COMPARISON OF THE TASMANIAN TRONATTA WITH THE ARCHAEOLITHIC IMPLEMENTS OF EUROPE. (PL. III., IV., V. AND VI.)

By Fritz Noetling, M.A., Ph.D., etc.

(Read 13th June, 1910.)

1. THE CHIEF FEATURES OF TASMANIAN CIVILISATION.

Before we compare the Tasmanian tronatta with the similar implements from Europe, it will be useful to fix the main features of the Tasmanian civilisation, because it represents the purest type of archaeolithic civilisation. We may deplore the fact that the Tasmanians died out within a few years since they came in contact with the Europeans; yet even this had its advantages. There was no time for the inception of ideas foreign to the Tasmanian mind; the primitive state of civilisation could not be adulterated by other notions. This preservation of the archaeolithic stage in all its pureness would have been impossible if the Tasmanians had become more or less acquainted with foreign ideas. We would always have to consider the probable influence of extraneous notions had this been the case. However unfortunate this may have been for the Aborigines, the student of the evolution of mankind must consider it as a very lucky incident. We know absolutely nothing about the human beings that used the archaeolithic implements in Europe; but if we apply the method so successfully used in palaeontology to our case, we must consider the Tasmanians as the living (1) objects the study of whose habits and customs gives us the key to the understanding of the state of civilisation of the fossil races—our own ancestors in all probability.

(1) Of course the Tasmanian race is extinct now, but it died out within the memory of many still living, and as we are well informed about many of their customs we can consider them the "living objects" with which we can compare the relics of quarternary and tertiary races.

The Aborigines had already made at least one important invention, based on a certain amount of logical reasoning. Instead of using any pebble or rock in its natural state, they had learned that certain siliceous rocks could be split, and that the flakes, by means of their sharp edges, were more suitable implements than those provided by nature—for instance, sharp-edged pieces of columnar diabas. The latter were, of course, still resorted to, but the bulk of the implements were artificially manufactured by the breakage of suitable siliceous rocks. It is one of the peculiarities of these siliceous rocks that they have a conchoidal fracture, which renders the production of sharp-edged flakes comparatively easy. And it is another peculiarity than when a flake is detached from a parent block, that face by which it is detached is generally very smooth and level. The flake breaks off in a plane, which may be more or less convex, but it always forms one plane. The shape of the face opposite the flat one is determined either by the original surface of the parent block or by the size and number of flakes previously struck off.

This peculiarity of fracture is probably the cause of the particular way these flakes were grasped. The thumb invariably rested on the flat side, not in the reverse way, be it well understood. This practice being in use for generations, eventually became an inborn habit. The foremost thought of the Aborigines when manufacturing an implement was the production of a plane face as rest for the thumb; the shape of the other face was immaterial. It may have been made more convenient to fit the hand by striking off smaller flakes, or it may have been left as it originally was, but its shape was of no importance.

The chief feature of the Tasmanian stone implement is its unsymmetrical shape. Even if—as it has been noticed in some specimens—there is an attempt of a symmetrical outline, the symmetry of the two faces is still existent. It is therefore obvious that the Tasmanian tronatta could not be altered without destroying its essential features. The indical face could be treated by the most delicate or regular chipping; the outline of the tronatta may have been so carefully shaped that it was perfectly symmetrical in two directions; all this did not alter the character of the tronatta, which still retained its essential

feature, viz., a smooth pollical face, in opposition to a more or less convex, wrought, indical face.

It will therefore be seen that the tronatta is incapable of further development without losing its character. I do not want to be misunderstood; I do not wish to say that the tronatta is not capable of further development; it is rather the opposite way; but any such development destroys its character as a tronatta. Neolithic, or even palaeolithic, implements can be materially altered and improved without losing their distinctive features, but not a tronatta.

We see, therefore, that that stage in the evolution of stone implements which is represented by the Tasmanian tronatta does not allow for improvement of its implements. The only direction in which an improvement can be carried out is in the more careful treatment of the indical face, and as far as I can see the Tasmanian Aborigines had reached that highest stage of perfection. But simultaneously with such highly-finished implements there were others in use that showed little or no improvement at all. This would tend to prove that it is impossible to classify the archaeolithic stage according to the finish of the implements: on the other hand, it seems that in the earlier periods the implements showed on the whole a much rougher finish than those represented by the Tasmanian tronatta.

The most remarkable feature in connection with these implements is the fact that though the Tasmanians had a rudimentary knowledge of the art of grinding, they never used it to improve the efficiency of the tronatta. They had not made that invention yet, and they probably never applied it in the manufacture of tronattas, because their essential features would have been destroyed thereby.

The tronattas were tools only, and they were never used as weapons. The Tasmanian civilisation had not made the invention to provide the spears with stone heads or to fix a handle to some of the large tronattas. Their chief weapon was a wooden spear of considerable length, but rather light; besides the spear they used a short throwing stick pointed at both ends. Their utensils were of the most primitive type, and consisted mainly of neatly

plaited baskets and a sort of pitcher made of seaweed. Clothing was practically unknown to them, which is somewhat remarkable considering that in winter time all heights above 1,800 feet are snow-clad for several months, and that the temperature even at sea level is pretty cold.

Their ornaments consisted in a shell necklace for the women, while the men rubbed a mixture of red ochre and grease into their hair. Their encampments were mainly situated on warm, sandy soil close to fresh water, but they apparently never constructed any huts, except a rough sort of shelter or breakwind of bark. Occasionally they may have resorted to caves, but to judge from the great scarcity of implements in the cave deposits, these caves were no dwelling places, but rather places where they consumed their meals only.

Their food (1) consisted of the natural products of land and sea, but they had no idea of agriculture, nor did they ever make an attempt to domesticate the animals running wild in Tasmania (2).

They had learnt to make a fire, though there is some doubt as to how it was made. There is a great probability that they used siliceous stones for striking fire, though it is probable that they produced it by the fire stick and drill.

The dead bodies were disposed of by burning, and subsequent burial of the ashes.

If they had any religious notions they were of the crudest form, and mainly restricted to certain rites, in which flat, curiously marked pebbles, representing dead relatives, played a great role.

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(1) See also "The Food of the Tasmanian Aborigines," Pap. and Proceed. Roy. Soc. Tas., 1910.

(2) It is a remarkable fact that the Tasmanians soon recognised the value of dogs for their hunting expeditions. Under these circumstances it is very strange that they never made an attempt to domesticate the Tasmanian tiger or the devil, both animals that would have been very suitable for hunting.

2. CONCLUSIONS AS TO THE STATE OF PRIMITIVE MAN IN EUROPE.

Now, what inference can be drawn from these facts with regard to the European races that used implements of exactly the same type as the Tasmanian tronatta?

We can in the first instance state with almost certainty that none of these implements were weapons. They were used as tools only, and for no other purpose. Archaeolithic man of Europe had neither bow and arrow, nor were his spears provided with a stone head. It is therefore absolutely futile—in fact contrary to all knowledge—to discern arrow, spear, and axe heads among the archaeolithic implements of Europe.

The only weapon of archaeolithic man was a wooden spear, probably rather long long and light. Possibly he may also have had short throwing sticks: but he certainly did not use clubs (1).

There is a great probability that he smeared his hair with a mixture of red ochre, and that he had already learnt the art of plaiting baskets, and had a rudimentary knowledge of the art of grinding. His encampments were close to the rivers, probably on open, sandy soil. He had no domesticated animals, neither did he cultivate the soil; he had learnt to produce fire, and he burnt in all probability the dead. Religious notions were of the crudest form, and probably restricted to certain ceremonies in which round flat pebbles played a great role.

In one point only archaeolithic man seems to differ from the Tasmanians. The Aborigines were practically naked; now and then they seem to have worn a skin loosely slung round the body, but there was no attempt of a habitual covering of the body even in the coldest weather. It is perhaps probable that the oligocene or miocene human beings were in a similar state of naked-

(1) Another notable fact must strike the observer: The first weapons primitive man manufactured were meant to be used at a long range. It is only later, when sword and axe had been invented, that the combatants came to close quarters. Modern man has again reverted to the practice of primitive man, to fight its battles at long ranges, only that the range is now almost as many miles as it used to be feet with primitive man.

ness, but it is impossible to assume that those that existed during the glacial period did not cover their bodies, unless we believe that the body was still covered with a thick fur.

Archaeolithic man had not made those simple inventions that were to raise him from the state of savageness to a higher level. All these inventions, the use of stone as weapons, the hafting of weapons and tools, must have been made early in the palaeolithic age, and it is very probable that the first invention made was the providing of the weapon of age—the wooden spear—with a stone head instead of sharpening its point. The natives of the Admiralty Islands have typical archaeolithic stone-heads glued to their lances; the Queensland Aborigines use still the unsymmetrical archaeolithe as a spear-head or a dagger, either with or without a handle, though a tendency to give the archaeolithe an intentional shape is apparent. In Western Australia the Aborigines use beautifully-finished spear-heads of palaeolithic type, but other weapons are unknown to them.

On the whole it appears that the substitution of the wooden point of the spear by a stone head was the first great invention that man made after he had for countless generations used a sharply-pointed piece of wood as spear.

It is therefore obvious that if such was the state of civilisation of archaeolithic man in Europe, nothing but the indestructible stone implements used by him was left behind. In fact, there is very little chance of discovering its bones, except in such cases when a lucky accident, such as a slip of rock or earth, prevented the corpse to be disposed of in the usual way. Otherwise the dead bodies were burnt, and the few fragments that remained of the larger bones soon crumbled to dust.

Considering that archaeolithic man burnt his dead, I have my gravest doubts whether the corpse of Homo Aurignacenis was really buried. The accounts of the discovery of the skeleton make another theory quite permissible. It may be possible that the skeleton belonged to a man, perhaps a kind of chief, who was lying sick in the cave; in order to make him more comfortable, a sort of hollow was scratched out in the ground, in which he rested in a half-sitting position. While his friends were away a portion of the roof fell in, and killed him. The

debris completely hid the body, thus preserving him for future generations. When his friends returned and found a heap of loose blocks instead of a live being they probably fled in superstitious terror. If the Aurignac race buried their dead, why have not any more skeletons been found? Even the Tasmanians had special burial grounds for the ashes away from the camping grounds, and it is, in my opinion, not very probable that the higher Aurignac race buried their corpses in their living grounds (caves). If the Aurignac race did bury their dead it would be more probable to assume that they had special burial grounds. On the whole, I think that all the circumstances point more towards an accident than towards an intentional burial. The discovery of the skeleton does certainly not prove that the Aurignac race was in the habit of burying their dead.

3. COMPARISON OF THE TRONATTA WITH THE ARCHAEOLITHIC IMPLEMENTS OF EUROPE (1).

The greatest authority on eolithic and archaeolithic implements, Dr. Rutot, has by his strenuous work fully cleared up the geological sequence of the different industries distinguished by him and others in Europe. In the following table I give his classification in a somewhat modified form, but it must be understood that the sequence of the different industries has not been altered.

We see from this table (pag. 9) that we know now two tertiary, one præ-glacial, and twelve glacial industries. Of these 15 industries only seven can be considered representing the archaeolithic stage, viz., the two tertiary, the two pliocene, and the three lower quarternary industries. Thanks to the generosity of Dr. Rutot and Professor Dr.

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(1) See also Rutot, Un grave probleme, Bull. Soc. Belge de Geol. Pal. Hyd., vol. xxi., 1907.

Verworn, I have a very instructive collection of specimens from the following industries:—

Upper Palaeolithic Stage.	9. Solutreen	Upper Quarternary		
Lower Palaeolithic Stage.	8. Mousterien	Middle Quarternary	Glacial Period	
	7. Acheuleen			
	6. Chelleen			
Archaeolithic Stage.	5. Mesvinien	Lower Quarternary		
	4. Mafflien			
	3. Reutelien			
	2. Cantalien	Tertiary		
	1. Fagnien			

As the Tasmanian tronatta represents the purest archaeolithic stage, we see that only the last five industries would come in for comparison. But the archaeolithic implement had a tough life; it was never quite discarded. We find archaeolithes among all the palaeolithic industries; in the Flenusien, as Dr. Rutot has shown, neolithic implements of the highest type were used simultaneously with archaeolithes of the crudest form. The use of the archaeolithe continued even to the metalliferous period. In Baluchistan I found archaeolithic knives side by side with well-finished arrow heads and celts of palaeolithic type, and a fine celt probably of copper. There can be no doubt that the archaeolithic implement is much quicker produced than a palaeolithic or a neolithic one. From this point of view it is quite intelligible why archaeolithic implements were still in use even when the stone industry had reached its highest perfection, and even in the earlier days of the metalliferous age. As already pointed out, the archaeolithic implement could not be perfected without losing its character, and we see, therefore, that the youngest archaeolithe is undistinguishable in form from the oldest one.

The oldest human industry was discovered by Dr. Rutot at Boncelles, in Belgium. The specimens he sent me from this locality are of a very crude type; yet it would be possible to find a match for each of them among the more primitive tronattas. A large number still retain the original crust, and it appears that in many cases a natural fragment was used without being previously split off a parent block. Others are, without doubt, flakes that were detached from a larger block, and a fine bulb of percus-

GEOLOGICAL STAGES.			SUB-INDUSTRIAL STAGES.		INDUST. STAGES		TASMANIA.
QUARTERNARY.	Upper	Post-Glacial Period	Magdalenien		Upper	PALAEOLITHIC STAGE	Separation of Tasmania from the Mainland Immigration of Aborigines Epoch of Gigantic Marsupials
			Solutreen				
			Aurignacien	Upper Middle Lower			
		4th Glacial Period (Wurmian)					Glaciation of Tasmania
	Middle	Last Inter-Glacial Period	Mousterien	Upper Middle Lower			
			Acheuleen II.		Lower		
		3rd Glacial Period (Rissian)	Acheuleen I.				
		Middle Inter-Glacial Period	Chelleen				
			Strepyien				
	Lower	2nd Glacial Period (Mindelian)	Mesvinien Mafflien Reutelien			ARCHAEOLITHIC STAGE	
TERTIARY.	Pliocene	1st Inter-Glacial Period	Saint-Prestien				
		1st Glacial Period (Gunzian)	Kentien				
	Miocene	Upper Middle Lower	Cantalien				
	Oligocene	Upper Middle Lower	Fagnien				

sion can be seen on several specimens. One specimen which has been determined by Dr. Rutot, "Percuteur tranchant," shows a fine smooth pollical face, and on the indical face the traces of misspent blows can be seen, exactly as they can be observed on numerous specimens from Tasmania.

The same remarks apply to the specimens from the Cantalien. In the collection from Puy de Boudieu the specimens attain considerable size and weight, though it is certain that, exactly as in the case of the tronatta, the implements of 4 ounces and under form far the majority. On the whole these specimens do not show a very careful treatment of the indical face. I am unable to give an explanation for this except the nature of the flint. The specimens from Puy de Boudieu were manufactured from rather thin, flattish pieces of flint, which by their nature had a pollical face, and, being comparatively thin, not much trimming of the indical face was required. A few specimens, and apparently mostly those that represent flakes detached from a larger piece, show a fair amount of trimming of the indical face.

If we now leave the tertiary and turn to the industries of the glacial period and those that immediately preceded it, I am unable to offer an opinion about the implements of the Kentien and Saint Prestien industries. To judge from the figures it appears, however, that River-drift implements already represent a much higher than the archaeolithic stage. The few archaeolithic implements found in England are probably of that kind that was used simultaneously with implements of a higher stage, and it almost appears that a true archaeolithic industry did not exist in Great Britain.

The oldest of the industries of the glacial period is the Reutelien, of Belgium. The implements of this industry are as crude as those of the earlier tertiary industries; there are, however, several specimens from Elouges showing a considerable amount of treatment of the indical face. Among the specimens belonging to this industry which Dr. Rutot kindly sent me are a number of rough and insignificant-looking pieces from Leval. I had not the slightest doubt that numerous scientists were not inclined to consider these specimens as treated by human beings; yet I could place side by side to every one of

them, a specimen from Tasmania. Though very insignificant looking, these specimens have been submitted to a good deal of hammering, but whether we consider them as actively or passively used matters very little. The main point is that they were used by human beings.

I have only a few specimens from the Mafflien industry, but a larger one from the Mesvinien, from the famous locality of Spiennes. The implements of that industry find their counterparts in the tronatta, though it seems that on the whole the treatment of the indical face never attained the high finish of some of the tronattas. The most interesting specimen is a rolled pebble of flint, probably a reject, which proves conclusively that the Messinien industry obtained some of the material from gravel deposits, exactly as the Tasmanian industry did. This ends the archaeolithic, or as Dr. Rutot says, the eolithic stage of the evolution of stone implements. The next stage, the Strepyien, is considered by Dr. Rutot as a passage stage between the archaeolithic and palaeolithic periods. It must, therefore, be of a particular interest, because its implements should exhibit the evolution of the unsymmetrical archaeolithic into the symmetrical palaeolithic. In the next higher stage, the Chelleen, there appear for the first time those peculiar implements of a amygdaloid form, roughly chipped on both faces; the difference between pollical face and indical face has disappeared. These implements have been styled "coups de poing," and have been considered as a kind of universal instrument. I agree, however, with Herr Klaatsch, that they have rather to be considered as spear heads. We have seen that the first weapon of primitive man was a wooden spear, and that in every probability the spear was the first human implement provided with a stone head. As it is pretty certain that the human beings of the Mesvinien stage used wooden spears only, it is very probable that those of the Chelleen stage, who already practised the bi-faced trimming of their implements, had also made the invention of providing the wooden spear with a stone head. This invention would in all probability have been made during the Strepyien stage—that is to say, at the beginning of the middle quarternay—the Campinien stage in Belgium, towards the end of the second interglacial period in Europe.

During this period for the first time stone was used in the manufacture of arms, while in all the preceding industries its use had been restricted for domestic—sit venia verbo—purposes.

The archaeolithic implements of the Chelleen, as well as the Acheuleen and Mousterien, do not differ in any way from the tronattas, but it is unquestionable that the indical face shows a much more careful treatment.

During the Mousterien stage the spear heads were very carefully finished, and these implements prove that the human beings of the period had already attained a great skill in the treatment of stone—a skill that far exceeded that of archaeolithic man.

And now we come to a very grave problem. The homo mousteriensis Hauseri that has been unearthed at La Chapelle-aux-saints, in France, with a beautifully finished specimen of a coup-de-poing under his left hand, must have been, as his skull conclusively proves, of a much lower type than the Tasmanian race, yet this being used an implement of a much higher type than the Tasmanian, and had in all probability already learnt to provide his spear with a stone head. It is impossible for me to find a satisfactory explanation of these apparently contradictory facts; yet there is no getting away from the fact that the lower developed Mousterien man manufactured implements of a much higher stage than the higher developed Tasmanian, and that the former had already made two inventions which the higher developed Tasmanian never made, viz., the trimming of the implement on both faces, and the providing of the wooden spear with a stone head.

Even if we were to disregard the interpretation of the coup-de-poing as spear head, the fact that this implement denotes a higher stage in the evolution of stone implements than the tronatta remains undisputable. Likewise, the fact that the homo mousteriensis Hauseri represented a much lower type in the evolution of human beings than the Tasmanian race cannot be disputed either.

I think that this is a problem of the gravest kind, inasmuch as it would indicate that though the body can gradually evolve a higher stage, the brain power did not evolve as a corollary. The brain power of the Tasmanian Aborigines still represented the stage of say the human

being of the Fagnien period, though his body was in evolution equal to the human beings of the Magdalenien or even a later period. Could we accept the theory that evolution of body does not necessarily go hand in hand with the evolution of brain—and I see no way out of it in face of the above facts—the problem of the evolution of the human race would appear in quite a new light. What agency was it that reacted on the brain of a race still lower than the homo mousteriensis Hauseri to make inventions that the much higher developed Tasmanian could never make; he practically stood at the threshold of the door, but never took the step to enter it.

It cannot be the insular isolation alone that prevented a higher evolution of the Tasmanian race. If the struggle for existence were really the moving agency, the Tasmanians should have reached a much higher stage. Their life was a pretty precarious one; during the winter time the temperature was pretty cold; food was not over common—at least it took a good deal of work to procure the necessary supplies; there were frequent feuds between the different tribes. All this created a hard struggle for existence; yet we do not see that the intelligence of the race made the slightest step forward.

I do not quite see that it can have been the ice, as some scientists assume, that is responsible for the evolution of the human race. For an almost immeasurable time—that is to say from the oligocene past the second glacial period, the evolution of the human beings remained stationary at the archaeolithic stage. There is no difference between an implement from the Mesvinien or the Fagnien industries. Then suddenly an impetus was given right between two glacial periods, and ever since that impetus was given the evolution of the stone implements progressed—slowly at first, but quicker and quicker afterwards.

The Aurignacien industry produced certain kinds of implements, rather long and narrow, that appear characteristic of it. The exact counterpart of these knives occurs among the tronattas. I have in my collection some fine specimens which are absolutely undistinguishable in shape and finish from Aurignacien specimens. The next stage—the Solutreen—which is characterised

by the beautiful leaf-shaped implements, gives still numerous archaeolithic implements, but it would go too far to follow them through the more modern stages.

We see, therefore, that archaeolithic implements are not restricted to the oldest industries only; they occur at all periods; even at the early metalliferous period they were still used. But the difference is this, that while the older industries up to the Mesvinien exclusively used the unsymmetrical archaeolithic, the younger industries, from the Strepyien upwards, used the symmetrical palaeolithe in preference to the archaeolithe. It is probably correct to assume that as little as the archaeolithe changed its character, equally little were the manipulations for which it was used changed. The archaeolithe was still used as a scraper, chopper, or knife, but it was, with very few exceptions, never used as a weapon. The symmetrical palaeolithe, of intentional shape, was the weapon.

These facts seem to indicate that Mortillet's system is untenable, because forms that are considered characteristic for the different stages occur simultaneously in Tasmania or the Australian continent. Yet it is quite certain that such a view would be erroneous. The stages distinguished in Europe are based on well ascertained geological and palaeontological evidence, and in Australia we must discriminate between two stages at least, viz.—

The older—archaeolithic stage without the dingo;

The younger—palaeolithic-neolithic stage with the dingo.

To mix up the European stages would be quite as erroneous as to mix up the two Australian stages, as advocated by Herr Klaatsch. All these stages are chronologically different, and must be kept separate.

Similarity of form does not necessarily prove synchronism. If this were so the Tasmanian civilisation would be synchronogical to the Fagien, or the Aurignacien—in fact to any stage in which archaeolithes were used. Unless corroborated by other evidence, stratigraphical or palaeontological, the age of an industry cannot be deduced from form alone, a fact which has not been generally recognised, but which is conclusively proved by the Tasmanian tronattas.