50,000 To 1 = Earth

So far back as we can trace it, we may conjecture the past history of our earth to have been somewhat as follows. Some millions of years ago the atoms of which the earth and all the contents of the earth, including our bodies, are made, formed an infinitesimal fraction of a huge nebular mass, which . . . . assumed the form of a spiral nebula. This ultimately broke up, throwing off stars much as a "Catherine wheel" firework throws off sparks. One of these formed our sun, then a giant star of far greater size and magnificence than now. As the result of millions of millions of years of emission of radiation our sun has shrunk to his present moderate dimensions. Sometime during this span of millions of millions of years a wandering star came so close that our sun, unable to stand the intense tidal forces generated, broke into pieces, and out of the debris our earth and moon, as well as all the other planets and their satellites, were formed.

It is not the normal fate of a star to be broken up in this way, so that we cannot suppose every star to have our sun's accompaniment of planets. If we simplify the problem by supposing that every star is and always has been precisely like what our sun now is, and that all the stars have always been arranged and have always moved similarly to our sun's present neighbors, then there are odds of about 50,000 to 1 against a star meeting the fate of our sun in a lifetime of 6 million million years. But this calculation greatly overestimates the odds. A star is far more liable to be broken up when it is in the earlier and more tenuous stages of its existence than when it is as compact as our sun. And the chances of break up are further increased, if, as seems likely, the stars were originally far more closely packed than they are now, and consequently far more prone to pull one another to pieces. In the present state of our knowledge it would be pure folly to try to estimate the precise chance of a star breaking up; we may, however, reasonably conjecture that planetary systems, although not the normal accompaniment of a sun, must be fairly freely scattered in space.

Logic and Fact

The human population of the world is going on increasing for a long time to come, and perhaps at times at an even more rapid rate than the present one. Will this process necessarily increase the sum total of human misery and wretchedness in the world, as we are told it will? I used to think so, but the longer I have pondered over the matter the less sure I feel about this conclusion. I think the thing which first made me dubious about this inevitable misery doctrine was its seemingly compelling logic. It was so easy to prove logically that it must be so that I began to be suspicious that in fact it probably was not so at all. Long experience with experimental work has taught me that a somewhat rough and ready, but on the whole dependable, rule is that any natural phenomenon which, in advance of observation of the event, can be proved by purely logical processes to be necessarily so, almost invariably turns out upon really competent and penetrating trial or observation to be in fact not so at all but quite otherwise. This curious phenomenon is, of course, not the fault of logical processes of thought, but merely an expression of human fallibility in the matter of premises.

Cosmical History

Worlds on worlds are rolling ever
From creation to decay,
Like the bubbles on a river,
Sparkling, bursting, borne away.
—Shelley: *Hellas*.

One Immense Army

The animal supports itself upon the plant; man goes astride the animal, and all humanity, scattered through space and time, is one immense army, galloping beside and behind and before us, drawing each of us on in a sweeping charge than can beat down every resistance.

Readers having favorite or important quotations of scientific worth are invited to send them in for possible publication on this page.

The average person in this country has about four defective teeth.

First Glances at New Books

COMMON SENSE AND ITS CULTIVATION, by Dr. Hanbury Hankin, New York: E. P. Dutton and Company. $2.50.
That elusive quality known as common sense is pinned down by Dr. Hankin to a theory, with musical geniuses, lightning calculators, Quakers, business men, and globe trotters furnishing a pleasing variety of illustrations from life.

BRAINS OF RATS AND MEN. By C. Judson Herrick. Chicago. The University of Chicago Press. $3.00.
An effort to render intelligible the complicated problems presented equally by the behavior of the higher vertebrates and of the mechanism through which it is controlled. Physiological psychology and nervous anatomy travel with linked hands throughout the book.

CONTRIBUTIONS TO A KNOWLEDGE OF INHERITANCE IN MAMMALS. By W. E. Castle, H. W. Feldman and W. H. Gates. Washington. The Carnegie Institution.
Studies of color inheritance and of linkage in rabbits, of fertility and sterility in the Norwegian rat, and of the origin and genetics of the Japanese waltzing mouse.

MOUNT MULTNOMAH. By Edwin T. Hodge. Eugene, Oregon. The University of Oregon.
A complete discussion of a vast volcano of the remote past, whose fragments now form the Oregon mountains known as the Three Sisters.

CONTRIBUTIONS TO EMBRYOLOGY, Vol. XVII, Nos. 85 to 89, Washington. The Carnegie Institution.
A collection of six papers on human and other vertebrate embryology.

CALCULUS OF VARIATIONS. By Gilbert Ames Bliss. Chicago. The Open Court Publishing Co. $2.00.
A discussion of the calculus of variations, a subject of the greatest importance in any science which involves measurement, and what science does not? This is the first of the Carus Mathematical Monographs.

PENNSYLVANIAN FLORA OF NORTHERN ILLINOIS. By A. C. Noé. Urbana, Ill. State Geological Survey.
A collection of superb photographic plates of coal bed fossils, with brief systematic and geological notes.