of the northern ocean, as is volcanic *débris*, but that the chief portion of the material consists of the solid matter carried out to sea by drift-ice and glacial rivers.

M. E. WADSWORTH.

THE NATURAL HISTORY OF IMPLEMENTS.[1]

"WHEN will hearing be like seeing?" says the Persian proverb. Words of description will never give the grasp that the mind takes through actual sight and handling of objects; and this is why, in fixing and forming ideas of civilization, a museum is so necessary. One understands the function of such a museum the better for knowing how the remarkable collection formed by Gen. Pitt-Rivers came into existence. About 1851 its collector, then Col. Lane Fox, was serving on a military sub-committee to examine improvements in small arms. In those days the British army was still armed (except special riflemen) with the old smooth-bore percussion musket, the well-known 'Brown Bess.' The improved weapons of continental armies had brought on the question of reform; but the task of this committee of juniors to press changes on the heads of the service was not an easy one, even when the Duke of Wellington, at last convinced by actual trial at the butts, decreed that he would have every man in the army armed with a rifle-musket. Col. Fox was no mere theorist, but a practical man, who knew what to do and how to do it; and his place in the history of the destructive machinery of war is marked by his having been the originator and first instructor of the School of musketry at Hythe. While engaged in this work of improving weapons, his experience led his thoughts into a new channel. It was forced upon him that stubbornly fixed military habit could not accept progress by leaps and bounds, only by small partial changes, an alteration of the form of the bullet here, then a slight change in the grooving of the barrel; and so on, till a succession of these small changes gradually transformed a weapon of low organization into a higher one, while the disappearance of the intermediate steps, as they were superseded, left apparent gaps in the stages of the invention, — gaps which those who had followed its actual course knew to have been really filled up by a series of intermediate stages. These stages Col. Lane Fox collected and arranged in their actual order of development, and thereupon there grew up in his mind the idea that such had been the general course of development of arts among mankind. He set himself to collect weapons and other implements till the walls of his house were covered from cellar to attic with series of spears, boomerangs, bows, and other instruments, so grouped as to show the probable history of their development. After a while this expanded far beyond the limits of a private collection, and grew into his museum. There the student may observe in the actual specimens the transitions by which the parrying-stick, used in Australia and elsewhere to ward off spears, must have passed into the shield. It is remarkable that one of the forms of shield which lasted on latest into modern times had not passed into a mere screen, but was still, so to speak, fenced with. This was the target carried by the Highland regiments in the low countries in 1747. In this museum, again, are shown the series of changes through which the rudest protection of the warrior by the hides of animals led on to elaborate suits of plate and chain armor. The principles which are true of the development of weapons are not less applicable to peaceful instruments, whose history is illustrated in this collection. It is seen how (as was pointed out by the late Carl Engel) the primitive stringed instrument was the hunter's bow, furnished afterwards with a gourd to strengthen the tone by resonance, till at last the hollow resonator came to be formed in the body of the instrument, as in the harp or violin. Thus the hookah or nargileh still keeps something of the shape of the cocoanut-shell, from which it was originally made, and is still called after (Persian, *nárjíl* = cocoanut). But why describe more of these lines of development when the very point of the argument is that verbal description fails to do them justice, and that really to understand them they ought to be followed in the series of actual specimens? All who have been initiated into the principle of development or modified sequence know how admirable a training the study of these tangible things is for the study of other branches of human history, where intermediate stages have more often disappeared, and therefore trained skill and judgment are the more needed to guide the imagination of the student in reconstructing the course along which art and science, morals and government, have moved since they began, and will continue to move in the future.

[1] Extract from a lecture on anthropology, delivered Feb. 21, at the University museum, Oxford, by E. B. TYLOR, D.C.L., F.R.S. From *Nature* of May 17.

THE INTELLIGENCE OF THE AMERICAN TURRET SPIDER.

AT the meeting of the Academy of natural sciences of Philadelphia, June 19, Rev. Henry C. McCook exhibited nests of Tarentula arenicola Scudder, — a species of ground spider of the family Lycosidae, properly known as the turret spider. The nests in natural site are surmounted by structures which quite closely resemble miniature old-fashioned chimneys composed of mud and crossed sticks, as seen in the log cabins of pioneer settlers. From half an inch to one inch of the tube projects above ground, while it extends straight downward twelve or more inches into the earth. The projecting portion, or turret, is in the form of a pentagon, more or less regular, and is built up of bits of grass, stalks of straw, small twigs, etc., laid across each other at the corners. The upper or projecting parts have a thin lining of silk. Taking its position just inside the watch-tower, the spider leaps out, and captures such insects as may come in its way. Nests had been found at the base of the Alleghany Mountains