TIN MINING IN LARUT.

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With Maps, Plates, and Notes.

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TIN MINING IN LARUT.

The tin industry is fast developing, under British protection, in Larut, and bids fair to eclipse, in a period far from remote, the productions of the other parts of the Peninsula and islands of the Archipelago. There is no exaggeration in the statement that its deposits (which exceed in richness those of any other tin-producing country in the East), if worked with British capital and enterprise, with appliances of modern machinery, would surpass the production of any other part of the known world.

Before proceeding to describe the geological features of the country, and deal with its mineralogical productions, a brief historical Summary, by way of introduction, will not, it is presumed, be devoid of interest or unacceptable to readers.

Every now and again, some great catastrophe arouses our attention, and forces us, in spite of ourselves, to search more carefully the distant locality in which the event has taken place. It is not long since the murder of Mr. Birch, a representative of the British Government in the State of Perak, drew the attention of Englishmen more immediately to the Malay Peninsula. On the west coast of this tongue of land, which stretches nearly to the equator, lies the rich territory of Perak, once ruled over by a Sultan and his petty chiefs. Larut, the subsidiary district of Perak, was under an enterprising man, appointed by the then reigning Sultan before 1855, and from the revenue of its large tin mines afforded him the opportunity of privately enriching himself. This man kept the Chinese—who comprise the bulk of the population—under control, but on his death, and the succession of his son, these split up into /
two rival sections, and began a series of disturbances, and sub-
sequent piracies, which led finally to the necessity for British
interference in self-preservation, since the contagion of dis-
affection was spreading to Penang, Malacca, and Singapore.
British Residents and Assistant Residents were sent to the Court
of the Sultan to help him to preserve peace in his dominions.
It would be out of place here to dwell on the treachery of the
Sultan and his chiefs, which culminated in the assassination of
Mr. Birch, their punishment, and the new régime as a British
Protectorate. It will suffice for our purposes to mention that,
as regards Larut, considerable success has all along attended
British intervention in the affairs of this subdivision of the State,
and that the social and political condition is on a par with that
of the adjoining British settlements, of which it will become, it
may be safely presaged—as an inevitable result of the existing
policy—a valuable component.

Readers desirous of becoming acquainted with every interest-
ing point of information about this rich and wide-spreading
country—"so mild in climate, so luxuriant in vegetation, so
regular in the succession of refreshing rains, so unvisited by
storms that prevail in the East"—are referred to Major
McNair's recent valuable work,* which will amply repay
perusal.

The geological formation of the Peninsula has been described
as granitic, overlaid most generally by sandstone, and fre-
quently also by laterite or cellular clay ironstone, and to the
north by limestone. A granitic mountain chain runs along the
whole length of the Peninsula, and on both sides of it, but
particularly on its western one, or that sheltered by Sumatra,
there are extensive alluvial plains little above the level of the
sea. The prevailing metals are iron, tin, and gold. Iron ores
are found everywhere, and tin in all parts where it is sought.

There is a striking resemblance in the mineral characteristics
of all parts of the Malayan Peninsula—particularly as regards
the unvarying general conditions under which the deposits of
tin are found throughout the full extent of the Malayan tin

* 'Perak and the Malays;' "Sarong and Kris."
field, stretching, as it does, over 17 degrees of latitude and 10 of longitude, from Tenasseram (Tavoy) in the north to Banca and Billeton in the south; and the observations of Messrs. Logan, Horsfield, and others, in different parts of this area, have been verified in a corresponding identity with those recently noted in Larut.

Perak is the second Malay state of the western side of the Peninsula, counting from the north, and Larut, its chief province, is an irregular strip of country about 70 miles in length, varying from 10 to 25 miles in breadth, bordering on the coast.

The physical aspect of Larut is level from the sea-shore to some ten miles inland, where the mountain ranges rise to an altitude of nearly 5000 feet above the level of the sea, and run in an almost unbroken line in a north-westerly direction, with detached hills at intervals at their base. The whole of the land lying along the base of the Larut ranges is more or less stanniferous. This strip is in length about 50 miles, with an average breadth of six miles. The level of this belt is even now undergoing a change by the alluvium brought down from the hills by a rainfall exceeding 150 inches throughout the year.

All the ore heretofore worked has been found in the alluvion or detritus of ancient mountains—what is called in mining language "stream-works"—obtained by washing the soil in the same manner as, for the most part, gold in Australia and California. No ore has ever been obtained by mining the rocks containing veins of it, although it has been traced to them.

The tin beds are composed of débris of granitic rocks, mixed with the ore, which—exemplifying the various stages of progression from the lode in the hills to the dust on the plains, the fragments becoming smaller the further they recede down and from the hills, and proving beyond a doubt, that attrition of enormous power has at some period of the earth's history been brought into play—varies in size of crystal (peroxide of tin) from that of fine sand to that of an ordinary quartz pebble.

Conflicting geological speculations exist regarding these deposits of tin ore. There are evidences in favour of an alluvial
origin, which many circumstances strongly support. The earlier waste of the hills before alluded to, which consists of a coarse granite in which the tin-stone united with ore is enclosed in veins, appears to have produced, by a slow decomposition of the rock itself, successive layers, in which the secondary tin is now found.

This process, but, as would be expected, in a much modified form, demonstrating how deposits have been spread over large areas during long periods, is in active operation at the present day. Further, the embedded remains—including the trunks of trees in varying stages of decay—frequently met with in the workings, all tend to prove that some of the deposits may be appropriately designated as "recent."

Sections of the mines show that the strata under the soil consist of alternate bands of sand, with sometimes high admixtures of dark clay of different colours. There is something singular in the appearance of these strata, which exhibit strikingly the agitation of water at the period of stratification. There is also striking evidence of the operation—visible in the arrangement of the superior strata—of a powerful cause in the effect produced on the separate fragments comprising the last layer which contains the ore of the tin.

These substances are almost silicious, composed of quartz, felspar, mica, and schorl, among which are found occasionally masses of clay, but they appear to have been subjected to a power, which in many cases has completely dissolved their union or the adhesion of their particles: most of them are so loose in their texture that they cannot be handled without separating and crumbling to pieces. The regular striated surface which appears on some of these fragments is highly characteristic of their original composition—the particles of quartz have remained and show themselves on the striae, while the felspar separates as a white powder. Many of the fragments possessing more solidity, have rounded angles, and their surfaces marked with numerous intersecting lines show them to belong to those silicious rocks occurring in extensive veins in different parts of the country.
The termination of the tin stratum is indicated by a peculiarly white clayey substance, which becomes friable by drying, and is called Kongtay by the Chinese. The Kong is everywhere of precisely the same quality—sometimes yellow, sometimes white, or somewhat of a bluish colour, and consists of Kavliën, sometimes mixed with fine quartz sand, which is a decomposed product of felspar. Borings through the Kong taken to a depth of 20 feet yielded nothing but the same, with more or less quartz sand.

Differences of opinion arise as to whether this white (porcelain) clay will be found invariably underlying the stanniferous deposits. In the Larut field, it may be considered as the general mode of occurrence, the only exceptions to the rule being where the tin stratum rests upon sandstone. Even in these instances opinions vary as to the possibility of this being another form of the silicate of alumina with a large admixture of the quartz sand before adverted to.

The following are sections of the mines in different localities, giving a very fair criterion of the district:

<table>
<thead>
<tr>
<th>I.</th>
<th>Feet.</th>
<th>IV.</th>
<th>Feet.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetable mould</td>
<td>1.25</td>
<td>Red loam</td>
<td>2.00</td>
</tr>
<tr>
<td>Loam</td>
<td>1.00</td>
<td>Sand drift</td>
<td>5.50</td>
</tr>
<tr>
<td>Sand</td>
<td>4.00</td>
<td>White grey clay</td>
<td>4.50</td>
</tr>
<tr>
<td>Bluish clay</td>
<td>3.50</td>
<td>Black clay (containing trunks of trees)</td>
<td>2.00</td>
</tr>
<tr>
<td>Darkish clay</td>
<td>3.75</td>
<td>Stratum of ore</td>
<td>5.00</td>
</tr>
<tr>
<td>Stratum of ore</td>
<td>6.00</td>
<td>Pipe-clay</td>
<td>?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>II.</th>
<th>Feet.</th>
<th>V.</th>
<th>Feet.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mould soil</td>
<td>3.00</td>
<td>Red loam</td>
<td>4.00</td>
</tr>
<tr>
<td>Varying shades of clay, from dark yellow to whitish grey</td>
<td>12.00</td>
<td>Sand drift</td>
<td>8.75</td>
</tr>
<tr>
<td>Light gravelly drift</td>
<td>3.00</td>
<td>Whitish grey clay</td>
<td>9.25</td>
</tr>
<tr>
<td>Stratum of ore</td>
<td>6.00</td>
<td>Stratum of ore</td>
<td>6.00</td>
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</tbody>
</table>

<table>
<thead>
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<th>III.</th>
<th>Feet.</th>
<th>VI.</th>
<th>Feet.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mould soil</td>
<td>4.00</td>
<td>Red earth loam</td>
<td>5.00</td>
</tr>
<tr>
<td>Shades of sand from white to brown</td>
<td>4.00</td>
<td>Whitish grey clay</td>
<td>3.00</td>
</tr>
<tr>
<td>Dark grey sand</td>
<td>6.00</td>
<td>Drift sand</td>
<td>8.50</td>
</tr>
<tr>
<td>Stratum of ore</td>
<td>4.00</td>
<td>Stratum of ore</td>
<td>8.00</td>
</tr>
<tr>
<td>Pipe-clay</td>
<td>?</td>
<td>Sandstone</td>
<td>?</td>
</tr>
</tbody>
</table>
Some idea of the irregular and confused stratification of this tin field may be derived from the fact that in an excavation (working) of less than 100 feet square, the details of the sections of no two of its sides were similar, although of course, all agreeing generally.

The depth at which the stratum of tin-ore is obtained, and its thickness depend upon position and locality. The mines cover an area of nearly four square miles—or less than a tenth of the accessible tin land—divided into three sections, viz. :—Assam-Kumbang, Kamunting, and Topai—in the order of their existing size and importance. The variations of depth and thickness of the ore layer may be seen from the following statement:—

<table>
<thead>
<tr>
<th>Sections</th>
<th>Depth</th>
<th>Thickness</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean.</td>
<td>Range.</td>
<td>Mean.</td>
</tr>
<tr>
<td>Assam-Kumbang</td>
<td>16.0</td>
<td>10 to 25.5</td>
<td>3.0</td>
</tr>
<tr>
<td>Kamunting</td>
<td>9.9</td>
<td>4 to 21.0</td>
<td>4.9</td>
</tr>
<tr>
<td>Topai</td>
<td>18.2</td>
<td>12 to 25.0</td>
<td>5.1</td>
</tr>
</tbody>
</table>

There is probably no working of a greater depth than 30 feet, or deposit of a greater thickness than 10 feet, which figures may, therefore, be safely taken in these respects as the maxima for the field.

At present the extensive mining operations in Larut are carried on entirely by Chinese, which nationality also probably forms nine-tenths of the population. There have been various estimates framed, all more or less based on uncertainties, as to the Chinese population in Larut. It is exceedingly difficult to determine the number even approximately; scattered as they are, and so irregularly distributed—14000 may be taken as the limit, the mines affording occupation for fully a half of this number.

There are 80 mines in operation in Larut, owned by 40 kongsees or firms, with an average of nearly 86 men per mine, distributed as follows:—

* This statement is entirely derived from unofficial sources.
The four largest and richest mines in the Assam-Kumbang section belong to one firm, the Hap Seng Kongsee, which employs upwards of 600 coolies. But the largest mine of any in the country is owned by the Kong Loon Kongsee, in Kamunting, under the direction of an enterprising Chinese gentleman, Captain * Ah Quee, whose appreciation of European appliances is evinced by a centrifugal pump and engine, in supersession of the cumbrous, and comparatively useless, Chinese water-wheel (of which more hereafter). There are 300 coolies employed on this mine, which is the highest number of all the workings.

The health, social mode of living, and prosperity of the miners in Larut are—comparatively with those of the neighbouring States—good, due undoubtedly to their more profitable labour. They appear to understand the benefits of co-operation, and in many of their industries there is an association of labour as well as capital; capabilities for organization and self-government being a national characteristic. The Chinese remain Chinese in whatever nation or place they may be, the worst feature being their clannishness—their national individuality. They are slaves of custom, doing everything by precedent, being disdainfully averse to improvement, which their peculiar religion and excessive superstition greatly aid and abet. They are proverbially industrious and enterprising, their constant plodding and dogged perseverance leading to progress “slow but sure.” They are regular in their habits, eating and resting each day at regular hours—there being no variation in their conduct.

* Honorary rank, accorded from courtesy.
Gambling appears to be the besetting sin of the Chinese in Larut as elsewhere, and its prevention being impossible, the Government has very wisely licensed the vice, bringing it better under control and restricting its action, besides affording a remunerative source of income to the State. It is practised universally among the Chinese, and they go about it with a recklessness which does not accord with their usual safe business habits. It is a rare and a curious sight to see a drunken Chinaman, none drinking enough to be called drunkards. But the habit of opium eating and smoking, more particularly the latter, among them is almost as universal as that of gambling. Many partake of the drug moderately, finding relief from the day’s labour in the opium-pipe at night. These negative traits of character would necessarily be incomplete without a reference to the sanguinary encounters which sometimes ensue when rival factions of the Chinese come into hostile contact, during which it is said that John Chinaman’s celestial face is transformed into the visage of a demon! Before concluding this long, but not altogether unavoidable, digression, it may be well to mention that these people arrive at all ports of the Archipelago in vast numbers every year, and there can be no doubt that the “celestial” will be an important factor on the Pacific Coast lines wherever hard, earnest work, by human hands has to be performed.

It is only necessary to allude to the influence which they have already exercised in California and Queensland in depreciating European, or rather “white” labour—leaving the political aspects of the “Chinese Immigration Question” to statesmen.*

The mine holdings vary in extent from 1 to 20 orlongs,† the boundaries of which are continually changing from the irregular and unsystematic mode of working adopted by the Chinese, coupled with the fact that no “register” has ever been kept of the limits or extent of the allotments. Further, the existing system of granting metalliferous land in Larut for mining

* Since this was written the subject has been ably discussed in an elaborate article in ‘The Nineteenth Century’ (No. 19, September, 1878), entitled, “The Chinese as Colonists,” by Sir Walter Medhurst.
† An orlong is as near as possible 1 1/4 acre, being 30 yards square.
operations is very unsatisfactory as regards the tenure under which such lands are held. The system for a long time in operation is a "pass," supposed to be renewable yearly, which offers no security of any value in the money market, and it is satisfactory to record that Mr. Low, H.B.M.'s Resident, is exerting his best endeavours to rectify the defect by the introduction of leases, as a security to encourage the expenditure of capital, leaving the revenue that would as a consequence accrue to the State aside. The form of lease which he suggests, and which is most likely to be adopted, requires and provides for a certain number of men to be constantly and steadily employed in working the holding—21 years being the period judiciously selected for the duration of the lease.

The liberty which had been granted to Chinese miners of choosing the ground for their work, has caused a large quantity to be unfit to be worked hereafter. There having been no regulations regarding the opening and abandoning of a mine, the finest localities were not unfrequently converted into pools, and thus for the most part entirely lost to Government. In consequence also of the want of system and proper supervision which had until very recently prevailed, much valuable tin-bearing land has been covered up by the neighbouring workings, and is now comparatively inaccessible, and left untouched among the abandoned workings.

The method of starting a mine in Larut is somewhat as follows:—The "undertaker," after obtaining a claim-licence, is frequently unable to provide more than the kongsee and smelting-houses, tools, and pumping machinery, besides, of course, collecting or importing the gang of coolies. In such cases, he has to resort to an "advancer" for the working expenses, including the food and necessaries of his coolies. The conditions under which the advancer agrees to supply these requirements vary very much, but are, in some form or other, embodied in the following:—(1) Obtaining a tenth of the gross proceeds of the mine, in addition to a certain fixed high rate of interest—frequently 36 per cent. per annum—on the value of the articles supplied. (2) Receiving the privilege of taking over the output of the mine at $2 per bhara, equivalent to about 4 per cent.,