

hours, each briquette being 1 lb. in weight. It was necessary to dry the lignite until neither more nor less than 10 per cent. of moisture was retained, and I understand the grinding and compression took place at such a temperature as rendered the addition of a binding material unnecessary. The relative value of these briquettes to the material from which they were made was as $2\frac{1}{2}$ to 1, or, in other words, $2\frac{1}{2}$ tons of lignite gave only the same results as 1 ton of briquettes.

Some of this lignite was sent to Germany for trial, but it appears that the machinery in use there would not deal with the Victorian article, as it was so much more difficult to treat than the German brown coals. It is also contended that bituminous small coal does not require anything like so elaborate a plant as is necessary for lignite.

As the composition of the brown coals of New Zealand appears to compare closely with those used for successful briquette-manufacture in Germany, there does not seem any great difficulty in the way of turning the small coal (now wasted) to good use, provided the cost of treatment is not too great.

The Henry S. Mould Company, Carnegie Building, Pittsburgh, Pa., U.S.A., are the sole licensees of B. C. White's patents in connection with briquette machinery, Messrs. R. R. Hunt and Co., of Shortland Street, Auckland, being colonial agents. The president of the company, under date the 18th January last, sent me a description of the plant, together with a drawing (which is reproduced) showing general arrangements. These, however, are not always adhered to, local conditions often necessitating alterations. The president states, "If there is available in your country any coal-tar pitch or low-grade asphalt at reasonable cost, there is no question but that the briquetting of the lignite and soft bituminous coals could be done very satisfactorily and profitably. . . . The general process is as follows: From a storage-bin the coal is automatically fed into a revolving screen of about 8 mesh, through which the coal that is in condition for briquetting falls to a trough with screw conveyor, at the end of which the coal-dust is elevated into heater; that which is too coarse for briquetting goes through crushing-rolls and then to the heater. The coal is brought up to a temperature of about 300° Fahr., and passes to double-bladed screw conveying mixer, at the bottom of which, from suitable tanks, the hot pitch is introduced in proper proportion, the mass thoroughly mixed, conveyed to the hopper of the press, where the briquettes are formed and ejected on to a carrier-belt, which takes them to storage-bins or cars. Owing to the very great pressure which we produce with our press, we are enabled to briquette the bituminous coals of this country (United States) with as low as 4 per cent. of pitch as a binder, and with some of our western lignites we can successfully briquette with 6 per cent. The process is entirely automatic, and the labour-cost consequently low. The briquettes made by our presses will stand transportation without much breakage, atmospheric influences without disintegration, and will not decrepitate when burning, but will burn from the outside to the centre, leaving a fine clean ash."

From the description of the press it appears that the pressure may be regulated from 0 to 5 tons per square inch to suit requirements; also that briquettes may be made in various thicknesses. The machines are built in three sizes—viz., 12-, 25-, and 50-tons capacity in ten hours, the briquettes turned out by the large size press being 3 in. in diameter by 3 in. long, and weighing a little over 1 lb. each, but size and shape can be altered, if desired, to suit requirements.

Sir James Hector, F.G.S., has given a considerable amount of attention to the question of utilising the small coal now thrown away at brown-coal collieries. He maintains that briquettes can be successfully made from brown-coal slack by heat and pressure, and without any agglomerant (or binding material) being added; and from evidence I have been able to obtain it would appear that this is the principle of the process adopted in Germany and Austria. My own view of the matter is that the heat to which the slack is subjected is sufficient to cause a partial exudation of its oily or tarry constituents, and that these act as an agglomerant in conjunction with the pressure to which the material is subjected.

It is stated in a Victorian parliamentary paper dealing with this question "that in the German process the coal is pressed when the bituminous or oily matter contained in it is at smelting-point." An English correspondent states, "We have no experience of brown coals in this country. The only place, so far as I know, where brown coals are made into compressed fuel is, I think, in Westphalia (Germany), where they have an extremely rich brown coal, which is passed through heaters and partially distilled. Notwithstanding this partial distillation, there is enough bituminous matter left to compress the coal into blocks."

The two quotations given would seem to support my views, but in discussing the question with Sir James Hector I found that he holds the opinion that chemical as well as mechanical influences are responsible for the results obtained, oxygen being set free by the drying process, the result being a direct combination of the hydrogen and carbon contained in the coal, which would materially assist in producing a compact block.

In dealing with bituminous coal for briquette-manufacture, it would appear that experience has demonstrated the necessity of using pitch or some other binding material, and, as a matter of fact, the several plants of English and American manufacturers of which I have particulars are all designed for the incorporation of an agglomerant with the crushed coal. The machines chiefly used in Great Britain are made by the Uskside Engineering Company (Limited), Newport, Monmouthshire, and Mr. Robert Middleton, Sheepscar Foundry, Leeds. Machines by one or other of these makers are also in use in America, India, China, Australia, and other parts of the world. The general method of manufacture does not vary a great deal from that of the White (American) process already described, except that the pitch is merely reduced in a mill (instead of being melted) before being mixed with the coal. Both pitch and coal are treated by the disintegrator together, the object being to thoroughly mix the two as well as to reduce them to proper size—fine grinding being said, by one maker at least, to be a mistake. After leaving the disintegrator, the material is elevated to a vertical pug-mill, which