of causes which determine the resemblance between individuals genetically related. "The critical problem of inheritance is the problem of the cause, the material basis, and the maintenance of the somatogenic specificity of germinal substance." Towards a solution of this problem contributions have been made along four lines—biometric, Mendelian, cytological, and embryological, and each of these methods is valuable and necessary. But they have at least one fundamental limitation in common. "This is that they offer no means of *directly* getting at any definite information regarding the origin, cause, or real nature of that specificity of living material which is the very foundation of the phenomenon of heredity." The most hopeful line of attack on this outstanding problem is biochemical.

A second chapter deals with the value and likewise the limitations of biometric methods, and it is full of good sense and good counsel. "To attempt to draw conclusions in regard to inheritance from studies involving the correlation method alone is futile." Third comes a useful essay on the nature of statistical knowledge, which is not, as some would have us believe, a higher kind of knowledge than that obtained in other ways. The statistical method furnishes shorthand descriptions of groups and a test of the probable trustworthiness of conclusions.

"It is, however, a descriptive method only, and has the limitations as a weapon of research which that fact implies." After a more technical chapter on certain logical and mathematical aspects of the problem of inbreeding, the author completes his interesting volume with the warning that the value of research in genetics is to be judged by its contributions to knowledge rather than by its aid to the practical breeder—useful as that aid may be.

The Universal Mind and the Great War. Outlines of a New Religion, Universalism, based on science and the facts of creative evolution. By E. Drake. Pp. vii + 100. (London: C. W. Daniel, Ltd., n.d.) Price 2*s.* 6*d.* net.

THERE is much honest and suggestive thinking in this book, though the writer is sometimes both pedantic and ill-informed. Having proclaimed the bankruptcy of all dogmatic religion, all philosophy, and all ethics, he proceeds to give us the right thing. Matter and mind are the two certainties; they are entities, of which we can know only the manifestations. The universal mind is individualised in each living organism, the creative intellect directing matter from within. God is in us; we are His direct personification. From the first beginnings of life on the planet He has been moulding matter for His ends of manifestation, dropping the saurian forms, *e.g.*, when not found to work, and trying another tack. He is continually *fighting matter,* aiming at fuller control, fuller manifestation; and matter is so big and strong that only a bit at a time can be grappled with—*i.e.*, the part which thereby we see as "alive." At death the mind that was in the organism survives, but in what form—individualised or not—we cannot know. The whole argument is in the right direction, though it is crudely put; if the author had read Fechner and Samuel Butler he might have improved it. Both of these see God as Logos manifesting through matter; but Fechner from the beginning, and Butler after trying a theory almost exactly identical with Mr. Drake's and finding it unsatisfactory, accept Him as energising not only through that small portion of matter which we call "living," but through all the matter of the universe.

LETTERS TO THE EDITOR.

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Gravitation and Temperature.

I SHOULD like to make a statement on the very suggestive contribution by "J. L." in NATURE, June 15, regarding my result of a temperature effect for gravitation of $+1{\cdot}2\times10^{-5}$ per 1° C. The confirmation, or otherwise, of this result will come, of course, from the laboratory, not the study. Still, a discussion at this difficult juncture might define the issue and perhaps indicate the best line for further experiment.

To take the scanty known data chronologically:

I. From Kepler's third law we deduce that gravitational mass (*g.m.*) and inertia mass (*i.m.*) vary together at the same rate, if at all, with temperature change. The mean temperature of the larger planets is probably much higher than that of the smaller ones. Thus if it were established that at these high temperatures *g.m.* rises with temperature, *i.m.* must rise proportionally. Any small departure from this principle would appear as a change in the mean motion for the observed distance, not as a periodic inequality; so it would be cumulative, and, with the great accuracy of modern astronomical methods, should be observed, unless very small. No such effect is known.

II. The pendulum experiments of Bessel establish the same principle, but since the temperature range is very small, this test is probably much less severe.

III. Poynting and Phillips found that for change in temperature of 100° in a mass of 200 grams, counterpoised on a balance, the change in *g.m.* is less than $1/10^9$ per 1° C. This very exact and direct result, taken in conjunction with I. and II., would seem to show that in the case of a gravitational couplet of a very large mass M and a small mass *m* the temperature of the latter can vary considerably at ordinary temperature without sensible change in *g.m.* or *i.m.*

IV. My result, quoted above, shows that when M, but not *m*, is raised in temperature, there is an increase in *g.m.* It will be seen that this case differs from I., II., and III., in that here the large, not the small, mass has temperature varied. My result appears to be in direct conflict with III. Can we make any justifiable physical assumptions whereby this seeming conflict may disappear?

A simple view of the effect of temperature on attraction is that the gravitational masses M, *m* increase with temperature, and the two increased masses, $M(1+\alpha T)$ and $m(1+\alpha t)$, would be multiplied together to obtain the resulting attraction Thus,