

sharpened stones, or shells, or bones, how the stone axes and arrow-heads found buried in the ground prove that in every great district of the world a Stone Age has prevailed at some more or less remote period; and lastly, how recent geological researches have displayed to us the traces of a Stone Age extraordinarily low and rude in character, and belonging to a time as extraordinarily remote in antiquity. The history of man, as thus told by a study of the implements he has used, is the history of an upward development, not indeed a gradual steady progress of each family or tribe, but a general succession of higher processes to lower ones.

Now there also exists evidence, by means of which it is possible still to trace, in the history of man's mental condition, an upward progress, a succession of higher intellectual processes and opinions to lower ones. This movement has accompanied his progress in the material arts during a long but undefined period of his life upon the earth; and of this evidence, and of the lines of argument that may be drawn through it, the object of the present discourse is to give a few illustrative examples.

I. In the first place, the *art of counting* may be examined from this point of view. We ourselves learned to count when we were children, by the aid of a series of words, *one, two, three, four*, and so on, which we were taught to associate with certain numbers, 1, 2, 3, 4, and can thus reckon up to the largest imaginable number, and down to the smallest imaginable fraction. But if we look round among other tribes of men we find a very different state of things. As we go lower in the scale of civilization, it becomes easier and easier to puzzle a man with the counting of 20 objects, or even of 10, and to drive him to the use of nature's counting machine, his fingers. When we reach the low level of the savages of the Brazilian forest or of Australia, we find people to whom 3 or 4 are large numbers. One tribe described by Mr. Oldfield, reckoned *one, two*, and then *bool-tha*, "many;" but when their poor word-language fails them they fall back on gesture-reckoning. Mr. Oldfield tells us, for instance, how he got from a native the number of men killed in a certain fight. The man began to think over the names, taking a finger for each, and thus, after many unsuccessful trials, he at last brought out the result by holding up his hand three times, to show that the number was 15.

Now our words, *one, two, three, four, &c.*, have no etymology to us, but among a large proportion of the lower races numerals have a meaning; as among many tribes of North and South America and West Africa are found such expressions as, for 5, "a whole hand," and for 6, "one to the other hand;" 10, "both hands," and 11, "one to the foot;" 20, "one Indian;" and 21, "one to the hands of the other Indian;" or for 11, "foot 1;" for 12, "foot 2;" for 20, "a person is finished;" whilst among the miserable natives of Van Dieman's Land, the reckoning of a single hand, viz 5 is called *puganna*, "a man."

For displaying to us the picture of the savage counting on his fingers, and being struck with the idea that if he describes in words his gestures of reckoning, these words will become a numeral, perhaps no language approaches the Zulu. Counting on his fingers, he begins always with the little finger of his left hand, and thus reaching 5, he calls it "a whole hand;" for 6, he translates the appropriate gesture, calling it *tatisitupa*, "take the thumb," while 7, being shown in gesture by the forefinger, and this finger being used to point with, the verb *komba*, "to point," comes to serve as a numeral expression, denoting 7.

Now, though many numerals, especially fives, tens, and twenties, were named from the fingers, hands and feet, this is far from being the only source of numerals. Many centuries ago, the Hindu scholars, besides their regular series, made a new set of words to serve as a sort of *memoria technica* for remembering dates, &c. Thus, for 1 they said "earth" or "moon;" for 2 "eye," or "arm," or "wing;" for 3, "Rama," or "fire," or "quality"—there being considered to be 3 Ramas, 3 kinds of fire, 3 gunas or qualities; for 4 "age" or "veda" because there are 4 ages and 4 vedas. One line of an astronomical formula will show the working of the system:

vahni tri rtwishu gunendu kritagnibhâta:

That is to say:

"Fire, three, season, arrow, quality, moon, four of dice, fire element."

That is 3 3 6 5 3 1 4 3 5.

When Wilhelm von Humboldt, more than 30 years ago, looked into this artificial system of numeration, it struck him that he had before him a key to the general formation of numerals. When a Malay, he said, calls 5 *lima*, that is, "hand," he is doing the same thing that the Hindu pandits did when they took "wing" as the numeral for 2; and then, he suggested, the numeral words having thus been once made, the sooner their original meaning was got rid of and they were reduced to the appearance of mere unmeaning symbols, the better it would be for their practical use in language. Now a number of actual facts may be brought forward in support of Humboldt's far-sighted suggestion. The Abipones of South America counted to 3, and for 4 said "ostrich toes," from the division of their ostrich's feet; then, for 5, "one hand;" for 10, "two hands," and so on. In Polynesia there is a regular set of decimal numerals, but sometimes, for superstitious reasons, they turn words out of their language for a time, and have to use fresh ones. Thus, in Tahiti, they ejected *rua* 2, and *rima* 5; and in a missionary translation of the Bible we find *piti* and *pae* instead; now *piti*, the new word for 2, means "together," and *pae*, new word for 5, means "side."

In other South Sea islands, the habit of counting fish or fruit one in each hand has led to *tauna*, "a pair," becoming a numeral equivalent for 2; the habit of tying bread fruit in knots of 4 has made a new numeral, *pono*, "a knot," while other terms for 10 and 100 have had their origin from words meaning "bunch" and "bundle." And so, even in European languages, numeral words break out from time to time, ready to become proper numbers, should a vacancy be made for them in the now meaningless series, *one, two, three, four*. Thus in English we have *pair* or *couple* for 2, and *score*, that is "notch," for 20. The Letts count crabs and little fish by throwing them 3 at a time, and thus the word *mettens*, "a throw," has come to mean 3, and so in many other cases in other languages.

Now when tribes count by saying *hand* for 5, *take the thumb* for 6, *half a man* for 10, and so on, it is evident that the basis of their numeration is finger counting. But there is also evidence in the systems of numeration of most civilized languages that they, too, are the successors of a rude unspoken system of gesture counting. The rule of the whole world is to count by fives, tens and twenties; the exceptions are so late or so incidental that we may neglect them and say that the original counting of mankind is the quinary, the decimal, or the vigesimal system, or a combination of these. We need not go abroad for examples. In the Roman numerals, which count to V, and then begin again VI, VII, we have the quinary system. The decimal system is our familiar one. And when we speak of "threescore and ten," "fourscore and thirteen," we are counting by the vigesimal system, each "score" or notch, thus ideally made, standing for 20, for "one man," as a Mexican or Carib would put it. It is a very curious thing that both we and the French, having two good decimal systems of our own, should have run off into vigesimalism. Why should we have ever said "fourscore and thirteen" for the 93, which we have good Saxon tens to express? and why should they say in France, "quatre-vingt-treize," instead of holding to the Latin original of their language, and saying "nonante-trois?" The reason seems to be that counting by scores is a strongly marked Keltic characteristic, found in Welsh, Irish, Gaelic, and Breton, and has been taken up into the alien numeral systems of France and England. At any rate, the rule of the world is to count by fives, tens, and twenties; and the connection of this rule with the practice of counting on the fingers and toes will hardly be disputed. Indeed the remark has often been made that the fact of our having 10 fingers and 10 toes has led us into a system which is actually not the best; while if we had had 6 fingers on each hand, and 6 toes on each foot, we should probably have taken