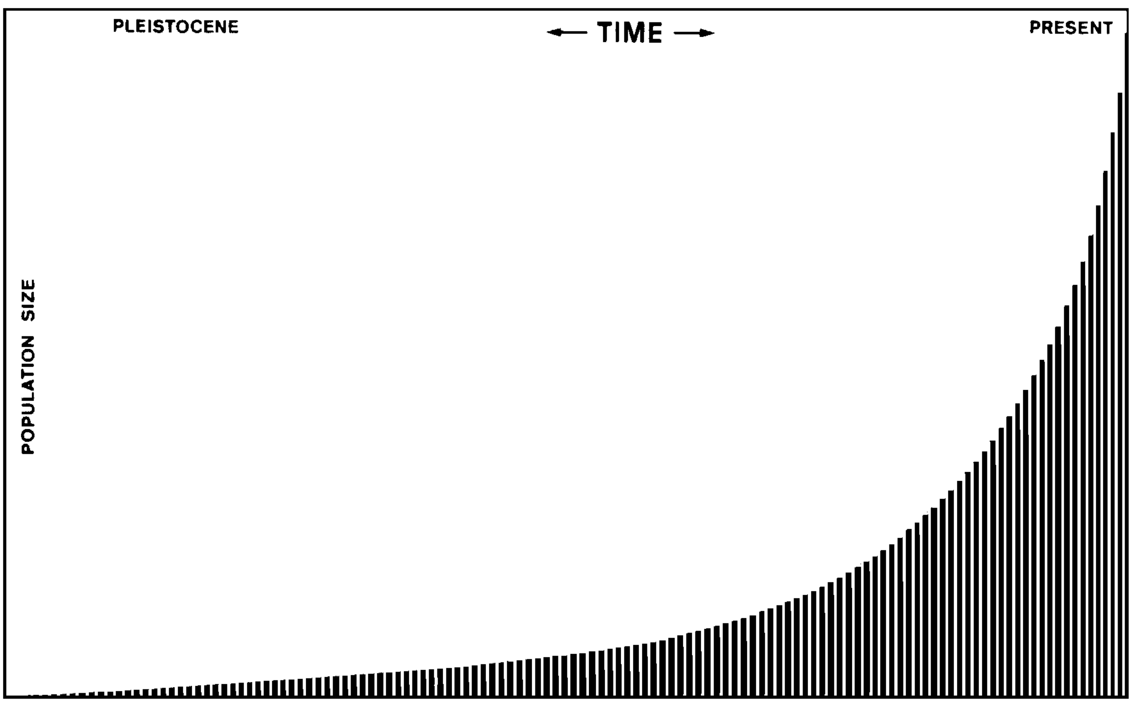
Taphonomic logic for dummies

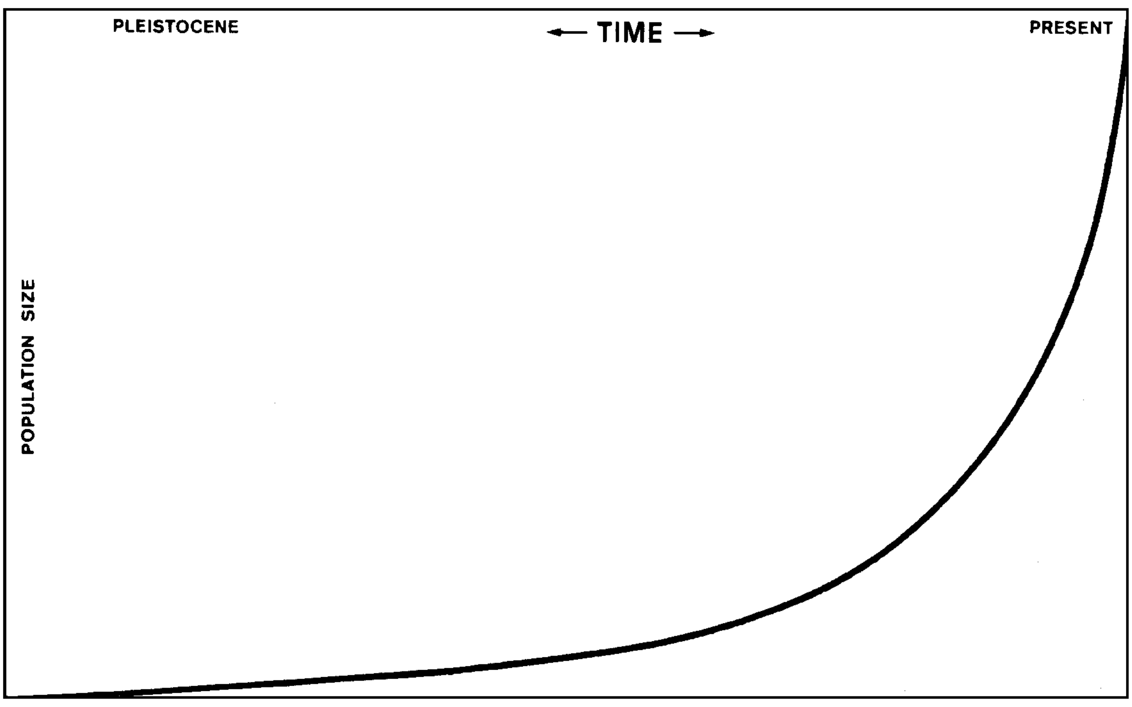
If you have a serious interest in archaeology, the 10 minutes it will take you to work through this primer will be most useful. After all, understanding archaeology is impossible without understanding taphonomic logic. And bearing in mind that most archaeologists don't understand it this will put you in front.

Don't be put off by that term "taphonomic", ignore it and focus on the "logic": this is about seeing so-called archaeological data from a perspective of better understanding than archaeology has been able to provide in a couple of centuries. And it is easy to acquire, as you will demonstrate in the next minutes.

Let's start by thinking of a type of artefact one might find in archaeological work, say, beads for example. Beads have been made and used by people for many millennia, initially perhaps not as often as later. If we were to depict the entire production of beads through time as a graph, we could draw a rectangle. Its abscissa (x-axis, the horizontal dimension) represents time, with the beginning of bead making at the left, the present time on the right. On the ordinate (y-axis, the vertical dimension) we indicate number of beads made during each time interval or time unit, be it a year, a century, a millennium, or whatever time period. We would end up with a histogram that might look something like this:



The height of each bar indicates the number of beads made in a particular time unit. We might simplify this depiction by drawing a line, a curve, along the top of the bars:



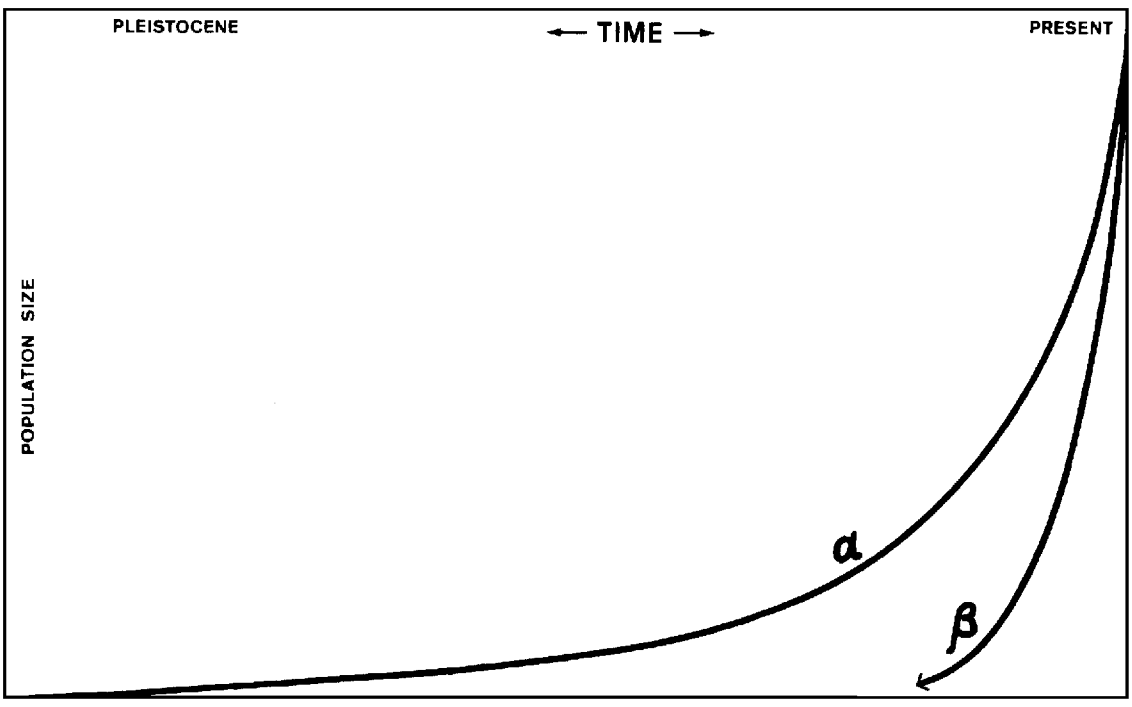
This means not only that each vertical line under the curve, each ordinate, indicates the number of beads made at that particular point in time, it also means that the area beneath the curve represents the total number of beads ever made and used by people. In this curve I have suggested that beads were initially made rarely, perhaps by few people, but more commonly later, especially as the population of the world increased with time. This is a probably realistic scenario in the case of beads, but if we substituted some other type of artefact, the curve would look very different. For instance we could imagine a type of artefact whose production remained perfectly stable (a straight line), or one whose production declined after a peak (spear throwers, for instance, might have declined in numbers after the introduction of the bow and arrow).

So it can be generalised that each type of artefact (or "phenomenon category", a more scientific definition) will have a characteristic shape of curve, depending on its use or popularity through time. But in all cases, the area below this curve, which I shall call alpha curve, represents the total number of specimens of the phenomenon category.

If you have followed this far, you are half-way to understanding taphonomic logic. Now comes the more interesting part. We all know that not all of these beads (or whatever phenomenon category) from the human history survived to the present time. In fact, most probably didn't. On the other hand, all of those that were made just very recently, say yesterday or during the last year, have survived. So if we were to draw a second curve that indicates the surviving population of archaeological beads, it would have to commence from the very same end point.

But what would it do beyond that point? Well, for one thing it can never be above the alpha curve, because logic tells us that there cannot be more surviving beads from any time unit than were actually made during that period. Clearly the loss of beads through natural attrition of one kind or another means that this second curve, which I shall call beta, must be below the first. Indeed, quite well below. But where precisely should it be relative to alpha?

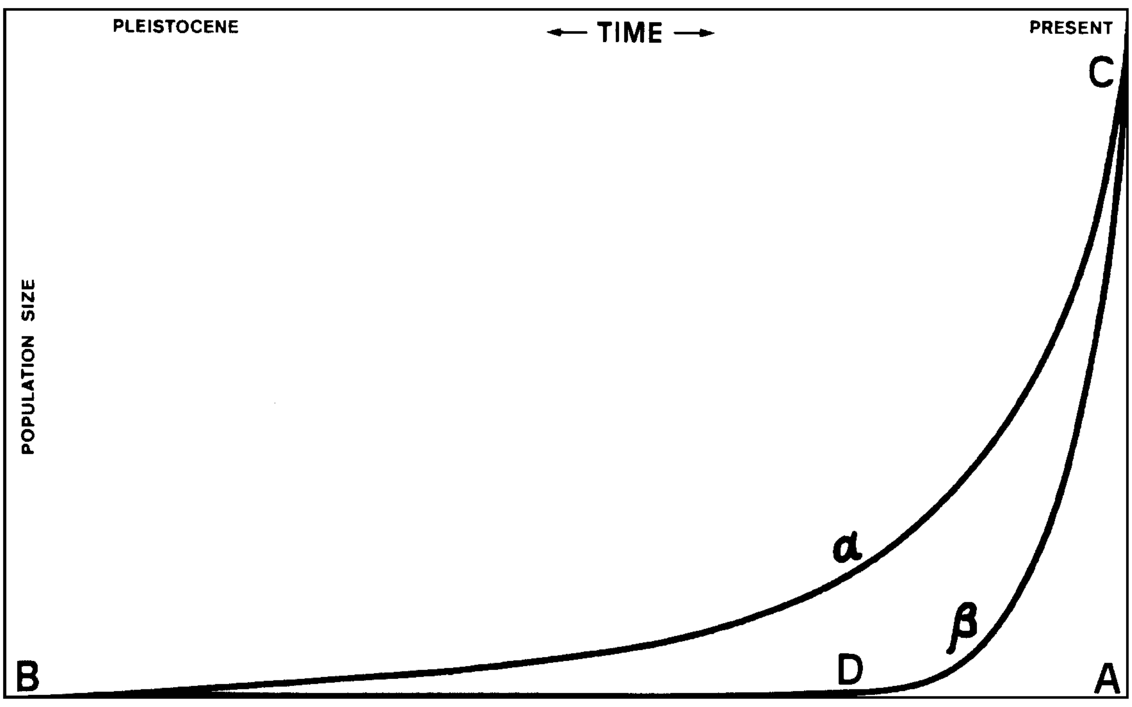
Let's say we experience a loss of 10% of beads in one time unit, which may be a century or a millennium or whatever. So in two time units we should lose something like twice as many beads, and so on, until after ten time units, pretty well the entire population of beads of that time period ought to have vanished.



But hang on, what does this really mean? Does it mean that there must be a cut-off point at which there can be no older evidence of the phenomenon category?

Fortunately not, because there is a second force shaping the beta curve. While on the one hand the “preservation bias”, which reduces the number of surviving specimens as we proceed back in time, forces the beta curve progressively further away from the alpha curve, this second force, called the “equilibrium bias”, prevents it from touching the bottom line, the zero-population abscissa. This is because as the remaining evidence gets older, the percentage of loss per time unit decreases as the specimens experience improved equilibrium conditions with their environment. Or it could be simply stated that the probability of survival can never be nil: even a snowman built by a Neanderthal has a chance of surviving to the present day, although the probability of that happening would be ridiculously small. But it cannot be zero, for any material evidence of any archaeological event that ever took place.

So how does the beta curve then behave? After initially being forced away further and further from the alpha curve as it proceeds back through time, the “repelling” force of the zero line (the bottom abscissa) increases its effect gradually. As the curve tries to approach the abscissa, it must form a parabola, and at some point the repelling force of the abscissa overcomes the effect of the preservation bias, forcing the curve to flatten out and to remain hovering just above the abscissa for the rest of the time. It finally joins the alpha curve near point B, when beads were first made. The crucial point where there occurs a distinct kink in the beta curve is called the “taphonomic threshold”.



The time between this taphonomic threshold D and the moment the production of beads actually commenced (B) is called the “taphonomic time lag”. During this time, beads were obviously made, but none or almost none can have survived. The number of surviving specimens must be so low that archaeology would be either incapable of detecting them, or if it did it would reject them as stray occurrences, as intrusive, or as “running ahead of time” (this last, particularly silly way of explaining evidence away was actually used).

If we now sit back and let the effects of this realisation sink in, two things will begin to dawn on us. First, there must be a period of time preceding the accepted duration of each type of artefact during which the item was in use, but from which such evidence should be lacking. Second, this effect must become progressively greater, so further we go back in time.

So how great is this effect of truncating the archaeological record. This is where a great shock awaits us: it is very much greater than archaeology can accept without losing all credibility. Let’s take an example where we have figures. The oldest hard evidence we have of navigation is about 8500 years old (paddles and boat parts). But we know that people crossed the sea to colonise several islands at least 850,000 years ago. In this case, the taphonomic lag time is a full 99% of the duration of the phenomenon category (watercraft). This is one of the few cases where indirect evidence is available, for most phenomenon categories (textiles, leather, cordage - indeed most archaeological material evidence) no such indirect evidence is possible. But when we consider the large contribution of perishable materials it becomes obvious that for most classes of material evidence, the taphonomic lag time must be in the order of 98% or 99% and even higher.

Not only have archaeologists completely ignored that for most evidence types, no evidence should be expected, and its absence proves nothing. More fatally, when very rare examples of evidence were found, they tried to explain them away, instead of appreciating that the rare survivor from a category’s lag time is the most valuable archaeological evidence there is. So Pleistocene archaeology has created a human history that must be expected to be largely wrong. It has taken the infinitesimal fraction of one percent of surviving evidence and treated it as representative. It has invented start times for specific phenomena, like beads or boats or clothing or language that must all, without exception, be wrong. It has produced a mythology about the distant human past that must be expected to be largely false. It has failed completely in what it has set out to do.

Next time you meet archaeologists you can strike fear and terror in their hearts: simply tell them that taphonomic logic proves that most of their explanations of the human past, particularly that of the Ice Ages, are in all probability humbug. If they try to contradict you it means that they don’t understand the issue, simply challenge them to explain taphonomic logic. Don’t be deterred by being seen as a spoilsport: archaeologists deserve everything they have coming, they have had an easy ride for long enough and they have treated their own discipline with contempt for two centuries. Ask Boucher de Perthes, ask Johann Fuhlrott, ask de Sautuola, or Dubois, or Marshack, or anyone else who tried to correct them, and thus became the object of their contempt.

Robert G. Bednarik