

on such strictly abstract mathematical principles.

Now, to most of us the fact that two and two make four has been so familiar an idea from childhood upward, that we can hardly realize its true abstractness and its immense philosophical and mathematical value. But the poor heathen of Mr. Galton's story knew better: he saw that there was profound reasoning involved in it—reasoning utterly beyond the level of his uncultivated South African intelligence. That two apples and two apples make four apples, that two sheep and two sheep make four sheep, that two men and two men make four men—those are mere matters of individual experience, which any man at any time can settle for himself experimentally upon his own ten fingers. But that two and two make four—that is an abstraction from innumerable instances, containing within itself the root and basis of all subsequent mathematical science. The man who first definitely said to himself, Two and two make four, was a prehistoric Newton, a mute, inglorious, and doubtless very black-skinned but intelligent Laplace.

For just look at the extreme abstractness of the problem laid before the Damara's mind when the over-educated European calmly asked him to accept four cakes of tobacco, all in a lump, as proper payment for two individual sheep, severally valued at two cakes apiece. It is in reality a sum in proportion: "If one sheep is worth two cakes of tobacco, what will be the value of two sheep?" And the Damara had never been to school, or learned from Mr. Barnard Smith's arithmetic the right way to work a rule-of-three sum. It all looks so easy to us because we know the trick already. But how did we come to learn the trick? That is the real question. How did the white European and his ancestors manage to get so far ahead

in counting of the unsophisticated heathen Damara?

I don't know how far the Damaras themselves can count, but the Chiquitos of America, a very low Indian tribe, couldn't count beyond one; for any larger sum than that, their simple language used terms of comparison alone—as many as one's eyes, as many as a crow's toes, as many as the fingers on one hand, and so forth up to six or seven. The Tasmanians could get as far as two: beyond that they stopped short; their simple scheme of numeration was merely this: one, two, a great many. The Australian black-fellows in Queensland go a step further: they reckon thus: "one, two, two-one (3), two-two (4);" and after that they say, "more than two-two," meaning thereby an indefinite number. One South African tribe easily beats this rudimentary record, and knows how to count up to ten. But eleven, or both hands and one over, it regards as the *ne plus ultra* of human computation. When a British detachment once marched against it, the scouts brought in word to the elders of the tribe that an immense army was coming to fight them—"an immense army; eleven white soldiers!"

On the other hand, some savages have really very advanced systems of numeration; for example, the Tongans, whose native numerals go up as far as one hundred thousand. Even this degree of proficiency, however, did not quite satisfy the devouring mathematical passion of Labillardière, who asked them what they called ten times that number, and so on, until he had finally made them give him names for all the subsequent decimal stages up even to one thousand billions. The polite Tongans, anxious to oblige a benevolent and generous scientific gentleman in so unimportant a matter, proceeded at once to supply him with words, which the unsuspect-