

# SCIENCE

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## THE GRAPHIC REPRESENTATION OF RELATIVE VARIABILITY<sup>1</sup>

It has been the generally accepted biometric prac-  
tice to use the coefficient of variation as the measure  
of the *relative* variability or scatter of frequency dis-  
tributions. This constant is

$$V = \frac{100 \text{ (standard deviation)}}{\text{Mean}}$$

It gives the standard deviation of the distribution  
in terms of the mean value of the varying character.  
By expressing the scatter of the distribution in this  
way it becomes possible to compare the relative varia-  
bilities of characters measured in different absolute  
units.

But the coefficient of variation has never been an  
entirely satisfactory constant to biologists, at least.  
While formally correct enough, within the limits of  
its definition, it does not readily or instantly call up  
in the mind an adequate picture of the real degree of  
scatter of the distribution. This is, in part at least,  
because two things, the mean and the standard devia-  
tion, are involved in it. When one reads the value  
of the standard deviation of a particular distribution  
he recalls that roughly three times this quantity on  
either side of the mean includes the entire frequency  
and this gives at once some concept of the biological  
extent and meaning of the variation, in the particular  
case.

There would seem to be a place of usefulness for  
an adequate graphical method of depicting relative  
variability for comparative purposes, so that one may  
*see* the difference or likeness in the variation of a man  
and a mouse, for example, in respect of body-weight.  
It is the purpose of this paper to describe such a  
graphic method, and to illustrate its applications.

The method may best be approached through a con-  
crete illustrative example. We have lately been  
studying in this institute the normal variation and  
correlation of the relative cell volume of human blood,  
in relation to age, body-weight and stature.<sup>2</sup> The  
present situation regarding the measurement and  
graphical depiction of variation in these four charac-

<sup>1</sup> From the Institute for Biological Research of the  
Johns Hopkins University.

<sup>2</sup> Cf. Pearl, R., and J. R. Miner. "A Biometric Study  
of the Relative Cell Volume of Human Blood, in Normal  
and Tuberculous Males." Johns Hopkins Hospital Bulle-  
tin. In press.

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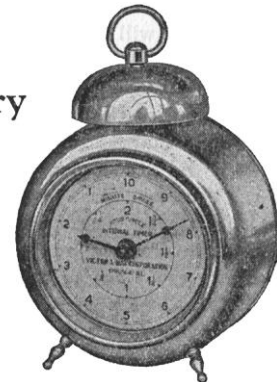
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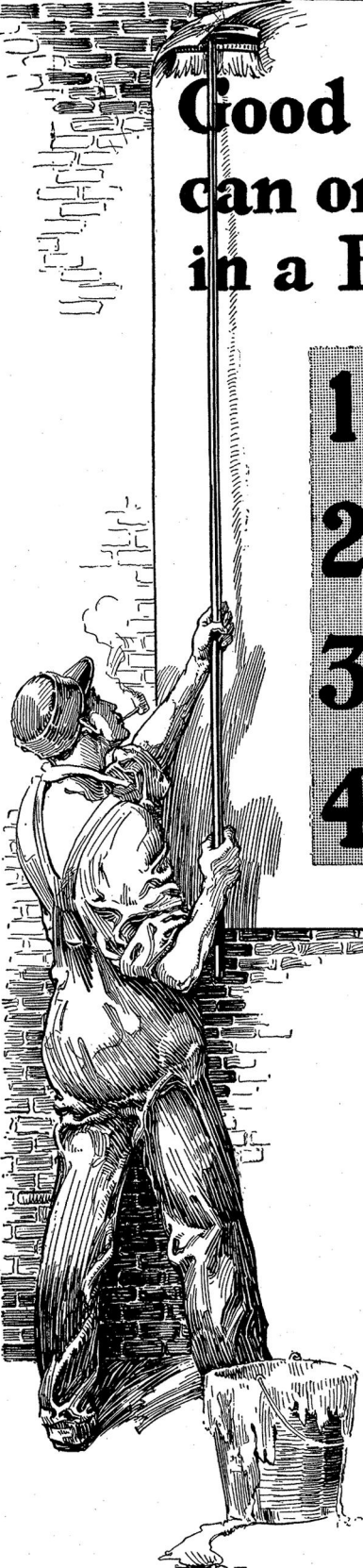
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