

charged. The drum is 8 feet in diameter and revolves at a speed of five to six revolutions per minute, taking a charge of 600 pounds of fully dried uncut tea, or 1,000 pounds if cut and sifted beforehand. One and a half to two hours are required to complete the glazing at a temperature of 240 deg. F.

Tea cutting machines are also extensively used on tea plants and consist of a fluted cutting roller with resistance plate and side brackets mounted on a stand with a receiving bin for the tea. The tea is next sorted into the various grades by a tea sorting machine, one of which is seen in operation in Fig. 5. This sorter is similar in many respects to the one previously mentioned, the tea being delivered by the chute to a large revolving cylinder having five sizes of wire mesh for separating the tea into five different grades. This machine can efficiently sort 800 pounds of tea per hour.

crushed nor broken, and from 5 to 8 per cent more can be packed into each box than by any method of hand packing. Until the recent introduction of machines of this type the tea was, it is stated, frequently packed into the chests by coolies tramping it down with their bare feet, a knowledge of which would probably have lessened the æsthetic joys of tea lovers.

The writer is indebted to Messrs. Davidson & Co., Ltd., of Belfast, Ireland, and to their American representatives, the Sicocco Engineering Company, of New York, for the accompanying illustrations, this firm being the pioneers in this particular field.

THE EARTH PYRAMIDS OF THE TYROL.

BY W. G. FITZ-GERALD.

Specimens of "earth pillars," due to the action of wind and rain, are seen in a more or less rudimentary

situated on the Eisach, a couple of miles above the junction of that river with the Adige; and it is only a short distance above the town that the principal groups of earth-pyramids are situated. The first group one comes upon, nearest to Botzen, is that in the ravine of Katzenbach, about 1,700 feet above the town. Most remarkable are three pillars for their number, size, and beauty. There are other groups found in the ravine of the Finsterbach near Klobenstein, 2,200 feet above Botzen. But indeed the whole valley of the Finsterbach River is decorated with these fantastic pillars, which the action of hot sun and rain have hewn out of the precipitous banks which hem in the river. The average breadth of the Finsterbach valley is only 600 or 700 feet, and it is from 400 to 500 feet in depth.

The lower part of each of these columns usually has several flat sides, so that it forms a pyramid rather

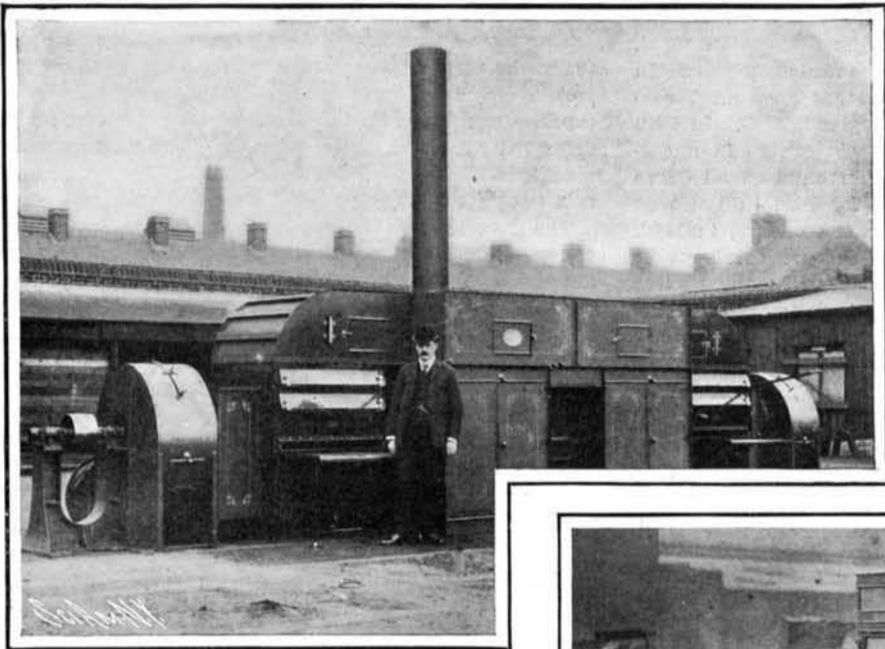


Fig. 4.—Large Down-draft Drier.

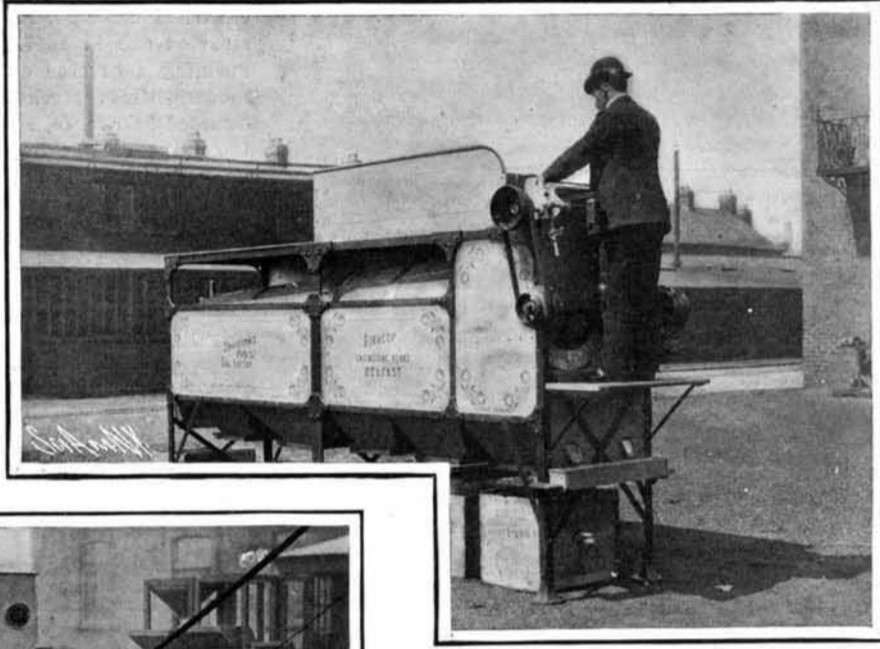


Fig. 5.—Automatic Tea Sorter.

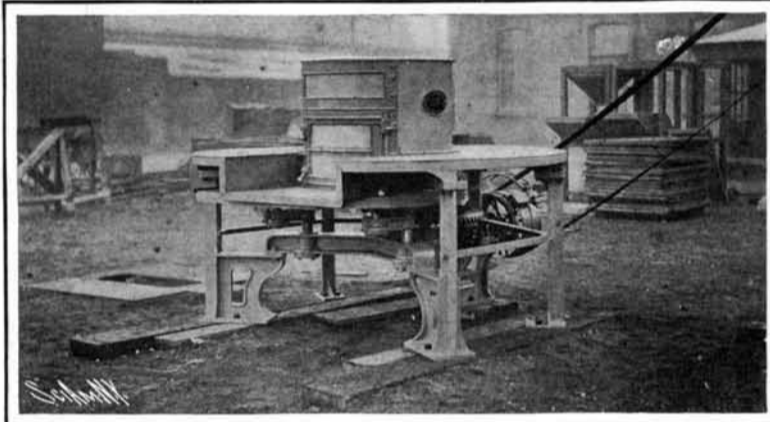


Fig. 1.—A Tea Roller.

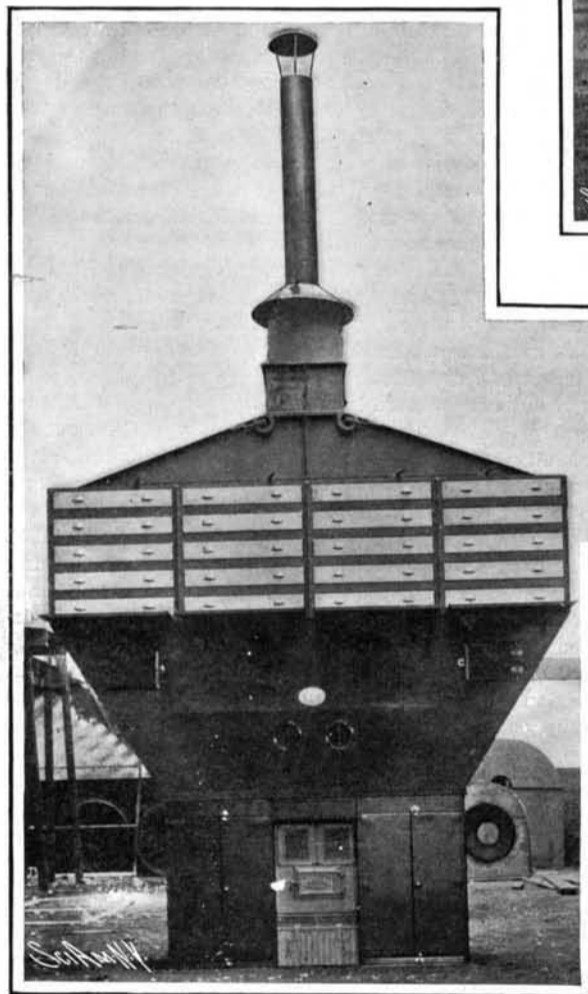


Fig. 2.—20-Tray Up-draft Side-Drawer Multitubular Air Heater.



Fig. 6.—A Tea Packer.

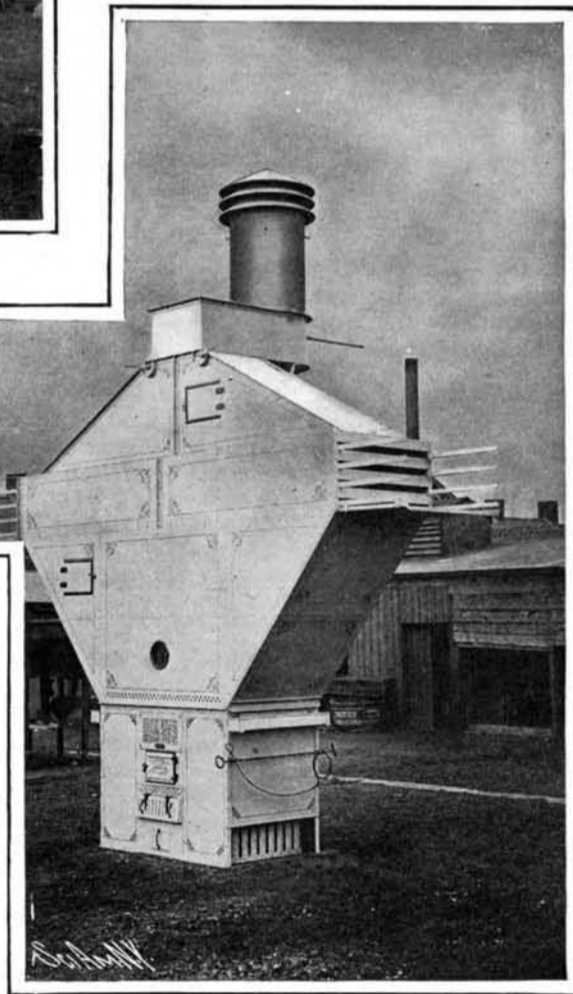


Fig. 3.—16-Tray End-Slide Up-draft Vertical-Flue Air Heater.

LABOR-SAVING DEVICES UTILIZED IN THE MANUFACTURE OF TEA.

The tea is then ready to be packed and is put into chests which are placed on the "tea packer."

This machine (Fig. 6), which is one of the most interesting labor-saving devices utilized in the manufacture of tea, consists of a rocking table, fitted with clamps and screw-tightening gear for gripping the chests, and connected to a phosphor-bronze eccentric by a steel shaft. The eccentric is mounted on a steel shaft which runs at a speed of 1,000 revolutions per minute and is supported in bearings of large proportions to withstand the vibratory action of the eccentric. The particles of tea, under the influence of this vibratory motion, settle down closely and compactly in the chests, which are filled very rapidly, one machine being able to pack 20 to 25 chests per hour. Moreover, by the use of a packer the tea is neither

form in many countries, including our own; but to behold them in all their fantastic impressiveness—as it were in groves, or forests—one must visit certain parts of Switzerland, and more particularly the Austrian Tyrol. By far the most important group are those known as the earth pyramids or stone-capped pillars of Botzen, for whose formation every circumstance has been favorable, as we shall see. They are what the physical geographers would call "columns of indurated mud," from twenty to a hundred feet high, and usually capped in a very curious manner by a huge stone. They have been hewn, as it were, by the rain out of the terrace they once formed part of, and now stand in groups on ledges and steep slopes bounding the narrow valleys.

That most picturesque Tyrolean town of Botzen is

than a cone. Close examination shows that the columns are composed of red unstratified mud of an extremely hard kind, curiously mixed up with pebbles. Up and down through the pyramids are scattered angular pieces of stone, many of them of a very large size; and as we shall see presently, a stone which may be twenty or thirty feet from the top of the pillar may one day be at the extreme summit, sheltering the column from the torrential rain. In fact the whole mass of which these pyramids are composed answers to the moraine or debris left by a moving glacier. Indeed, some of the masses of rock imbedded in them have their faces smoothed or polished, furrowed or scratched, clearly revealing their glacial origin. The chief reason why these are the most remarkable earth pyramids in the world is found in their

composition. The whole country round about appears to be composed of red porphyry; and the most numerous and biggest of the stones that protect the summits of these pillars are composed of this same red rock.

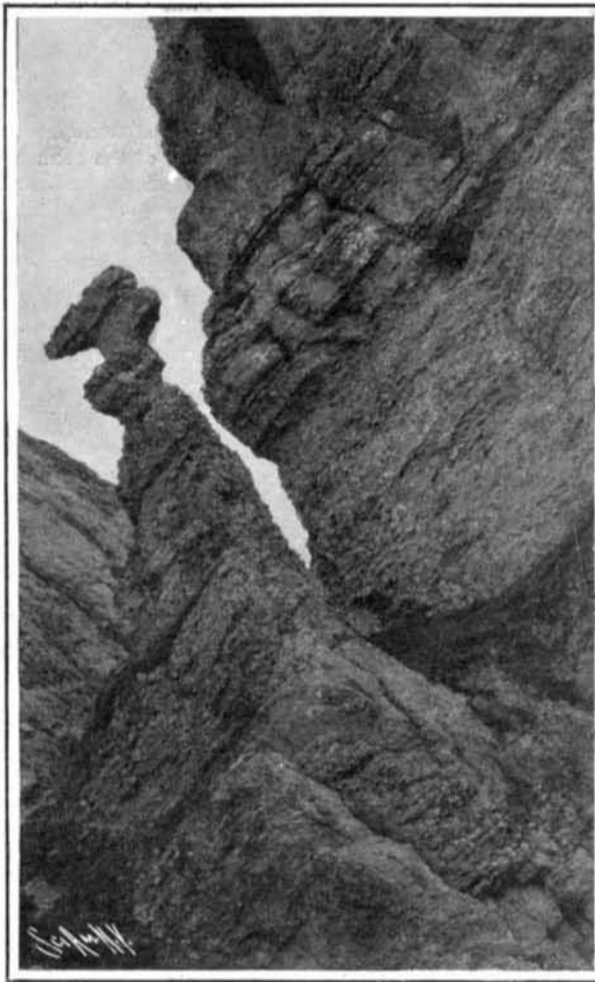
Now to explain the origin of these strange-looking pillars. First of all the Finsterbach River has in the course of ages dug out its channel at great depth, until it excavated a valley in a country of red porphyry rock. Next this valley was filled up in its lower part by debris and moraine matter, probably left by some great river of ice, after it retreated up the valley

ring in the mud, are the ones that make the most successful pyramids. If the stone be not big, however, the rain beating sideways wears out the "neck" of the pyramid, and the stone in time falls off, leaving the column terminating in a sharp point. But if, on the other hand, it be very large—several yards in diameter, as many of them are—the top remains secure, and the downward action of the rain ever lengthening the column, causes it to grow and grow until it often exceeds a hundred feet in height. Round about the pillars one may see huge fallen blocks which once were the "cappings" of other columns and pyramids which

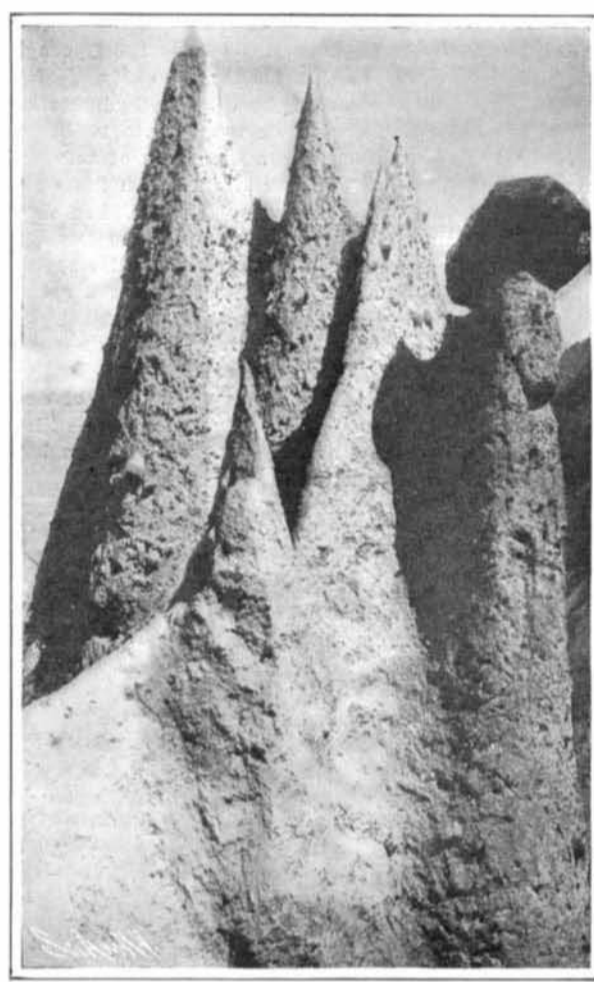
scend from the edge of the terrace to the picturesque torrent itself. Intervals between the groups are often filled in with fir trees, which form an extremely picturesque background. The spaces occupied by these firs were probably once filled in with "groves" of earth-pyramids, long since undermined and swept away by floods. Some years ago in cutting a road near a bridge over the Finsterbach River, the water collected during heavy rain-storms and scooped out a small channel which in a few years undermined and destroyed no less than twenty of the most stately pillars and columns. It may be asked why these earth pyramids are



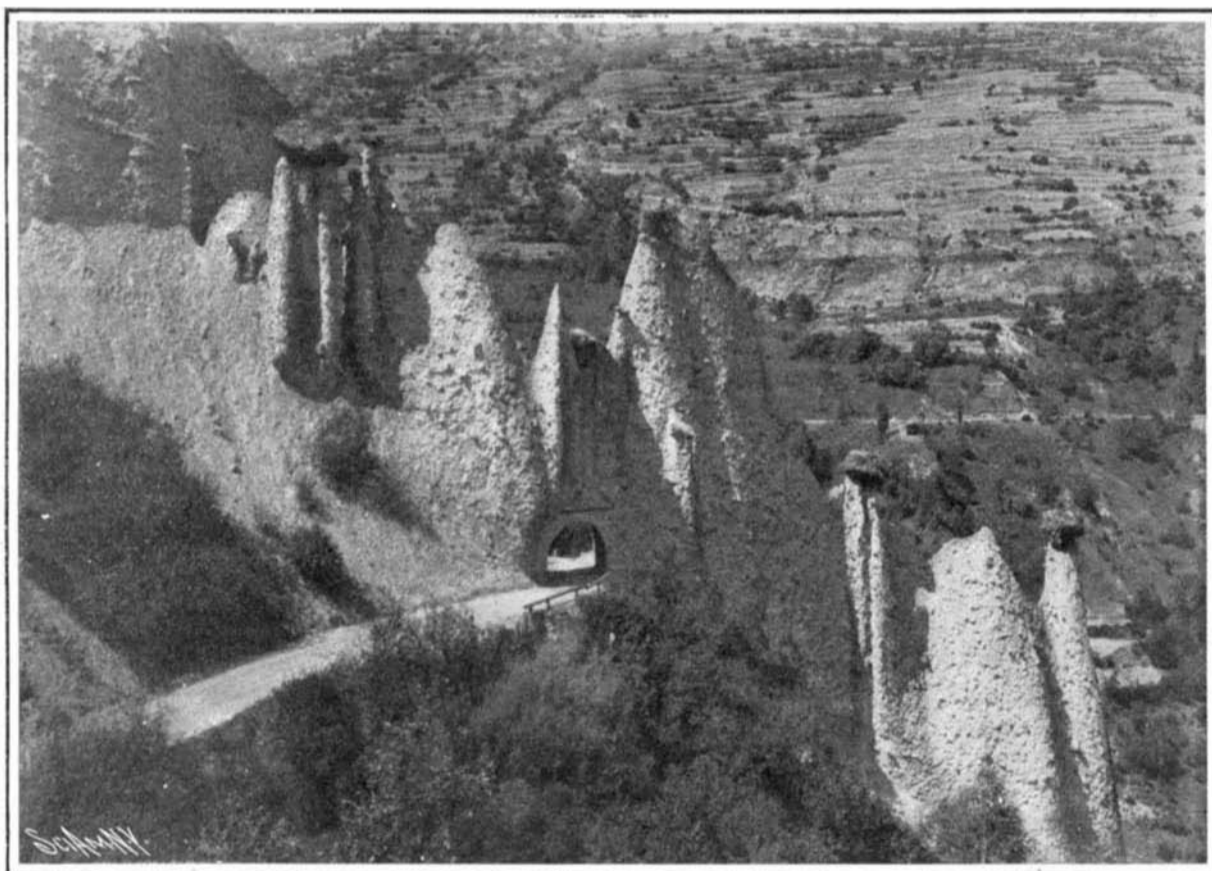
Stone Sheltering a Group of Pyramids From the Rain.



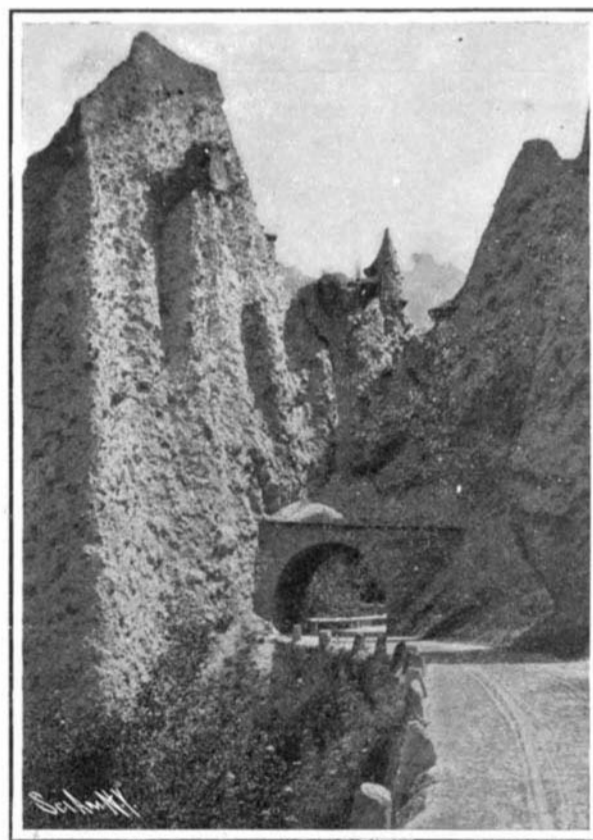
The "Duck's Head" Rock. All of Rock; the Earth Has Been Washed Away by Rain.



Pyramids That Have Lost Their Capping Stones.



Looking Down Into the Valley From the First Group of Pyramids.



The Road From Botzen Running Through the Forest of Earth Pyramids.

THE EARTH PYRAMIDS OF THE TYROL.

at the end of the glacial epoch. Then came the river again to hew and carve a chasm out of the moraine, whose red, mortar-like mud in due time presented a precipitous and perpendicular face to the river. This mud, extremely hard and solid as rock, almost, when dry, is in due time drenched by rain and then scorched by the sun—a treatment which causes great vertical cracks, into which the heavy rain beats again and again, and so the pyramids are isolated and gradually made to stand out in solitary majesty. Those parts of the surface that are protected from the direct downward action of the rain by means of a big stone occur-

have now disappeared, or, having lost their protecting stone, have grown smaller and smaller beneath the pitiless rain. The lower parts of some of the more ancient columns still exist, because in decreasing in height they have suddenly acquired new capping-stones which have been brought to the surface by the action of the rain. Here and there one may see imbedded in a terrace a great mass of porphyry rock with cracks around and above it, and here one recognizes the stone-capped pyramid of future years.

Both in the main valley and in its tributaries the columns and pillars are arranged in rows, which de-

so very rare. Rudimentary pillars are found in many parts of the Alps, as well as in Scotland, Norway and Sweden, and in many parts of America. But it is only near Botzen, where the red porphyry mud and rock are found, that these earth pyramids, of a solid homogeneous nature, weather with vertical faces possessing every requisite for making successful, lofty, and long-enduring columns.

The railway companies of England and Wales employ between them 312,000 men. The Scottish and Irish companies employ 40,000 men between them.