PREHISTORIC TOOLS.

The Study of Stone-Working Techniques.

One of the objectives of Prehistoric Archaeology is the study of the stone tools worked by prehistoric man. In order to understand clearly how one has manufactured these tools, which are found during the course of scientific excavations - an example of which we see here - the best approach is to try to reproduce them. In order to do this, it is necessary to adhere to the fundamental rule: only employ those raw materials which were at the disposal of the prehistoric artisans. Thus one puts oneself in the place of those who, having disappeared some millenia ago, have produced a scraper, a biface or an arrowhead. One can then discover how the latter have been manufactured, and judge, by comparing ones own results with the authentic pieces, what is intentional and what is accidental. We have learned much from experimentation, and we will still learn much more if the latter is done as it should be, with a completely scientific objective.

Following on that, some rare prehistorians, among whom one must cite Professor François Bordes and Mr. Donald Crabtree, have been chosen to show you how we imagine the manufacture of a small number of characteristic tools was done.

We will progress through the prehistoric interval of time from the simple to the complex, from the oldest to the most recent.

Hit two pebbles against one another and thus remove some flakes in order to obtain a sharp cutting edge. Such is the first act in the manufacture of a tool. During some hundreds of millenia this was the only technique known to the Australopithecines, those beings who were higher than apes, but not yet completely men.

The use of a simple water-rolled pebble as a hammer, as we see here, was prolonged throughout prehistoric time.

Then, during the Lower Palaeolithic, the Pithecanthropines knew how to manufacture what one formerly called "coups-de-poings", which one now calls "bifaces" - the most characteristic and abundant tools of that period. They are called bifaces, because in referring to a natural block or a large flake of hard rock, the artisan "sculpted" the piece by removing flakes on the two faces with a water-rolled pebble, which we call a hammer-stone. The block, here a nodule of flint, was trimmed down and then its general form was regularised.

Perhaps 400,000 years ago one of the greatest inventions of prehistoric man took place. He discovered that by utilising certain materials that were much less hard than flint, for example, bone, ivory, Deer or Reindeer antler, or even hard wood such as box-wood as a hammer [redacted], one could remove thinner flakes, thereby making it possible to go further than was possible with a true hammer-stone, and thus obtain finer, thinner and more evenly balanced bifaces. Here I am employing a Reindeer antler to produce the biface rounded out with a hammer-stone. It is the left hand which, by holding the piece at different angles, prepares it to receive hammer blows in accordance with the desired angle.

The edges are finally regularised by small blows, and thus one can note that not much time is necessary to complete these operations.

All the flakes detached from a block of flint during the manufacture of a biface do not consist of waste material. A good number of these flakes could either be utilized or transformed into tools. On the other hand, such material could be obtained purposely up to the point when the block or nucleus became unusable and was abandonned.

A detailed examination will permit one to reconstruct the order in which these flakes, scattered about in a workshop , were struck off. Thus one can thereby deduce the methods employed by each population during the different prehistoric periods.

A cutting edge is fragile. By retouching it (here with a Reindeer antler hammer) one can obtain a scraper, which is an extremely frequent tool at Middle Palaeolithic sites during the epoch of Neanderthal man.

It scarcely takes more time to retouch a flake in order to fashion it into the form of a point.
When hafted, this point can become a formidable hunting weapon.

On a nucleus of elongated form, one may detach, along the ridges left by previous removals, long slender flakes with parallel edges, called blades. These were in vogue for a long time, from the thirty-fifth to the tenth millenia B.C., that is, during the Upper Palaeolithic, the first period of Homo sapiens.

Following their detachment, these blades were transformed into

end-scrapers, burins, perforators, or into other tools.

To obtain an end-of-blade scraper one can, for example, strike directly on a blade, the extremity of which is resting on an anvil, in such a manner as to retouch it by blows on the bulbar surface.

In order to manufacture one of the numerous varieties of burins, it is sufficient, after having prepared a truncation on one extremity of the blade, to remove along the edge of this piece a small, very slender spall. At the point where the latter intersects the truncation, a very resistant cutting edge is produced by a well-directed blow.

On the screen, the small, very slender spall is shown together with the manufactured burin which we have just seen.

Burins can be utilized in several ways. The two most likely being (a) engraving or working a Reindeer antler by deepening a line by using the cutting edge of the burin; and (b) scraping -- shaping the same Reindeer antler, a technique proved by traces of use on the prehistoric burins, as Professor Bordes has demonstrated.

I have employed another retouching technique to produce an example of a perforator. The extremity of the blade is pressed against a Reindeer antler in such a manner as to "decape" a small, very sharp spine.

The hardness of flint (which, let us not forget, scratches glass)

permits one easily to pierce a skin.

By employing a nucleus of obsidian (which is a volcanic glass), an original method for obtaining long, regular blades is the one used by the Aztecs and rediscovered by Donald Crabtree. A point of bone or ivory is fixed to the extremity of a crutch and set on the edge of the nucleus, which is solidly held between two planks.

In the fraction of a second, imperceptible to the eye, an obsidian blade is thus removed, detached by a sudden pushing down on the crutch by the chest.

Already present in certain Upper Palaeolithic cultures, especially in North Africa and Spain, arrow heads that are finely worked on both faces become very numerous in the Neolithic, particularly in the Algerian portion of the Sahara. They exhibit an infinite number of forms and have been manufactured from very varied materials, often pleasing to the eye, such as yellow jasper.

Each application of pressure properly directed on the tool, held in the right hand, detaches a very thin flake, which little by little "sculpts" the point. The leather is only there to protect the left hand.

The knife tang and the barbs are then "dressed" on each face, by turning the piece and re-turning it again.

During several all too short instants in comparison with the two million years of prehistoric time, we have thus been able to find again the technological actions of the prehistoric men. Now we must compare the tools which we have reproduced with authentic pieces, in order to judge our results.

I - Alongside an authentic worked pebble coming from Morocco, is the one which you have seen manufactured.

II -Here is a biface produced at St. Acheul in the Somme Valley some two hundred thousand years ago, and the one manufactured a few moments ago.

III - The side-scraper which I have just worked, and a Mousterian example found in the department of Charente.

IV - The end-of-blade scraper is here compared with an authentic piece.

V - On the right, the burin which has just been made, and on the left the same type of tool coming from the excavations which you have seen, and their two characteristic small spalls, which are only by-products in the manufacture of these tools.

VI - Two of the obsidian flakes which you have seen detached with the crutch, together with the nucleus.

VII - The arrowhead of yellow jasper is very similar to the one made some five thousand years ago in the Central Sahara.

After having attempted to rediscover a little of the daily life of our distant ancestors, we can but admire the ingenious techniques

which permitted them to survive — techniques sometimes accompanied by a remarkable sense of the aesthetic.