sentatives of type B. If these cross at random one obtains, by applying the symbolism of the binomial theorem, the following composition of the filial generation:

$$\frac{(m\,AA+n\,BB)^2}{(m+n)^2}=\frac{m^2}{(m+n)^2}\,AA+\frac{2\,m\,n}{(m+n)^2}\,AB+\frac{n^2}{(m+n)^2}\,BB$$

or if $m+n=1$

$$m^2\,AA+2\,m\,n\,AB+n^2\,BB.$$

If now the male and female members of the first generation are crossed at random among themselves one obtains the following frequencies of the various cross combinations:

$m^2\cdot m^2\cdot(AA\times AA)=m^4\,AA$
$4m^2\,m\,n\,(AA\times AB)=2\,m^3n\,AA+2\,m^3n\,AB$
$2m^2n^2\,(AA\times BB)=2\,m^2n^2\,AB$
$4\,(mn)^2\,(AB\times AB)=m^2n^2\,AA+2\,m^2n^2\,AB+m^2n^2\,BB$
$4m\,n\,n^2\,(AB\times BB)=2\,m\,n^3\,AB+2\,m\,n^3\,BB$
$n^2n^2\,(BB\times BB)=n^4\,BB$

or the relative frequencies

$$AA:m^2\,(m+n)^2$$
$$AB:2m\,(m+n)^2n$$
$$BB:(m+n)^2n^2$$

and the composition of the second filial generation is again

$$m^2\,AA+2\,m\,n\,AB+n^2\,BB.$$

Thus we obtain under the influence of panmixis in each generation the same proportion of pure and hybrid types. . . .

While Weinberg's paper, like Mendel's, appeared in an obscure journal, its failure to be recognized can not be ascribed to this fact alone. His later contributions dealing with extensions of the statistical treatment of the genetics of populations are found in the "regular" journals. These papers have received some attention (*e.g.*, Sewall Wright, 1930) and in them Weinberg refers to his 1908 pioneer work. However, both Weinberg and Hardy were ahead of contemporary thought and similar problems were not generally considered for at least eight years. At that time perhaps Hardy's name and the prominent place of his publication both helped to leave Weinberg's contribution neglected.

Hardy as a mathematician did not follow up his discovery by any further consideration of its genetic implications. Weinberg in 1909 reformulated his theorem in terms valid for multiple alleles—at a time when no case of multiple alleles had been discovered in man nor in plants and even Cuénot's demonstration of multiple alleles in the mouse had remained unnoticed. He also for the first time investigated polyhybrid populations and recognized their essentially different method of attaining equilibrium. Considering these facts it seems a matter of justice to attach the names of both the discoverers to the population formula.

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THE SHOT-PUT AND THE EARTH'S ROTATION

IN SCIENCE for August 28, 1942, Joseph O. Thompson cites with skepticism a recently published statement[1] to the effect that the earth's rotation enables an athlete to put the 16-pound shot farther toward the east than toward the west. As a matter of fact there was nothing new about the statement. Artillerists in all the world's armies have been aware of the very definite effect of terrestrial rotation upon the ranges of projectiles for generations and have corrected the aim of long-range guns accordingly as a matter of regular routine.

The effects upon the ranges of athletic projectiles are not large but they are definitely larger than the precision of measurement which is implied when a hammer throw is recorded in the record book as, for example, 176 ft. 11⅛ in. or a shot-put as 52 ft. 6 3/16 in. These effects have nothing to do with the drag of the air and are in addition to any consequences deriving from the fact that gravity itself depends partly upon the centrifugal forces of our rotational motion. They are due rather to the fact that the gravitational pull upon the projectile is applied in a constantly changing direction as the earth turns, and to the further fact that the landing surface does not await the arrival of the projectile in the same relative position as it occupied when the firing occurred, but instead drops away from the projectile to the eastward or rises to meet it from the west, thus either extending or curtailing the measured range. Nonmathematical explanations are, of course, incomplete.

A few years ago the writer of this note published an article[2] upon this and other inaccuracies in the metrology of sport, inaccuracies which have, beyond the slightest doubt, imposed definite and calculable handicaps upon some competitors while favoring others. Reprints of this article were sent to all the several hundred committeemen of the Amateur Athletic Union of the United States in the faint hope that improvements in the handling of the data of field sports might result. One committeeman acknowledged receipt of the reprint but there has been nothing to indicate that any of them read it.

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THE WATER HYACINTH IN CALIFORNIA

THE water hyacinth, *Eichornia crassipes* (Mart.) Solms, which became a serious hindrance to navigation in the streams of Florida, has been known from a few isolated localities in California for a good many years. In 1922 Jepson[1] reported it as occurring at

[1] *Collier's*, July 4, 1942, page 6.
[2] *Scientific American*, April, 1937.
[1] W. L. Jepson, *A Flora of California*, 1: pt. 6, 247, 1922.