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THE PENRHYN SLATE QUARRY.

"I'd make a quarry." - Coriolanus, Act I, Scene i.

This quarry is about six miles distant from Bangor, Carnarvonshire, and one mile from a modern town called Bethesda. It is the largest of all the Welsh slate quarries, and employs a greater number of men than any other quarry in the Principality, perhaps in the whole world. The development of the Penrhyn Quarry has, even in the memory of the living, changed the aspect of the country intervening between it and the sea. Where formerly boulders deposited by the Snowdon glacier abounded, are now small level fields with thick boundary walls built with the stones which once strewn the ground. Here and there in the corners of some of these fields may be seen small low dwellings, whitewashed externally as well as internally, and these are the houses of old quarrymen. The remains of the forest of Snowdon, consisting of brashwood of various kinds of trees, are rapidly disappearing, but the rude, unculivated state of the country before the quarry was systematically worked can be still discerned, for here and there are seen small patches of ground in their primeval state, covered with stones, brambles, hawthorns, and pools of water. The names of places, where at present a portion of the town of Bethesda stands, sufficiently indicate the once wild state of the country. Before the late Lord Penrhyn commenced his great improvements in the working of the quarry there were no wagon roads in the country. Sledges were in general use in the mountain farms. These are not altogether obsolete in the present day, being still used to haul peat from the mountain burry. We were informed by an intelligent farmer that in his father's time there was only one wheeled conveyance in the parish of Llanllechid, and that was a cart or wagon introduced by one of the lowland farmers. The roads formerly were merely zigzag bridle pathways, and the walls on each side so near each other that the panniers on the horses, mules, and donkeys touched now this and now that side of the wall. The cottages were wretched, consisting of one oblong compartment, with a part at the end opposite the fire marked off as a sleeping apartment. The walls of these cottages were from three to six feet thick. The stones

with which they were built seem to have been mostly, if not altogether, undressed. The space between the stones was filled with clay mixed with straw. Occasionally the better kind of cottage was protected from the weather by a cement made of cockle shells. These abodes were never more than one storey high. The woodwork of the roof was wattled, and on this a layer of turf was placed, and on that again a covering of rough slates. Fires were made on the hearthstone. The chimney was large, to enable the family to gather round the fire during the stormy winter nights. Primitive buildings of the kind now described, where they have been allowed to stand, are now converted into barns, stables, or other kind of outbuildings. The country at present is intersected with good roads. The houses are neat, though still in several cases only one storey high. Wheeled carts are in constant use. The wonders produced by money and industry are everywhere observable. Surface changes, however, always follow a remunerative undertaking which gives employment to numbers of people.

Slates appear to have been worked at a very early period in the neighbourhood of the Penrhyn Quarry. There are great numbers of small openings along the hills in Llandegai parish, in which the Penrhyn Quarry stands, and also in the adjoining parish of Llanllechid, which must have been worked as slate quarries in remote times, for the débris is overgrown with soil, and in some instances well-grown oak trees have taken root therein. The excavations carried on upon the site of Segontium show that the Romans had worked slates somewhere along the Carnarvonshire hills, for quantities of slate were found in the ruins of that Roman town. Even before the time of the Romans slates seem to have been in requisition, for large slabs of slate-stone have been discovered as pavements in the circular abodes of prehistoric times. There is evidence that in the sixteenth century a small coasting trade was carried on in slates. The author of Observations on the Snowdon Mountains, whose work was published in 1802, states that a Sion Tadur, a bard, and registrar of the Ecclesiastical Court of St. Asaph, who flourished in a.d. 1580, in a poetical address to Roland Thomas, Dean of Bangor, requests the Dean to procure him a ship load of slates from Aber Ogwen. This proves that so far back as three hundred years ago a limited commerce had commenced between Carnarvonshire and other parts of Wales in slates. But the slates manufactured in those early days were not much like those at present made. They were thick and small. They could not be otherwise, for all the old quarries are nothing more than surface diggings. As the commencement of every great undertaking is worth recording and its progress worth being noted, it will not be amiss to relate that one of the bard-prophets of Wales, who foretells certain events which took place
in the reign of Edward I., and who, we will suppose, lived at least after the occurrences he mentions (but perhaps before then), states "that when the stones near Snowdon would be turned into bread," some great event would happen. It appears from "this turning stones into bread" that six centuries back there were those who got their bread by working in the various slate quarry openings that are to be met with in every direction in the north of the Snowdon range facing the sea towards Anglesey, and thus obtaining their livelihood by working in the rock. To them the stones brought bread, or, as the poet has it, were turned into bread, in this way was fulfilled the saying of Merddin ap Morfran, or it may be the imitator of that celebrated bard, who is said to have flourished about A.D. 550.

Before proceeding with an account of the quarry as it was in the last century, a short digression shall here be made upon the derivation of the mercantile and local name of the Penrhyn Quarry. Names of places in Wales, however long, or difficult of pronunciation to strangers, are generally apt descriptions of the places to which they belong, and this is the case with the names given to this quarry. Locally, by the Welsh speaking inhabitants, and they all, except a few emigrants, speak Welsh, the quarry is called "Chwarel Cae-braith-y-cafn," colloquially abbreviated into "Chwarel-y-Cae." This name correctly describes the position of the quarry. Chwarel is a corruption of the word quarry; and Cae is an enclosure, so that we have "the enclosure of Braich-y-cafn." Braich is an arm, a ridge; and the arm is that long ridge of mountain to the left, as you enter the quarry. It commences by the Ogwen river and joins you lofty summit behind, but somewhat to the west of the quarry called "Carnedd-y-Filiast." Carnedd, a heap; filiast, a greyhound bitch, or the head of the greyhound bitch. This ridge is named on the Ordnance Map Bronllyw; bron, a breast; Illyd, grey; grey breast. The word cafn means a hollow, a depression, a cavity. The cafn was on the north side of the ridge just mentioned, and was in winter filled with water, in summer a small lake stood there. The hollow has disappeared, or, more accurately speaking, has given place to a greater depression, for the quarry stands where the hollow was, and the water springs have been drained. So that putting all that has now been said in order, we find that "Chwarel Cae-braith-y-cafn," means "the quarry in the enclosure of Braich-y-cafn." From the word cafn in the name we are led to infer that the place where the quarry is was formerly enclosed ground, and not common land or waste. Having said this much about the local name of that quarry, I will now notice its mercantile designation, viz., the Penrhyn Quarry. The word Penrhyn means a headland. It is the name given to the slightly elevated promontory between the mouths of the rivers Ogwen and Cegin, on which Penrhyn Castle is built. It will thus be noticed that the trade name of the quarry is a compliment to the noble owner of the Penrhyn estates, and has nothing to do with the quarry itself, Penrhyn being six miles from the quarry. But the name Penrhyn Quarry is certainly a more pronounceable word than Chwarel Cae-braith-y-cafn. It was in Cae-braith-y-cafn, near the north side of the Bronllyw ridge, that the embryo Penrhyn Quarry was commenced. No one can tell when the first opening was made. The Romans, as already stated, might have worked in those parts. Several scores of Roman coins of the lower empire have been found not far from the site of the quarry. It can safely be said that some of the small quarries already alluded to were worked from time immemorial, and so this quarry might have been, and most probably too was worked in ancient times, without let or hindrance from any proprietor. Perhaps the value of the slates was in early days so small that it was immaterial where the quarryman made his excavation, and as he found his slates amidst the rocky slopes of unproductive mountain land, the owner of the estate would take no notice of the intruders and their laborious undertakings. The ground too upon which these early quarriersmen squatted might have been common lands, and therefore they were left undisturbed. The appellation Cae, as previously stated, would lead us to suppose that the piece of ground occupied by the Penrhyn Quarry was in remote times an enclosed tract distinct from the waste; but after all this will carry us no further back than the time when it was separated by a wall from the surrounding common lands. From the tradition prevailing in the quarry district, it seems that no royalty or any kind of acknowledgment was paid to any one for the liberty of digging up slate rock to about the middle of the eighteenth century. It is, however, a question whether the meagre business then carried on would come under the immediate notice of the proprietor of the Penrhyn estate. So this question need not be discussed any further.

The author of Observations on the Snowdon Mountains says that "The proprietors of the Penrhyn estate, time out of mind, claimed the eighth part of the value of slates quarried on that property, according to the price they fetched at the water side; and to make themselves sure of this rent, they always employed a man to superintend the business, and the workmen were accounted with once in a year, viz., on the general rent day." Mr. Williams was himself first employed in this matter in the year 1761, when Sir George Young and General Hugh Warburton were the joint possessors of the quarry and the Penrhyn estates, and he succeeded one John Jones, who had been employed in the same capacity six or seven years
previous to Williams's appointment. Jones, it seems, had a predecessor named Thomas Williams, and he again was preceded by one John Griffiths, who died in 1766, aged seventy-five. It would be difficult, however, to ascertain the number of years that these slate reeves were employed in receiving the eighth claimed by the quarry proprietor. It is not unlikely that Griffiths was the first collector. But so insignificant was the sum received from the small takers, that Mr. Hughes, the agent at Penrhyn, about the year 1765, let the quarry to the workmen at the yearly rent of one pound each man, and thus avoided keeping intricate and tedious accounts. The new arrangement was found to yield annually eighty pounds, a sum about equal to the amount produced by the eights. Thus a little more than a hundred years ago there were only eighty quarrymen engaged in the Penrhyn Quarry, whereas at present there are about three thousand, and the profits accruing therefrom then, as rent, could not have been eighty pounds a year, after deducting the expenses of collecting the same; whilst now the quarry is the most valuable part of the Penrhyn estates. Although this annual rent appears to be so small when compared with the worth of the quarry in these days, still it seems to have been considered a good rent for the quarry in its undeveloped state, for the men then working on the rock had twenty-one years' leases granted them of the holes in which they worked at the nominal ground rent of one pound a year. Their leases dated from the year 1765, and consequently would expire in 1786. The author of Antiquities of Llandegai and Llanllechid, who is himself engaged in the quarry, gives a list of several of these leaseholders, and informs us that these small quarry proprietors were grandfathers or great-grandfathers to some of the old people still living in the neighbourhood, a fact which no one would doubt, considering that the state of things now described existed not ninety years ago.

A few detached quarry holdings on the side of the hill continued to be worked in a very partial and indifferent manner by these leaseholders for several years. They had not the means to get at the real slate rock, and consequently were obliged to content themselves with the top, or worst part, of the slate bed. With the use of pickaxes and bars they loosened the rock, and pieces likely to yield slates were carried on a man's back to an open space a short distance off. There the quarryman, seated on a heap of stones, after having split the slate delf into pieces of a certain thickness, dressed it into roofing slates. The formidable operation of conveying these rudely formed slates to the seaside was the real difficulty which these poor men had to contend with. They did this by bringing into their services hardy, sure-footed mountain ponies, on which were placed panniers, and wherein the slates were carried to the sea, to be transported to the coast towns of Wales. This was then the only way of conveyance, as the roads were too narrow to be passable by any vehicle. Lads and lasses, the children of the quarrymen, were engaged in this work, and glad enough their parents were of their scanty earnings. The owners too of these sturdy ponies, if not quarrymen, were pleased to get an honest penny by their ponies' work. There was but little land then under the plough, and consequently not much use was made of horses. The wealth of the mountain farmer consisted chiefly in the number of his sheep and cattle. At the time of which we write slates were carried to the mouth of the river Cein, and not to the estuary of the Ogwen, as in previous years. This was an improvement, the former place being nearer the quarry than the latter. Slates, however, still continued to be transported to the seaside on horseback in panniers. The writer has seen the last of the race of those girls who were employed in driving the ponies laden with slates to the seaside. She was very old—to all appearance upwards of ninety—and she said that both her father and mother, and grandfather and grandmother, were employed in the business of conveying slates to the coasting vessels. In her days the roads were bridle paths, and sixty-four slates composed a horse load. It seems that there was in the early days of this old woman only one man employed in the quarries to fill in the borings with powder and to let the loads off. He went from taking to taking for this purpose as his services were required.

The quarries continued to be worked in this primitive manner upon lease for the seventeen years following 1765; but on the 25th of October, 1782, a most beneficial change in carrying on the works took place. It was at this date that the proprietor of the Penrhyn estates took the quarry into his own hands. It has already been stated that in 1761 Sir George Young and General Warburton were joint owners of the Penrhyn estates. They derived their title thereto through Sir Griffith Williams, of Penrhyn. He died unmarried, and the estate went to his sister Frances, whose last husband, Lord Edward Russell, dying without issue by her (her only child by her former marriage died in infancy), left her estate to her surviving sisters, Anne, married to Thomas Warburton, Esq., and Gwen, married to Sir Walter Young, whose descendants, Sir George Young and General Warburton, held the estate in 1761, and for some years afterwards. General Warburton's only daughter, Susannah Anne, married Richard Pennant, Esq., afterwards Lord Penrhyn, December 6th, 1765, and Mr. Pennant's father having bought the other moiety of the Penrhyn estate from Sir George Young, the two moieties became united in the persons of Mr. Pennant and his wife. The lady, by right of inheritance, obtained her portion, and Mr. Pennant his by
right of purchase. It would be interesting to know the sum
given to Sir George Young for his moiety. He could have had
no idea of the real value of the estate he was parting with, or
he would not have sold it. The quarry alone is an inexhaus-
tible treasure, and a continual source of riches.

When Mr. Richard Pennant, previously mentioned, came
into possession of the Penrhyn estate, the quarry came under
his notice. He paid a visit to the quarries, and inquiring on
the spot whether more slates could be disposed of than the
quantity procured, he was answered by Mr. William Williams,
the estate agent, that all that was necessary to increase the
trade was a greater variety in the sizes of the slates made, and
a large quantity of all kinds of slates would meet with a ready
market. After careful inquiries amongst builders and others,
it was ascertained that an extensive commerce might be
conducted in slates. Mr. Pennant consequently determined to
open a spacious quarry. As there were four years unexpired
of the leases granted in 1765, he bought up these leases, the
holders thereof parting with them for the sum of two pounds
each. The whole transaction cost Mr. Pennant one hundred
and sixty pounds, so little were these leases valued by the
lessees. The 25th of October, 1782, was a day memorable in
the history of the Penrhyn Quarry. It was on this day that
operations were commenced under the direction and control of
Mr. Pennant. He engaged the persons then employed in the
quarry, and hired twenty-five labourers in addition, and these
men, on the day above named, began to clear away the rubbish
which had accumulated for years close to the various excava-
tions made by previous workers in the rock. It was then
that the foundation was laid for the present slate commerce
which has done so much good, not only to the quarry districts,
but to Bangor, and other parts of the county of Carnarvonshire.

For some time large sums of money were expended in clearing
the quarry of the accumulated rubbish heaps, and improve-
ments were carried on in a spirited manner by the owner of
the Penrhyn estates up to the time of his death, which took
place in January, 1808, and he had the pleasure of seeing the
quarry and slate trade so far developed that instead of eighty
pounds a year, before he died he was in receipt of about seven
thousand pounds yearly profit from the quarry.

The year following that in which Mr. Pennant took the
quarry into his own hands, 1783, he was created Baron Penrhyn
of the kingdom of Ireland, and henceforth in this paper he is
called Lord Penrhyn. Within the first eleven years of his
lordship's management of the quarry many changes were
brought about gradually and at considerable expense. The
horse paths were supplanted by roads, the panniers by teams,
a port was built at Aber Cegin, and the quarry was systema-
tically opened. Pennant visited those parts in 1792, and he
states in his Tour that the farmers were so poor when his lord-
ship came to the estate as not to be able to produce more than
three miserable teams in all the tract, and that then not a
thousand tons of slates were exported annually; but that when
he (Pennant) was there, about a hundred and three broad-
wheeled carts are in constant employ in carrying slates down
to the port. In the year 1792, he says, 'upwards of twelve
thousand tons were exported.' The slate commerce, therefore,
seems to have become flourishing at once. So many ships
crowded into the port for cargoes of slates that they had to be
served in rotation, the supply not being equal to the demand;
but a great check was put upon this rapidly increasing trade by
the breaking out of the war with France. The building trade
was greatly affected by the war, and what perhaps was equally
damaging to the quarry works was a duty of twenty per cent.
imposed by Government upon all slates carried coastwise.
Both things combined were so far disastrous to the slate
commerce that instead of six hundred men engaged in the
quarry previous to the commencement of the war, there were
not more than one hundred and twenty employed in the quarry
in 1798. Lord Penrhyn, however, turned none of the men
engaged in the quarry away, but employed them in widening
the roads and making new ones, and others were employed in
clearing away the boulders from the mountains, and there they
made small fields for their own use. The work, however,
by-and-bye partly revived, and in 1802 there were about three
hundred engaged in and about the quarry. On June 25th,
1803, a contract was made to deliver all the produce of the
quarry to Worthington & Co., a Liverpool company, a sign that
the trade was in a depressed state. In 1808 the number of
quarrymen was six hundred; upon the termination of the war,
in 1815, it seems that this number had increased to eight
hundred, and in the following year it was one thousand.
Circumstances appear to have been antagonistic to the develop-
ment of the quarry in after years, for we find in 1825 only
eight hundred engaged in the works. But when we reach the
year 1860, the hands, reckoning lads and men, engaged in the
Penrhyn Quarry exceed two thousand, and in 1870 it was about
three thousand. Fluctuations in the number employed may
be accounted for in recent times by the state of the slate
market.

But to return to the manner in which the quarry was worked
by Lord Penrhyn. It has been stated that the removal of the
heaps of refuse which had accumulated in the places where
slates had been dressed was the first operation taken in hand.
This was necessary ere the workmen could extend the shallow
excavations which dotted the sides of the hill. These discon-
nected quarries continued in Lord Penrhy's days to be worked separately for several years. But Mr. Greenfield, who was appointed manager of the works in 1799, formed the design of working the quarry in terraces, just as it is at present. This plan was ultimately a great boon both to the quarryman and to the proprietor. To the former it gave greater personal safety, and to the latter additional profit. This will appear evident when we consider that the greater the space through which the slate-rock fell the more would it be shattered by the fall, and in this manner much good rock would become useless. But further, the expense and trouble of hauling the stone from the bottom of deep excavations was a matter for serious consideration. The risks to which the men were exposed in such places were great, and the devising of a plan by which all these drawbacks could be remedied had become an undertaking of vital importance. It speaks much for the grasp of Mr. Greenfield's mind that he saw the practicability of working the quarry by forming it into ledges one above the other, like seats in an amphitheatre. The hill rising at an angle of about forty degrees, is highly favourable for working the quarry in this manner. Terrace after terrace was formed when Mr. Greenfield was manager. The highest terrace in the quarry was the one that receded furthest into the hill, and when the height from the surface of the hill to the step below became too deep, another ledge was commenced, and in this way all previous excavations disappeared and were swallowed up. It was at this time that the two conical rocks in the centre of the quarry were left standing, not for ornamental purposes, but to avoid the expense of clearing so huge a mass of unproductive rock. As we shall have to allude to these terraces again it shall only be remarked here that the scooping out of the hill in the comprehensive and systematical manner in which it is at present done, initiated by Mr. Greenfield, has been followed in other quarries of North Wales.

The next step taken by this far-seeing agent for developing the Penrhyn Quarry was the introduction of tramways along the terraces. This diminished the labour of the workmen. The good rock was placed in wagons and driven outside the quarry to small hills, to be split and converted into roofing slates. The rubbish was in the same manner taken out of the quarry and tipped down the hill on both sides the quarry. Thus on each terrace there was a set of wagons which met about midway, and kept the quarry clear of rubbish. The tramway extended from the left extremity of the quarry to the right, with a slight incline in both directions. Such was the plan originated about 1799, and which has been continued up to the present time. It will be seen that as the quarry is extended, the quarry tips become lengthened, and such is the extent of these terraces of refuse that the one at the base of the hill is from one extremity to the other two miles or more in length. The rubbish banks recede yearly further and further from the quarry, and already they have covered a church and many cottages that at one time were considered beyond their reach. It has been stated that Lord Penrhyn formed a road to the port, and that panniers were succeeded by carts in conveying the slates to the sea coast. About one hundred carts, capable of carrying from fifteen hundredweight to a ton each, were employed for the first nineteen years in the transit of slates. But Mr. Greenfield, extending the idea of the tramway, constructed a road of this kind from the quarry to Aber Corina, a distance of about six miles. This undertaking, commenced about 1800, was completed in the following year. At the same time the port was being enlarged. The tramway and port cost his lordship one hundred and seventy thousand pounds. The improved means of conveyance, it appears, affected injuriously for a while the carriers, but we are told that they took to cultivating their small farms instead of carting slates to the port, and were by this means compensated for their loss. Some of these carriers had been engaged in the work under the primitive style of conveyance in panniers. Now they saw their carts superseded by a more expedients and cheaper kind of carriage. These great improvements were not as beneficial when first introduced as might have been expected. The French war, as has been said, nipped the quarry in the bud. But in after years the large sums embarked in these works were reimbursed with interest. The golden fruit was gathered, but not by him who laid down the plants. Previously to Lord Penrhyn working the quarry hardly one thousand tons of slates were exported annually. In his lordship's time from twelve thousand to sixteen thousand tons were shipped yearly. At present the annual average exported is one hundred and twenty thousand tons.

Before leaving this early period in the history of the Penrhyn Quarry, it will not be amiss to notice the manner of working the rock. It appears that formerly ladders were much used in carrying on operations. By means of these the men scaled the face of the cliff, bored holes for blasting, and wrenched the loosened masses from the side of the precipice. This dangerous manner of working the rock was by-and-by, however, superseded by the use of suspended ropes, and instead of being worked from below, as was the custom when ladders were in fashion, the rock was and still continues to be worked from above. But so reckless are men, and so tardily are precautions made by them or their employers for the protection of life, that in the first instance, in the commencement of the present century, it is said that these ropes were merely secured to a large piece of wood or
block of slate. The quarryman having tied this rope round his waist went to work like a spider at the end of his web. If the ladder were liable to slip, to be crushed by falling rocks, to retard the escape of the men in moments of imminent danger, the rope fastened to a movable block had likewise its failings. Should the pressure upon the rope become so great as to overbalance the resisting force, then the quarryman could hardly avoid being precipitated to the ledge below. This loose way of working has ceased. At present the ropes are secured to an iron bar which rests in a bore specially made for it some distance from the brink of the cliff.

The implements used at the time we are speaking of were similar to, though ruder than those in present use. The knife or hatchet, with which the slates were squared or dressed in Lord Penrhyn's time, has since been greatly improved. This may be seen by comparing the implements now used with those borne by the quarryman on a monument by Westmacott in the chancel of Llandegai Church, erected to the memory of Lord and Lady Penrhyn. This monument is a beautiful work of art in marble, and is descriptive of the Penrhyn estates at the time of the decease of his lordship. It consists of two life-size figures standing upon a pedestal. The female figure is in an attitude of grief, with a distaff at her feet, which appears to have fallen from her hands at the news of the death of her kind and munificent benefactor. The male figure is that of a despondent quarryman, holding the tools of his trade then in use in a listless manner. The crowbar, upon which his left hand rests, is much thicker than that now used. It is two inches and a half broad at the head, and four feet nine inches long. The slate-dressing knife in the right hand, which much resembles a cleaver, differs in several particulars from the modern one. The handle and knife of this implement are in a straight line. Its dimensions are:—Handle, six inches long; blade, seven inches and a half long, four inches and a half deep. It is wedge-shaped, and not flat, but rounded on the back, on which, about three inches from the extremity, is a small spike, one inch and a half long, slightly curving towards the handle. This tool is about an inch thick throughout the whole of its upper length, but it gradually tapers off towards the edge. The chief differences between this implement and that which supplies its place are the following:—The modern slate-dresser is of a uniform thickness throughout, having though a keen angular edge, like that of a chisel, and the handle, instead of being in a line with the knife, throws out a little, so as to protect the thumb when the stone is being split. From the Penrhyn monument another hint can be taken respecting the early working of the quarry. On one side of the pedestal are four compartments with figures in relief. In one compartment are two stout chubbies in the act of drilling or splitting a piece of rock, which lies on the ground between them. One holds a drill or wedge, whilst the other is in the act of striking with a hammer; behind them is a scaling ladder placed against the rough perpendicular rocks in the background, a position which bears out what has been said with reference to the early use of ladders in working the quarry.

It may further be remarked that the cleaver-like hatchet above referred to could not have been used in the manipulation of large-sized slates, for the thumb of the workman would come in contact with the slate at every sharp blow. In agreement with the inference drawn from the dressing knife it would appear that the slates manufactured in the middle of the last century were really much smaller than those at present made. And further, as might also have been supposed from the great weight and thickness of this knife, the slates then formed were thicker than those of the present day, being sometimes three quarters, and even an inch thick. The largest slates then made could hardly have been above twelve inches long; they never could have exceeded fifteen inches. These small thick slates were dressed on a stone called the Maen Nâdl. The quarryman, seated on a heap of stones on a straw cushion at the end of this dressing stone, cut his slates into form. The Maen Nâdl was succeeded by a bench similar to those at present in use in the quarry, but the iron which is placed scrapewise down the middle of the bench, to sustain the weight of the slate, and otherwise assist the quarryman in properly cutting the slates, was then only about sixteen inches long. The Maen Nâdl and bench were unprotected from the weather, now the quarryman works under covered sheds. A collection of the several kinds of old tools used in the quarry, as well as of those at present used there, would form a museum of considerable interest. One of the rooms at Ogwen Bank, Lord Penrhyn's charming villa in the neighbourhood of the quarry, fitted up with these things, would add to the attractions and utility even of that delightful retreat.

The workman's wage was, in Lord Penrhyn's time, one shilling a day, whilst the marker, or overlooker, received one and sixpence per day. These sums seemed so small a remuneration that I have taken the trouble to ascertain the price of a few of the necessaries of life in those times, and the following is the result:—Bacon fetched about fourpence a pound; beef and mutton from twopence to threepence; butter sixpence to sevengle. Fuel cost nothing but the labour of procuring it. It consisted chiefly of peat, each cottage having a portion of a turfy, where he procured an ample supply. The rent of cottages was two pounds two shillings a year. Bacon at
present reaches tenpence a pound; beef and mutton eightpence to elevenpence; butter one shilling and sixpence to two shillings; rents are twice as high as formerly, and coals fetch one shilling and sixpence per hundredweight, so that the difference in the price of things taken into account, the shilling of those days was equal to at least from three to four shillings of the present. When we bear in mind that wool was so cheap in the childhood of the aged quarryman, and even more so in his father's days, and that many articles of apparel were made of wool, we shall have another proof of the comparative value of the wages then and now. The quarrymen's wives in the last generation were clever and industrious in household work; the same is no longer the case with their daughters. They spin their own yarn, and knitted their own and their families' stockings. They prepared the warp and woof for their husband's best suit of clothes and their own Sunday dress. Their busy and nimble fingers likewise made home-spun blankets, which lasted years. The hum of the flax-wheel or of the spinning-wheel was heard early and late in the winter months, and they could carry on their spinning by the touch in the dim light of a peat fire. Even men were able to darn and knit stockings. But this kind of industry is no longer carried on; perhaps it is no longer possible, nor even desirable. The spinning-wheels are stowed away, and are considered to be so much of a curiosity that in a bazaar held a few years ago in the quarry district, a woman in costume, spinning flax, was a sight much wondered at by the rising generation. In the last century every family was pretty nearly self-subsistent. Potatoes enough for the year were planted, a fat pig was killed every winter, brewing was a domestic art, rushes, harvested, peeled, and dipped into grease, formed the usual light, although mould-candles of home make were used for grand occasions. The baking was all done at home. The diet was plain, consisting much of oat-bread, milk, butter, cheese, potatoes, bacon, mutton, and beef. The drink was whey or buttermilk diluted with water. Tea had not then reached the Snowdon hills; now it is only too common. It will be seen that this state of society could only exist in a thinly-populated country, and that those parts were sparsely peopled may be inferred from the fact that in 1690-9 inclusive, there were only one hundred and eighty-three children christened in the district of the quarry. In the last decade of the eighteenth century, viz., in 1790-9, the number baptized in the same parts was four hundred and thirty-nine. These figures are taken from the register of the parish of Llanllechid, the only church then in the neighbourhood of the quarry. Consequent upon the influx of strangers attracted by the employment obtainable in the quarry these primitive modes of living soon began to disapp-

pear, and as the population increased a higher wage was given to the workmen, but the price of the necessities of life made a corresponding advance, so that the labourer's condition at present is not materially much superior to that of his grandfather.

Lord Penrhyn died at Wintnington, in Cheshire, 21st January, 1808, aged seventy. He was a great benefactor to the whole of Carnarvonshire. His character seems to be drawn with considerable power and truthfulness on his monument in Llandegai Church. It is there said that

He was for many years an intelligent and active representative in Parliament for Liverpool, and was created Baron Penrhyn, 1783. He opened the first carriage road through the valley of Nant-Ffrancon, formed the quarry at Port Penrhyn; enriched and adorned the domains and the country around it with buildings, agriculture, and plantations; improved the condition of the peasantry, exciting them to habits of industry by employment, and laid the foundation for the more important blessing of an advancement in religion and morality, by the erection and endowment of St. Ann's Chapel. His domestic life was distinguished by order, temperance, and regularity, an habitual cheerfulness and complacency of temper, and a polite and uniform courtesy of manners to persons of every description.

Such was the gentleman who developed the quarry, changed the face of the country, and introduced a commerce which has enriched Carnarvonshire. Bangor, from being an insignificant town, where in 1774 Johnson and the Thoales' found "a very mean inn, and had some difficulty to obtain lodging," has become a thriving city. The Menai Straits, or, as it is called by the people, Afon Menai, the river Menai, is never without vessels sailing along its smooth waters. Larger villages than Bangor have been brought into existence, and the whole country transformed by the slate trade which Lord Penrhyn was the means of introducing. Upon the death of his lordship the estates came into the possession of his wife, Baroness Penrhyn, who died at Penrhyn, 1st January, 1816. The property now descended to George Hay Dawkins, Esq., who assumed the name and arms of Penman, being the first Lord Penrhyn's cousin's son. He died 17th December, 1840. His eldest daughter and heiress, Juliana Isabella Mary, married the Hon. Edward Gordon Douglas, who assumed the name and arms of Pennant. She died April 23rd, 1842, leaving behind her several children. Her husband, who was created Baron in 1866, still holds the estates. His lordship is a worthy follower of the first Lord Penrhyn, for he has greatly developed the slate quarries.

Having made the above short genealogical digression, which is necessary for the purpose of timing the various alterations effected in the working of the quarry during the period that has elapsed since 1808, I shall now return to the quarry. It has been said that the chief manager of the works under the first Lord Penrhyn was Mr. Greenfield, certain improvements
introduced by whom have already been noticed. Mr. Green- 
field was an able engineer, and carried on the works in an 
enlightened manner. The terrace plan of working the quarry 
and the tramway originated with him, and he likewise invented 
a kind of screw for shewing slabs from the live rock, 
which, however, has not come down to these days. Mr. 
Greenfield's death took place in 1825; in 1826 Mr. William 
Francis was advanced to the responsible post of head-manager. 
It is curious to notice the many and great improvements which 
have been made in the working of the quarry during Mr. 
Francis's time. I will briefly touch upon the most important. 
Mr. Greenfield, his predecessor, had introduced tramways into 
the quarry, but it remained to Mr. Francis to carry out the 
system into all parts of the works. In places where there were 
no tramways the workmen were still in the habit of throwing 
the rubbish three or four spades' distance from their bargains 
to the height of several yards, and they carried the slate 
stone on their backs yards away to the place where it 
was to be worked. In this manner the same person worked as a 
quarrier, a labourer, and a slate-dresser, to his own and the 
proprietor's loss. But by a division of labour and an exten-
sion of the tramway system these things were remedied. 
Another beneficial change was the introduction of the fuse for 
blasting purposes instead of a straw filled with powder. This 
alteration was effectual against the wishes of the men, who, in the absence of the overlookers, continually resorted to 
the old plan of letting off the discharges. Strange as it might 
appear there were formerly no fixed times for blasting, but 
each discharge was let off to suit the convenience of the work- 
men. Such a system must necessarily have increased the 
number of casualties, as well as materially retarded the 
progress of the work, for upon every discharge the men in its 
neighbourhood were obliged to seek shelter, and thus they 
continually lost time, and further, from inattention to the 
oft recurring blast warnings, they were exposed to 
great danger. The new regulations which continue in force 
oblige the men to blast every hour at the sound of a 
horn. Five minutes are allowed for this purpose, and during 
these minutes the men take refuge in strongly constructed 
huts. The horn sounds again, and they go forth to their 
labour. These regulations were rightly calculated to economise 
time, obtain greater security for the men, and increase the 
efficiency of the quarryman by confining him to his own partic-
ular branch, instead of allowing him to do labourer's work. 
The improvements of late years were not confined to matters of 
detail only, but extended to the introduction of appliances the 
need of which was created by the development of the quarry. 
Thus as the excavations descended below the level of the surface,

there was no outlet for the water, and consequently in rainy 
weather the lower parts of the quarry were flooded, and the 
workmen were unable to pursue their occupations. To carry 
off this water a tunnel, which was completed under the direc-
tion of Mr. John Francis, engineer, Mr. Francis's son, who 
was likewise one of the quarry managers, was formed, which 
enabled the men to work in the lower parts of the quarry as in 
all other parts during the whole year. With the increased 
depth of the quarry increased facilities for clearing out the 
evacuations became necessary, or the works could not be carried 
on remuneratively in that direction, and ultimately they 
could not be carried on at all, unless some plan were devised to 
overcome this prospective hindrance. This difficulty was 
mastered by the introduction of water balances, with levels, or 
passes, leading thereto from these lower galleries. There are 
seven of these water balances at present used. They stand 
in well selected spots. Tramways are laid down in the levels 
to the shafts underneath the balance, and by its means the 
slate-stones are raised to the surface, to be wheeled off either 
to the tip or the working shed. By means of these water 
balances the slate vein can be followed to almost any 
depth.

As the quarry descended another difficulty presented itself, 
viz., the water difficulty, for the tunnel above referred to could 
not be serviceable for those parts of the quarry which were 
lower than its own level. But here again the ingenuity of 
Messrs. Francis showed itself. They introduced an hydraulic 
ram into those parts of the quarry, and having made certain 
alterations in it, to meet their special wants, they again 
succeeded in overcoming all obstacles; the ram of fifty-horse 
power, with its three cylinders, is capable of raising about ten 
tons per minute to the tunnel through which the water escapes 
out of the quarry. An invention of Mr. John Francis's, of an 
apparatus for slate dressing, is worthy of special notice. Its 
mechanism is simple, and it is worked by a treadle. A lad of 
fifteen can with this engine dress as many slates as two 
men with the hand-knife. This engine has been introduced 
into most of the large slate quarries in England and America. 
It has not, however, superseded the hand-knife; both are used 
in the works. By substituting nitro-glycerine for blasting 
powder a great saving of labour has been obtained, and it is 
said that four men in two days can make a boring with ordinary 
tools capable of holding a quantity of nitro-glycerine equal in 
strength to the powder contained in a hole which would take 
six men a week to bore. But the nature of glycerine is not 
so well known as that of gunpowder, and consequently several 
fatal accidents have occurred through, perhaps, the careless
THE PENRHYN SLATE QUARRY.

The rock from these three, as well as that from the four last above-mentioned terraces, is drawn to the surface through the water-balance shafts.

The meaning of the derivation of these names is worth recording. The name of the terrace abutting on the mountain, viz., “Gefnem,” took its appellation from the place of abode of one of the workmen engaged in opening this terrace. “Ceiling” and “Garret” took their names from these parts of a house. The “Garret” was at one time the highest terrace in the quarry. “Tan y Garret” was the next terrace below the Garret. “Pone ddwli” (Double Terrace) was so named because two terraces were here united. “Pone y Roller” (The Roller Terrace) from the fact that the incline which descends throughout the east side of the quarry here commences, and the large cylinder roller around which the chain moves is situated here. A mole, which in Welsh is called a “Twrch daear,” was caught at “Pone y Twrch” when this terrace was first opened, and the terrace was named after it. Near “Ttwl y d wyn” there was one of those detached deep excavations which were so common before the quarry was worked in terraces, and in such a place the noise or echo was great, hence the name. At “Pone y Level” there was formerly a tunnel going through worthless rock, such as still may be seen penetrating the conical pillar of rock which is left standing in the midst of the quarry. “Jolly Fawr” and “Jolly Bach” were so called after the sign of the “Jolly Herrings,” a public-house at Penmaenmawr, the landlord or tenant of which worked in this terrace. “Sling” is the name of a farm in Llandegai parish, the tenant whereof worked here, and hence the name. “Workhouse Terrace” was commenced about the time that workhouses were being erected, and furthermore it happened to be but a poor place, and therefore its appropriate name. “Douglas” was so called in honour of Lord Penrhyn when he was Captain Douglas. “George” in honour of Lord Penrhyn’s eldest son, the terrace being commenced shortly after his birth. “Rushout” was the patronymic of the late Mrs. Pennant’s family. “Fitzroy” was named in honour of Lady Penrhyn. “Sebastopol” in commemoration of the Crimean War, when the terrace was commenced. “Lord” in honour of Lord Penrhyn. It was opened shortly after his lordship was created a Baron, and hence the name. It is said to be the best terrace in the whole quarry. “Holywell” was named after a miner, a native of Holywell, who was one of the men engaged in opening this terrace. “Smith’s Terrace” after an Englishman, who took contracts in that part of the quarry to clear away the rubbish. “Ffridd,” because it commenced in a “Ffridd.” “William Owen’s Terrace” after a workman of that name. “Pone y Blue” after a man from Beaumaris, who worked there; blue,
being an abbreviation of Beaumaris, which locally is called Blaenmorris. “Agor Bonny” (Bonny’s Excavation.) This terrace was so named after Buonaparte. It was begun when he was carrying on his wars, and the quarrymen say that it was as difficult to master the rock in this part of the quarry as it was to conquer the First Napoleon. “Red Lion” is named after a tenant of the “Red Lion,” Bangor, who worked there. “Sling” has already been explained. “Hen Waelod” (Old Bottom) intimates that this was the lowest part when opened of the quarry, and in point of fact it has its outlet for the tramway on the lowest declivity of the mountain.

These terraces vary in height from seventeen to twenty-two yards; two of them are only about fourteen yards high. They likewise vary in breadth from twelve to fifteen yards, but some on the west side are from twenty to thirty yards broad, whilst some of those on the east side are only a few yards broad. The safety of the men depends considerably upon the breadth of these galleries, but on account of the angle in which the slate lies on the east side, it appears to be difficult to keep the terraces in that part of the quarry as wide as one could wish. The perpendicular height of the whole of these terraces is about three hundred and five yards, so that the Penrhyn Quarry is nearly a fifth of a mile deep. Along each of these terraces tramways have been laid down, upon which small wagons are either pushed by men or drawn by horses. Old men who have spent their best days in the quarry attend to the rails, and sturdy labourers shove the wagons along to the extremities of the rubbish heaps, or else to the small workshops which lie, like houses, the sides of such heaps. As the quarry is worked the debris extends further and further. Some idea of the size of the quarry may be formed when it is borne in mind that the excavation covers from eight hundred to nine hundred acres of ground.

Having given the history of the development of the quarry we will now refer to the varieties of slates and the fanciful names which they bear. It seems that the variation in the size of the slates commenced about the year 1740. Previous to that time the slates are said to have been small, not larger than a man’s hand. But probably they were even at that early period made as large as they possibly could be made, varying from the size just mentioned to a much larger size. From an inspection of the slates found upon old buildings in the neighbourhood, it appears that formerly slates were from half an inch to an inch thick, and twelve inches long by six inches broad or thereabouts, with the corners of one end chopped off. Slates made before 1740 were called singles. These measure at present twelve inches by six inches, and it is not unlikely that they were about this size at the time just mentioned. As the trade increased a larger size slate was introduced, and these were called doubles, because, as it is said, they were double the size and the price of the singles. Taking the singles as the standard, a thousand doubles were reckoned as two thousand. But as doubles in the present day measure only thirteen inches by seven inches, perhaps there is no foundation further than the inference drawn from the name that the doubles were twice the size of the singles. They were, however, a size or an inch longer and wider than their predecessors, and to procure such slates would in the infancy of the quarry cause the workmen twice as much labour as to obtain the smaller size, for they would require a larger slab for splitting up, and with the apparatus then used the procuring large pieces of rock was a real difficulty, so that the better and larger slabs only could yield doubles. Possibly if all the workable slabs were converted into slate, the proportion of the double to the single slates would be as one to two. By-and-by a still larger-sized slate was introduced, which was called double doubles, because, as we are told by the author of the Observations on the Snowdon Mountain, they doubled in size those called doubles, but as double doubles measure fourteen inches by eight inches now, they probably in the first instance exceeded the doubles by only an inch each way, consequently the reason which Mr. Williams gives for the name cannot be the correct one. A thousand of these slates were reckoned by the men as four thousand, possibly because the difficulty of procuring them was considered so many times greater than that of obtaining singles. Afterwards slates of a still increased size were found necessary. These are said to double the last named, and a thousand of them reckoned as eight thousand. General Warburton, the proprietor of the Penrhyn estate, is said to have given these last the name of “Countesses;” the “Double doubles” he denominated “Ladies,” and there were, in addition to the slates already mentioned, another sort of various dimensions called “Ceryg Pwysan,” because they were sold by weight.

It is difficult to account satisfactorily for these fanciful names, but special names were required, and hence their existence. A name which conveyed to the mind a slate of a certain size was all that was necessary, and as slates of various sizes were being made, special names were wanted by which to designate them. The largest kind of slate is known by the name of “Queens.” They are of three sizes, and vary in length and breadth. It would seem that all slates twenty-seven inches long are called “Queens;” in breadth these slates vary from fourteen to twenty inches, but they are chiefly reckoned by their length, and not by their breadth. Next to the “Queens” in size are the “Princesses,” twenty-four inches long, and
fourteen inches or so broad. Then we have "Duchesses," "Countesses," and "Ladies," and of these there are two sizes, thus:

<table>
<thead>
<tr>
<th>Size</th>
<th>Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duchess Major</td>
<td>24 x 12</td>
</tr>
<tr>
<td>Duchess Minor</td>
<td>22 x 12</td>
</tr>
<tr>
<td>Countess Major</td>
<td>20 x 10</td>
</tr>
<tr>
<td>Countess Minor</td>
<td>18 x 10</td>
</tr>
<tr>
<td>Ladies Largant</td>
<td>16 x 10</td>
</tr>
<tr>
<td>Ladies Coltian</td>
<td>10 x 10</td>
</tr>
<tr>
<td>Ladies Coblin</td>
<td>15 x 8</td>
</tr>
</tbody>
</table>

But besides these kinds of slates are many others called "Moss Slates," or "Cric Mwgog," of different sizes, but with a maximum length of fourteen inches, and a minimum one of ten inches. A multiplicity of names to an outsider is somewhat confounding, but to the quarryman it is not so, because from early years such words form a significant part of his everyday vocabulary. "The trade," however, describe the slates they want by length and breadth, and this is at once the most simple and most satisfactory way of speaking of them.

In the course of this history allusion has been made to the fatal accidents which have occurred in the quarry. I have before me a list of two hundred and seventy-seven men killed in the quarry between the years 1784 and 1873. The list professes to be complete from the year 1826 to 1873, but previous to the first date it seems to be fragmentary. However, taking the list as it is from 1784 to 1873, the death rate by accidents is 3.2 yearly—a not very high percentage when the number employed, and also the dangerous nature of the work, are taken into consideration. Since I am speaking of accidents, I must state that the quarrymen have a saying that small accidents are ever followed by the death of one or more workmen. Experience has proved the truth of the saying. At one time no one would work on Ascension Day in the quarry, because, year after year, a man was killed on that day. The day thus became a general holiday. It is said that individuals ultimately presumed to go to their work on this day, but they went to their doom, for some one was certain to be killed. For years one was bold enough to face the danger, and the quarry was deserted on the fatal day. Latterly, however, the day has lost its power. Now a few workmen deprive themselves of a holiday and go to their work as usual, but the majority take advantage of the day to attend religious services, or employ it in some other way.

In conclusion I may add that the quarry is at present under the management of Mr. J. J. Evans, supported by many sub-agents of great experience. The works appear to teem with life. The terraces are now traversed by locomotive engines that move stealthily along, dragging behind them many trucks filled with slate. What a change has come over the scene within the last century! Then men hauled a few slates; now steam relieves them of this labour. Then horses with panniers carried a small load to the sea side; now the iron horse drags tons daily to the quay. Then the country was poverty-stricken, and sparsely populated; now the country laughs and sings, and towns have sprung up where briars grew. Pretty cottages are now seen along the cultivated hillsides, once strown with boulders; well-dressed and intelligent men, who find in music a rational recreation, at present inhabit the country, and derive their sustenance from the quarry, and it will depend much upon their own good sense whether the prosperity of the last century is to last another hundred years or not.

Eforbrychd Rectory, Ruthin.  

ELIAS OWEN, M.A.