brittle, somewhat laminated, dull luster.

These coal fields are quite a distance from the railroad, and until just recently only Mexicans and Indians knew of the coal outcrops there. This coal is a good quality and the seams, as we have seen, are thick. The time, no doubt, is not far distant when coal will be mined there on a large scale the same as at Gallop at the western limit of the same coal horizon.

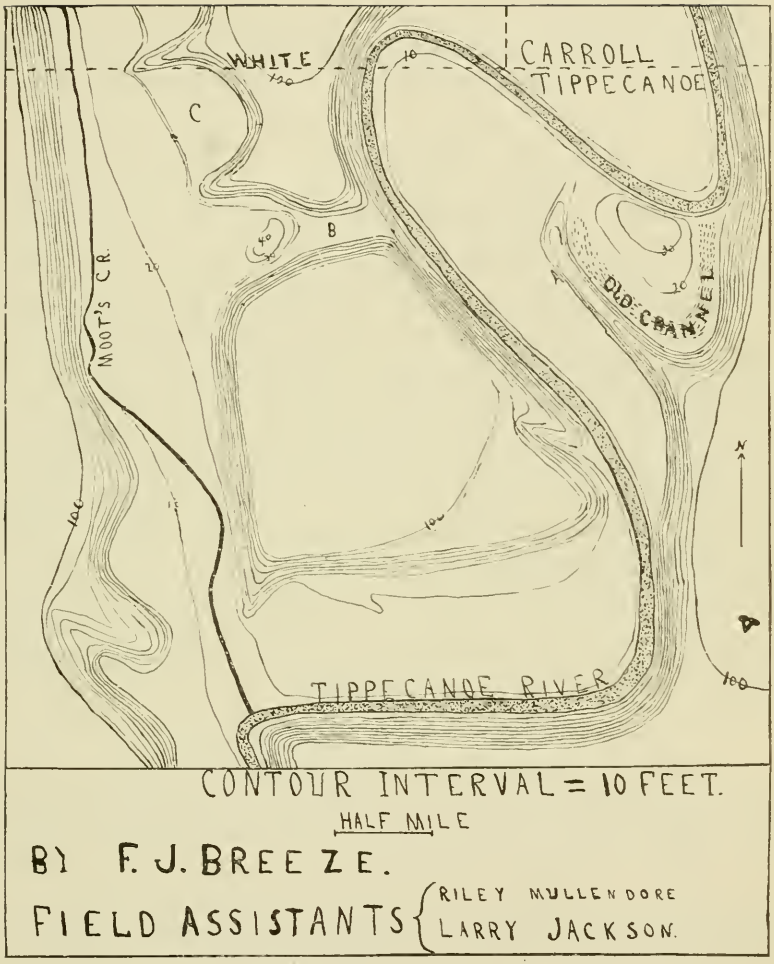
Some Topographic Features in the Lower Tippecanoe Valley.

Fred J. Breeze.

In the valley of the Tippecanoe about a mile below the Carroll--Tippecanoe line are two features of relief which perhaps deserve some attention.

On the east side of the river is a long, narrow ridge of gravelly material, about twenty-five feet high, a few yards wide, and three-fourths of a mile long. (See A on map.) It starts from a hundred foot bluff, and in a short distance slopes down to an elevation of twenty-five feet, and for the remaining distance is nearly level. On the up-river side of the ridge is an abandoned channel of comparative recency. This ridge is evidently a remnant of a large spur of upland which was gradually made narrower by the southward movement of a river bend, of which the present abandoned channel marks the southern limit. Before the spur had been entirely removed, the river straightened its course, thus forsaking the bend; and the remnant of the upland spur is this narrow ridge.

Just west of the ridge, on the other side of the river, is a gap joining the valley of the Tippecanoe with that of Moot's Creek, a tributary which empties about a mile below. (See B on map.) The floor of this gap is forty feet above the river, is nearly 200 yards wide, and is bounded on the north and south by bluffs sixty feet high. At first sight it seems that this gap was formerly the mouth of Moot's Creek; but investigation justifies



another explanation. For two or three miles above its mouth, Moot's Creek flows in a valley roughly parallel with that of the Tippecanoe. At many places the creek valley widens into crescentic hollows which are separated from each other by sharp-pointed, narrow ridges. The floors of these semi-circular areas are about twenty feet higher than the present flood-plain. One of these areas is marked C. Doubtless the gap B was one of the widened portions of the valley, and only a very narrow strip of

upland separated it from the Tippecanoe Valley. Later, after Moot's Creek had swung to the west side of its valley, the Tippecanoe by its westward meander removed the dividing strip, thus forming the present gap.

The Action of Hydrogen Peroxide on Cuprous Chloride.

W. M. Blanchard.

This investigation was suggested by the results obtained in the study of the action of large volumes of water on cuprous chloride. Some time ago my attention was called to the fact that when a large volume of water is added to cuprous chloride the salt becomes orange colored. If this water is removed and a second quantity added the color of the salt deepens, and if this operation is carried on long enough, a few days being sufficient if the water is changed every few hours, the salt finally becomes a bright red and in all respects resembles cuprous oxide. Upon analysis the compound proved to be almost pure cuprous oxide.

A search through the literature at command was made but no such action as this was found recorded. A careful study of the reaction was then made. It was at first believed that the reaction took place according to this equation:

$$Cu_2Cl_2 + H_2O = Cu_2O + 2\,HCl.$$

It seemed that the first water added resulted in the conversion of a part of the cuprous chloride into cuprous oxide and hydrocloric acid and that no further change took place until this acid was removed, and more water added. But further investigation showed that this was not correct. The water removed was found to contain cupric chloride; this salt could be produced in this case only by oxidation, and the oxidation could result in all probability only from oxygen dissolved in the water.

By properly constructed apparatus it was shown that water which had been previously boiled for an hour and cooled in a current of hydrogen produced no change on cuprous chloride.

About this time I had access to Dammer's Handbook of Inorganic Chemistry and there I found a reference to this very reaction. It was expressed by the following equation:

$$2\,Cu_2Cl_2 + O = Cu_2O + 2\,CuCl_2.$$