

phenomena reduces us, distinguishes between probable and improbable events or arrangements of a crowd of elements—*i.e.*, between such as are of an average and such as are of an exceptional character. Any highly improbable arrangement—though possible—will be followed by a gradual settling down to more probable or average arrangements. And as in nature you are forced to introduce the conception of availability, so in the calculus of chances you can introduce a certain mathematical quantity which is the measure of the probability. The more improbable, *i.e.*, exceptional, the begin-

not a refutation, but a confirmation, of our theory. But one must not consider the matter thus: as if two gases . . . which were initially unmixed, then became mixed, after a few days again unmixed, then again mixed, &c. We find, rather, that . . . only after a period which, even compared with 10^{10} years, is enormously great, a perceptible unmixing would take place. That this is practically equivalent to never, we see, if we consider that in this period there would be, according to the laws of probability, many years in which, by mere chance, all the inhabitants of a large city would, on the same day, commit suicide, or fire break out in all its buildings; whereas the insurance companies are in so good an agreement with facts that they do not consider such cases at all. If even a much smaller improbability were not practically identical with impossibility, nobody could rely upon the present day being followed by night and the latter again by day." And further (p. 255): "If we, therefore, represent the world under the figure of an enormously large mechanical system, composed of enormously

numerous atoms, which started from a very perfectly ordered condition, and exist still mainly in an orderly condition, we arrive at consequences which actually stand in perfect harmony with observed facts"; and (p. 258), "That in nature the transition from a probable to an improbable condition does not happen as frequently as the reverse, can be explained by the assumption of a very improbable initial state of the whole surrounding universe, in consequence of which any arbitrary system of interacting bodies is, in general, in an improbable condition to begin with. But one might say, that here and there the transition from probable to improbable conditions must, after all, be observable. . . . From the numbers regarding the inconceivably great rarity of a transition from probable to improbable conditions, happening in observable dimensions and during an observable period, it is explained how such a process within what we, cosmologically, call a single world, or, specially, our world, is so extremely rare that any experience of it is excluded."