

NATIVE MINING TOOLS AND METHODS IN SUMATRA.

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NOTE.—The first portion of this paper, descriptive of the journey to Sumatra, and some of the Native customs, etc., is omitted.

THE Concession for which I was Engineer is shown on the map of the West Coast. (Fig.). It embraces an area of some 30,000 acres, having the Rivers Lawas and Palanki as the Western and Eastern boundaries respectively. The Northern boundary is an East and West line joining these and cutting just below the village of Ayer Loeo, while the Southern boundary is a parallel line about seven miles to the South. The geological formation over the greater part of the Concession is a fairly hard blue slate, which, near the surface was much decomposed, and always covered by a surface soil of red clay. In the North-west corner, and along the Eastern boundary, small areas of limestone come in, while on the North boundary, and running a little South, is a narrow strip of granite.

Mining appears to have been carried on many years ago by the natives, but it has been almost entirely abandoned during the last two generations.

The endless number of adits driven into the hills in all directions, most of them in quite barren country, others following small irregular strings and veins of quartz, show what an enormous amount of work has been done in former days, and the years it must have taken to accomplish it under existing conditions.

It is difficult at first to understand why so much of this useless work was done, but when we come to know the peculiar ways of the Malay, his superstitions, his laws of possession, and the fact that when mining was at its height, so also was the condition of slavery; we begin to get some explanation for the enormous amount of dead-work that has been accomplished. I shall touch on some of these points later, so we can leave them for the present.

Practically, the whole of the ancient workings are in the slate country, within the boundaries of this Concession, and they are confined more particularly to the East and West slopes of the dividing range near Bukit Penjaboengan, and to a place near the South boundary called Ayer Abang. At both these places large landslips had occurred, enormous quantities of slate, with whatever gold-bearing quartz it held, were washed down the gullies, with the natural result that part of the gold was concentrated in the adjacent streams.

It was this that first attracted the attention of the natives, who are said to have come from the Korintji Mountains, some miles to the South, and understood mining, and after these streams became exhausted, the quartz veins in the adjacent hills were worked, with, apparently, very poor results.

On many occasions I asked the natives why their grandfathers had given up mining, but as they were all interested persons, and each had a mine or two for sale, their various explanations were unreliable, and I think that the only true one was that the amount of gold won did not pay them well enough.

The only mining carried on in the whole district at the time of my leaving, was a small amount of washing in the creeks, more especially after heavy rain, or when the rice is harvested and the Malay has nothing to do till the rice planting of the following season begins.

All Mining Concessions on the Dutch Islands are granted on the following conditions:—During the first five years, when prospecting work is supposed to be carried on, an annual rental of 25 cents or 5d. per bouw (1 bouw = 1.75 acres) is paid, and at the end of that time the Company must decide what ground it requires, start exploitation, and pay to the Government 10 per cent of the profit from such work.

The Government, however, is not the real owner of the land, and should the Company start work in the old native mines, it would also have to settle with the owners of such.

In the event of rich alluvial ground, or an easily-worked and rich reef being discovered, there would be great difficulty in finally settling with the numerous owners, and probably the Company would have to pay heavily for the ground. The only real thing granted by the Government is the exclusive right amongst Europeans to prospect on the Concession.

NATIVE LAWS.

The Malay Adats are the unwritten laws of the country, which have been handed down from father to son for ages past.

They are well known and understood by the chiefs of villages, and the head men of the different families or Soekoes, and whenever a dispute arises among individuals as to ownership of property of every description, or when any trouble occurs between families or individual members, the Twankoes, or head men of villages, and Penghoeloes, or heads of families or Soekoes, meet together, and the matter is settled definitely on their decision. One of the chief Adats is that a child belongs to the Soekoe or family of its mother. This brings in rather a peculiar arrangement of inheritance—viz., a child does not inherit anything from its father, but it gets its mother's property, and also that of its uncle on the mother's side.

This is done to prevent any property going out of the Soekoe, and it does not matter what individual the property goes to by the death of his or her predecessor, it still belongs to the Soekoe.

For instance, if a man of Soekoe A marry a woman of Soekoe B, the children all belong to Soekoe B, according to the first Adat, so that if the child were heir to its father, the property it would inherit would pass from the Soekoe A and belong to Soekoe B.

In place of this a man's property always passes to the children of his sister, who being of the same Soekoe as himself, thus keeps the property in the family. There are two distinct kinds of property—"Harta Poesaka," or property belonging to the Soekoe and handed down from one member to another, and "Harta Pentjarian," or property which a person has obtained for himself by buying or otherwise.

The former he cannot sell, but with the consent of his Soekoe he can let it or mortgage it. The "Harta Pentjarian" he can of course do with just as he pleases. In letting a property, if no time is specified, the lessee holds it till he dies or leaves the district. An owner in mortgaging his property accepts a certain sum of money, and when this sum is returned the property is redeemed, which seldom happens with a Malay.

In the case of a mortgage there is a special Adat for each kind of property, such as houses, rice-fields, gardens, fish-ponds, mines, etc., which if suddenly redeemed, may carry compensation. For instance, if a man mortgaged his rice-field when it was dry, and then wanted to redeem it after it had been planted, he would have to compensate the holder, or wait till the crop was cut.

So with a mine, if ground was let to a miner, and after, say, a year's work, he found good gold, the owner could not redeem it simply with the sum he had received in the first instance. He would have to pay compensation, or allow the lessee to work on for an equal period of time to the duration of the lease up to the time of finding the gold.

With regard to mines, an owner of a piece of land can, with the consent of his Soekoe, let a portion to anyone to work; the lessee picks out the position of his adit and holds the land for three dapa (18 feet) on each side, *i.e.*, no one can work within that distance of him. This is of course a case in which an adit is being put in to cut a reef, and explains an instance in which I found five parallel adits on the same level, and about forty feet apart, driven to cut the same vein. In each case the vein, about three inches thick, was cut, followed a few feet both ways, and then the adit continued, probably to try and cut a parallel vein. This work must have been done by five lessees, otherwise it would have been much less dead work to put in one adit and then follow the reef.

Another agreement that was often made, was for an owner to allow men to work on his land, or in his mines, give them rice, and in return get half the gold won, or purchase all of the gold at about half of its value.

There seems to be no question of direction in adits, and although two were started some distance apart, they might converge and meet at the same portion of the reef. This is a case which would have to be decided by the Penghoeloes, or the two owners would amalgamate and work the reef together.

Malays are most superstitious with regard to gold; they firmly believe it has a mother, sisters, and brothers—often at night, if some peculiar noise is heard, which cannot be explained, and a Malay is asked what it is, he will say it is the gold talking or calling to its mother. While working in mines, a man must keep very quiet, and not talk of certain animals, such as tigers, elephants, etc., as the gold would become frightened and run away. They also declared that Europeans would never get any gold as long as they used dynamite in the mines.

There was such a lot of time wasted by the coolies in smoking that I tried to convince them that it was the smoke which frightened the gold away, but their superstition would not carry them that far.

An interesting ceremony is that in which Malays make a peace offering to their god, and ask for gold. In doing this they use a funnel-shaped frame (Fig.) called "Sangka." A pure white fowl is killed with much ceremony, and some of the feathers are used for decorating the Sangka. On the platform are placed five dishes made of leaves, one large one in the centre and four small ones round it. In these are placed, respectively, boiled rice, the heart and blood of the fowl, tobacco, and betel nut.

After placing this arrangement in front of the mine or workings, they offer up prayers, and they firmly believe that if Allah is pleased, he will put plenty of gold in the mine.

MINING TOOLS.

The most common tool is the "doelang," or washing dish; this, together with a pointed, hard stick, portion of a cocoanut-shell to loosen and scrape up the gravel, and a "tangoek garei" for screening out the larger stones, forms the entire kit of the alluvial miner.

Fig. 2 shows a "tangoek garei": it is a small screen made of rottan cane, and is used by placing the material on it and shaking the whole up and down in the water; the finer portion passes through, while the larger stones are retained, and, when thoroughly washed, are thrown out.

Fig. 3 shows a "doelang" or Malay washing dish; as will be seen, it is cut out of a single piece of ordinary pine wood; the best ones are made from red cedar, which is much harder and goes black with use, so that the gold can be seen much better. These light-coloured ones have to be continually stained with some black liquid.

In using this, the Malay always stands in the water; the dish is filled with the material that has been screened by the "tangoek garei," the lip is rested on the bank and the dish given a rocking motion, so that the back end dips in the water; at the same time, the material is stirred round with the right hand, the larger gravel comes to the top, and is then raked together and thrown out.

When the material is reduced to about half, the dish is floated on the water and a circular movement given; this has the effect of making the sand move in a circle, the lighter portion on the outer part and the heavy in the centre; at the same time the dish is held on the slant, so that the left side dips slightly under the water, which comes in on that side and washes the light sand out on the other.

The dish, with a small quantity of water in, is next held in the air and the same circular motion given. This has the same effect as in the last case, the water and light material describing the largest circle; as these come to the back portion of the dish, the lip is pulled toward you and the dish sloped at an angle of about forty-five degrees. The result is that the water sweeps the light material forward and discharges it over the lip.

When the material has been reduced, leaving only the heavier sands and concentrates, a little precaution is taken so as not to lose any gold, and, instead of allowing the material to pass over the lip, it is retained near the lip, scraped up the side by the right hand to separate it out, and then a little water taken up with the hand and trickled on; if any specs of gold are seen they are brought to the back of the dish with the finger. In the final stage, the dish is given a circular motion, with a very small amount of water in it; the gold settles to the bottom, and the dish is then sloped and given a back jerking motion; the gold appears to stick to the dish, while the concentrates move forward and a perfect separation is effected; the thumb is then placed on the gold and the dish inverted, when the gold sticks to the thumb, and is washed into a coconut shell of water.

Malays are very expert indeed with this dish; they probably take longer than we do, but they save even the finest "colours," and, I think, get better results than we do. (I might here mention that gold washing seems to have been known all over the East for many years, and each country has its different forms of washing dishes.

The Chinese, in Borneo, use a perfectly circular one, much larger than the Malay dish and not hollowed, but in the shape of a very flat cone. This is used almost entirely under water, with a circular motion.

In Japan, a rectangular board, about two feet by one foot, is used. In cross-section it is slightly hollowed, except at each end, where it is left solid; this is used with a side rocking motion, the waste material being spilt over each side.

In Korea they use a large wooden dish, shaped very much like our own "pan," and used in the same way; it is cut from a solid piece of wood, and is much harder to make than any of the others.

The only tool Malays have for working underground is a steel bar called a "tabak" (Fig. 4), but in the fairly soft and jointy slate they can use it with good effect, especially when we remember that the drives are small and they are generally following small veins, in which case anything like a pick is very awkward.

The miner sits on the ground, tailor fashion, and picks away the slate from the sides of the vein for a few inches deep, he then carefully removes the quartz, places it in a small boat-shaped vessel, cut out of a single piece of wood, and drags it by means of a rope to the adit mouth. The floor of the adit is often laid with small saplings, twelve inches apart, so that the boat is easily hauled over them.

The Baliong.—Another important tool is the Baliong; this is a combined tomahawk and adze, and it is the only tool used in cutting and jointing the timber used in their workings.

Fig. 5 shows the baliong. The handle is of wood, cut from the bough of a tree just at a fork; this forms the head end, and gives a bearing

of a couple of inches for the blade ; the head is bound with green hide, leaving a wedge-shaped hole ; the shaft of the blade is also wedge-shaped both ways, so that it fits tightly in to form either the axe or adze.

Tjatoek or hammers (Fig. 6) are used for general purposes, such as napping down quartz or for striking when forging or sharpening the other tools.

Bellows and forge.—The forge at which tools are sharpened and repaired, consists of a shallow hole in the ground, filled with a charcoal fire ; draught is supplied to this by a native bellows, which consists of two large bamboo cylinders standing on end, the notch is left at the lower end, while the upper is open. Fitted in each of these pipes, and connected to a rod is a plunger made of kapok, covered with cloth, while from the lower end of the cylinders two small pipes deliver the blast to the forge. To work it, a boy sits above the cylinders and moves the rods up and down alternately. (Fig. 7 gives a sketch of the bellows).

For light while working underground, a torch made from the damar nut is used. The nut is crushed and mixed with kapok, forming an oily mass, which is then plastered to a thin stick of dry bamboo. One of these will last about two hours, but burns with a very smoky flame, which leaves a thick deposit of soot along the roof of the drive. Many of the natives still use the flint and steel for striking a light, because it is cheaper than matches, but the old style of making fire—probably, gone into disuse now—is with this instrument (Fig. 19). It consists of two pieces, a piston and cylinder, both made from the solid portion of the end of a buffalo horn. The cylinder is bored, slightly conical toward the bottom, while the piston is bound round the end with silk so as to fit the cylinder accurately, about half way down. The small recess in the end of the piston receives the tinder ; the piston is pushed in till it is fairly firm, then knocked in and withdrawn sharply, when the tinder is found to be alight. It seems hard to believe that the heat from compression of the air would be sufficient to light the tinder, and it is still more wonderful how the natives ever found it out. The tinder is made from stuff scraped off the leaves of a certain palm just where they join on to the trunk.

TIMBERING.

Two forms of timbering are used. Fig. 8 is a set consisting of two legs and a cap ; it is called "Santoeng," and has a peculiar joint. As shown in the figure, the leg is simply notched out to receive the cap, which is thus supported in every direction. The leg however, is not so strong to resist lateral pressure, and the cap has not the same bearing area as in our own leg and cap set. This form is used in fairly good standing ground. The second form of timbering is shown in Fig. 9, and is used in bad ground, which needs to be close "poled" on the roof and sides.

In this the set has two cap pieces ; the upper one simply rests on the tops of the legs, which are cut to receive it, while the lower one is let into the leg. There are two forms of sets, but they only differ in the position of the lower cap.

In very bad ground the sets would all be of the form shown in Fig. 10, (called Saie Rapat). The back ends of the poling boards rest on the lower cap, while the forward ends rest on the top of the upper cap.

In medium ground a set as shown in Fig. 9 (Saie Berarak) would be placed between two of the others, and the poling boards would extend from the lower cap of No. 1 over the top cap of No. 2, and on to the top of No. 3, and the next set of boards starts on the lower cap of No. 3. The length of the top cap varies, and is made to extend to the walls of the drive.

As a drive is worked only by one man, he makes it according to his own size, and in a timbered drive the dimensions inside are as follows:—The width at the cap is the length of the forearm from elbow to finger tips; at the bottom, the length from the sole of the feet to the back when sitting down with the legs extended. The height is made four times the length of the forearm.

Besides timber the flat slabs of slate are used to a great extent in building up walls to support the roof or sides, and in this work the Malays are very good.

TREATMENT OF QUARTZ.

When brought to the surface, the quartz is washed, carefully examined for gold, and then napped down to half-inch cubes with small hammers, and examined again. All pieces showing gold or signs of it are separated and further crushed. This is chiefly done by women and children, who squat in a circle, a handful of quartz being passed from one to the other of perhaps six of them, and carefully examined by each; all chippings from the nappings, etc., are carefully “panned” in the “doelang,” while the quartz showing gold is crushed to a powder and also washed in the dish.

In the few cases I have seen the natives at this work, the gold was very coarse and “free,” so that nearly the whole of it was obtained.

I have here a sample of the typical quartz showing gold. You can see that at most it is under three inches thick, and the gold is coarse.

As an experiment, I crushed a sample of this down to about one-eighth mesh and screened on a “ten” sieve. The “metallics” picked out with forceps represented seventy per cent. of the assay value of the ore, and by panning the fine portion I obtained practically the whole of the gold.

INDICATORS.

As indicators for reef and gold, the natives follow certain kinds of slate. The ordinary mass of slate is called “Napal gadang” or large slate, and in this are certain portions or bands, differing principally in colour, softness, joint, and included minerals.

The following are some of the more important indicators:—

1. Napal Perak:—A soft grey somewhat clayey slate, carrying small crystals of iron pyrites, and found between the quartz vein and the “napal gadang.” There are two kinds, “Bagardia,” and “Badoekong,” the former being on the hanging wall, and the latter on the

footwall. As far as I could see there is no difference between the two, and it is probably only from their position that they are named thus.

2. Napal Serapie:—This is much the same as No. 1, but has “serapie” (the native word for galena) in it, and is usually associated with gold. Serapie is also called “makan-an-amas” or food of gold, and it is believed that gold eats it.

3. Napal Koriek:—A soft banded slate.

4. Napal Kalodon:—This is really a decomposed eruptive dyke in the slate; it is looked upon by the natives as a different kind of slate; generally a soft yellow clay, and is certainly an indicator for quartz veins.

5. Napal Jamboe:—Soft red slate.

7. Napal nan serang:—Showing double jointing.

As far as my experience went, these indicators were of very little use, except perhaps the Kalodon, Serapia, and Perak.

The natives, however, have a wonderful amount of faith, and, if after following the best indications, no gold is obtained, they have always a good reason why the gold ran away.

For sluicing alluvial ground, and storing water for other purposes in gullies where very little water is obtainable, ditches, about twelve inches by twelve inches, are cut round the adjoining hills to catch surface water, or to lead water from some other gully, often a mile or two away, and these lead to a dam, or “goeboeran,” the bank of which is made of stones and clay. The outlet is made in the solid ground at the side, by cutting a narrow slit, eighteen inches wide, the full height of the dam. The sides of this slit are planked, and a wooden door, whose height is twice that of the dam, is hinged centrally at the top of the planks and fitted into the slit.

A rope is attached to the top of the plank, and comes back on to a rough windlass, by which the door is closed and kept shut when the dam is full. As the water rises, clay is rammed into the joint between the door and side planks. By means of the windlass the door can be gradually opened to release a small amount of water, or let go altogether to give a rush of water for breaking-down purposes.

The different articles shown in Figs. 11 to 20 represent the outfit of the gold-buyer, who was generally the chief man of the village.

The trays (Fig. 11) are called “Tintingan Amas,” “tintingan” meaning to separate, and “amas” meaning gold. A ridge will be noticed in the centre, and when buying gold, which has sand, etc., mixed with it, it is placed on one end of the tray, and with a tossing motion the two are deftly separated.

Fig. 12 shows the scales (called “Taradjoe”), and the box for holding them, (called “Tampat Taradjoe”). They are rather neatly made, but are not very delicate for weighing with.

Fig. 13 shows a “Batoe Oedjie,” the former meaning stone, and the latter, to distinguish. The name indicates its use, which is the same as our touchstone for determining the value of gold.

Fig. 14 shows a “Batoe brani,” the former meaning stone, and the latter bold. This name also indicates the use of the article: it is used as a magnet for separating the magnetic iron which generally accompanied the alluvial gold.

Fig. 15 shows small cloth brushes called "Toeiej," used for cleaning the scale pans, etc.

The next (Fig. 16) shows a stone pestle and mortar, used for crushing pieces of quartz with gold attached. The pestle is called "Aloe," and the mortar, "Lasoeng."

Fig. 17 shows a "Sendok" or spoon, used for putting the gold into the pan of the scales.

The small bags (Fig. 18) are for keeping gold in; they are made from the skin of a fowl's breast. When fresh the skin is tough and can be stretched and worked into any shape; they are usually bulb shaped at the bottom, and form a self-closing pouch.

SYSTEM OF GOLD WEIGHTS.—(Fig. 20.)

1 tahl = 24·3 dwts., troy	2 sago = 1 koepang
2 satengah tahl = 1 tahl	2 sabiah = 1 sago
2 soekoe ,, = 1 satengah	2 koendi = 1 sabiah
4 satoe amas = 1 soekoe	4 biji = 1 koendi
2 koepang = 1 satoe amas	

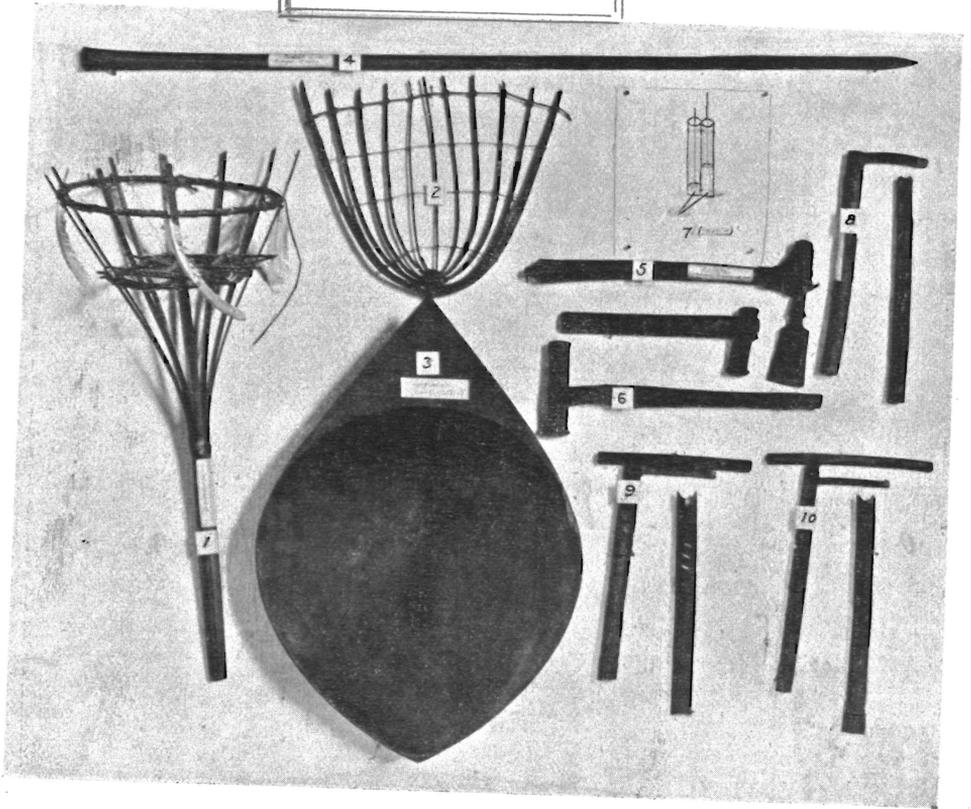
The lowest weight, a grain of rice, equals 1 kepeng worth of gold, and 120 kepengs equal one and eight pence.

The scales are not delicate enough to weigh one grain, but if a small amount of gold were balanced by, say 20 grains of rice, it would be worth 20 kepengs.



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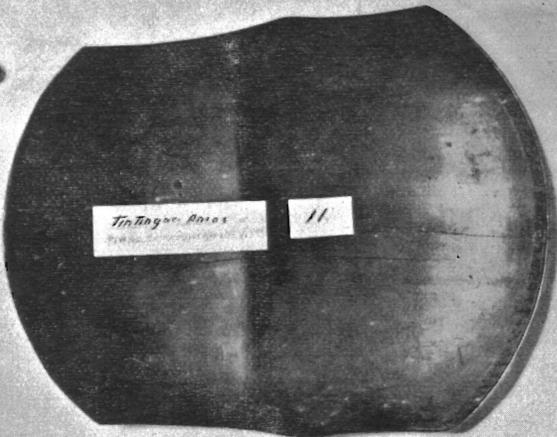
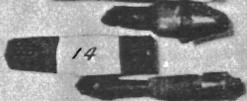
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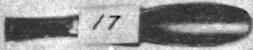
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16



TANIL

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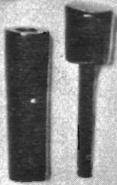
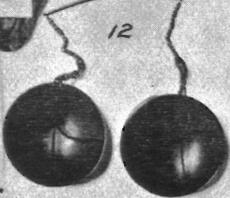
Kotpang

Saga

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Koentil

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