Science and Art.

Coal in the United States.

We have in recent articles called attention to the quantity and quality of the iron and copper within the territory of the United Sta'es, and wish now briefly to refer to the supplies of fossiliferous fuel. The miniature map accompanying is too small to represent all the coal fields minutely, were there sufficient knowledge extant to make it practicable to compile such ; but it is believed to be a correct general representation of the coal fields of our country. The fields in the British Provinces, from which are derived the Pictou coals sold in our Atlantic ports, are not attempted to be represented with any precision.

At a general glance, the whole triangular basin enclosed between the Alleghanies on the east, the great plains of the Far West, and the high lands of Upper Canada on the north, is one vast coal field. On closer inspection this may be divided into two, the great Pennsylvania field, covering almost the whole of that State and stretching down to the center of Alabama, and the Illinois coal field, which, with more or less interruption, extends from near the northern portion of Michigan into the northern portion of Arkansas. The immense partially-explored regions of the West have revealed coal at several points, which, in the absence of anything more definite, we have denoted by very strong black patches ; but since the preparation of this map, a study of the surveys for the Pacific Railroad has brought to our knowledge the existence of coal at many additional points, one of which is at or near the northernmost bend in the Missouri.

Nearly all the coal under the immense area blackened is bituminous coal. Anthracite, most used in Eastern cities, comes from a number of small fields lying out of the main field on the east, as shown by several slight patches near Philadelphia. There is what is termed by geologists the Rhode Island coal field, extending as represented, into Massachusetts; but although science shows the substance thence procured to be actually coal, it possesses one important defect—it will not burn.

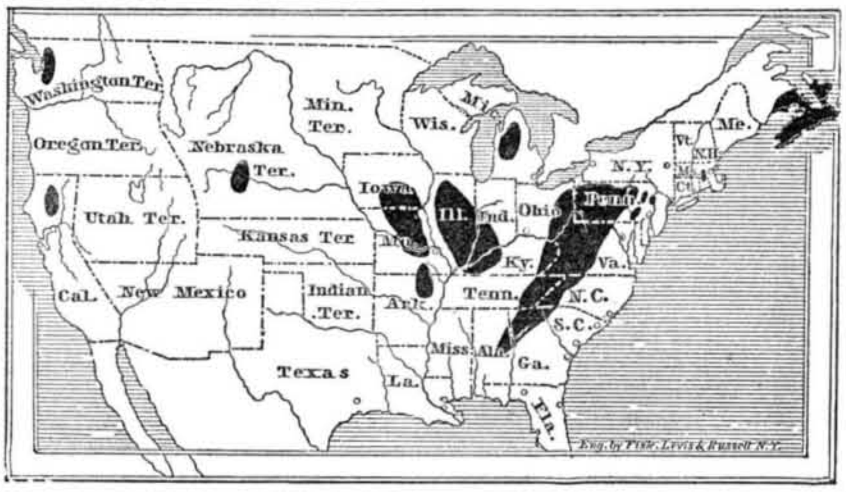
We cannot attempt, in a brief space, to explain the causes which are supposed to have produced the great deposits of valuable fuel which we find beneath the earth's surface, further than to remark that it is demonstrated to be wood, preserved from decay by an air tight covering of earth, which has been converted into its present condition by the action of time, pressure, or heat, or all of combined. The eastern outskirts of the Pennsylvania field has been more fully roasted, or coked, and reduced to anthracite, while the Rhode Island field has been so intensely burned as to reduce it almost or quite to cinder.

The coal which is revealed in the great Rocky Mountain region, although it may furnish liberal supplies at some points for hundreds of years, it cannot possibly belong to any such great beds as those in the settled portions of the States. The area of the coal beds proper is estimated by Prof. Rogers at 200,000 square miles. This is believed to be far greater than the area of all the coal fields of Europe, and somewhat larger than those of the whole of Europe, Asia and Africa. It is useless to attempt to calculate how long this supply of coal will last, as the consumption is increasing every year with the increase of steam power; but the fields of anthracite alone could supply the world for a very long period before it would be necessary to touch upon the margins of the great fields. Great Britain has a far nearer prospect of exhausting her supply. We now mine only 9,000,000 tuns annually. Great Britain mines (and burns or sends abroad) 65,000,000 tuns each year. If the consumption continues to increase at its present rate, the fields now most worked in Great Britain will be exhausted in about 300 years, and her whole supply in about 2,000 years more.

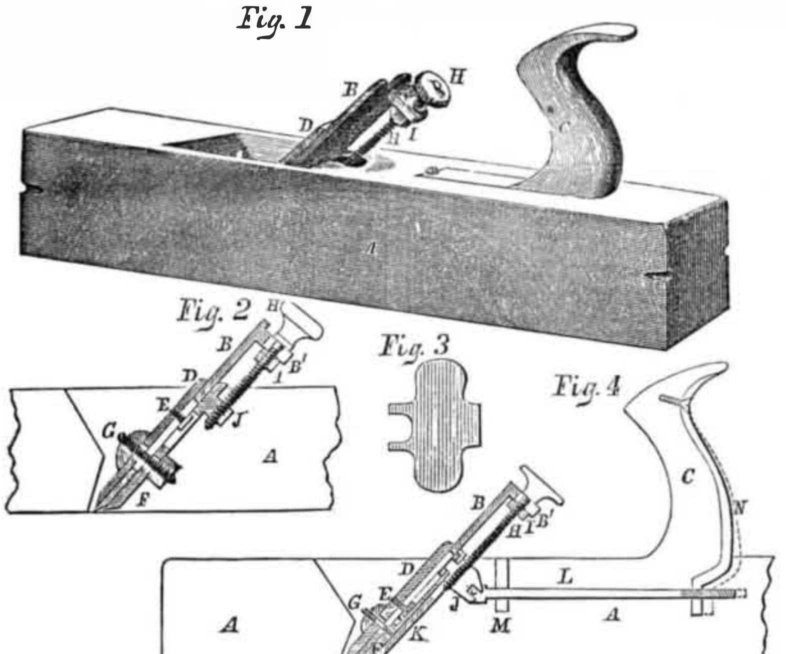
Layers of coal vary in thickness from little exceeding that of a sheet of paper up to fourteen feet or more in thickness. The coal fields here represented generally include thick valuable layers, and the greater part contains a considerable number of strata of coal, several of which are workable, with common earth and rock between them.

The number of strata decrease westward. According to a late paper by Prof. Rogers, the number of coal seams in Nova Scotia is about fifty, though only five of them are of workable thickness, being equivalent to about twenty feet of coal. The deepest anthracite basin of Pennsylvania, that of the Schuylkill, contains also about fifty coal seams, and twenty-five of these have a thickness each of more than three feet, and are available for mining. Further west, the great Appalachian, or, as we have here termed it, the Pennsylvania coal field, contains about twenty beds in all, ten of which are thick enough to be mined. Still further onward the broad basin of Indiana and Illinois shows apparently not more than ten to twelve beds, and it is believed that only seven of these are thick enough and pure enough for mining. Northward, in the Michigan coal field, there are only two or three layers, and these lay so low that the expense of draining mines by pumping will long forbid successful coal mining in that locality. Still further westward, the coal field of Iowa and Missouri contains, it is believed, but three or four beds of profitable size, and the total number, thick and thin, does not exceed six or seven. A similar gradation is noticeable in the general size of the individual coal seams, by far the thickest being in the anthracite basins of Eastern Pennsylvania. The coal in the Western territories is generally thin.

THE AMERICAN COAL FIELDS.



PALMER'S PARAGON PLANE.



The accompanying engravings represent two varieties of an improvement in planes. Both are well adapted to allow of a perfect adjustment of the "iron" without bruising or springing the stock, and the second ingeniously provides for automatically elevating the iron as the plane is drawn back over the lumber. It is the invention of J. F. Palmer, of Auburn, N. Y., and was patented Feb. 3d, 1857. Fig. 1 is a perspective view, and Fig. 2 is a longitudinal section in its simplest form ; Fig. 3 is a wrench used for adjusting the parts, and Fig. 4 a longitudinal section of the most complete form, that in which the iron is raised on the return movement. A is the body or stock, B the iron and B' a horn or lug projecting laterally from the top of the iron. C is the handle provided with a peculiar spring, N, in Fig. 4, which will be described below. D is the cap, which serves the usual purpose of rapidly breaking up or curling the shaving so as to enable the tool to produce a smooth surface on cross grained stuff. E is a screw, binding the iron and cap together. F is a substantial plate which underlies the iron. G is a screw and nut by which the iron is screwed to F. H is a screw by turning which (with G suitably slackened) the iron may be slid up and down upon F. I is a nut which serves simply as a collar on H. J is a projection on F which is tapped to receive the threads of the screw H. The operation of the plane shown in Figs. 1 and 2 is now perfectly clear. The plate F being fitted tightly into the stock and made simply to support the iron, B D, at any required height by turning the screw H.

Fig. 4 shows the additional device. In this plane the plate F is not firmly fixed in the stock, but is mounted on the additional plate K and is free to slide up and down the inclined surface thereof. The projection J, in addition to the duty performed by the corresponding part in Fig. 2, is forked to receive a pin projecting laterally from the longitudinal rod L, which latter is so mounted within the stock as to be free to move endwise. N is a spring attached to L at the base, and let into the handle so that as the hand of the operator pushes the plane forward in the usual manner it, compresses the spring, moves L forward and consequently, by its connection with J, depresses F with all its superincumbent parts. By this means the iron is depressed at each forward motion of the hand but when the plane is drawn backward, the pressure on the spring N is diminished and its elasticity induces it to assume the position shown in the dotted line, thereby drawing L backward and elevating the iron so far that its edge an entirely above the surface of the lumber. It is evident that the injury to the edge of the iron due to the backward motion is very considerable, and probably much greater than that due to its forward motion, while the latter alone is effective in planing the stuff. By elevating it, therefore, in this manner, its sharpness is preserved much longer than when rigidly held as in the ordinary plane stock.

For further particulars the inventor may be addressed as before stated.