silica and alumina) in the atmosphere would in a few hours or days become partly hydrated appearing brownish or yellowish toward the sun, bluish at a wide angle from the sun, just as commonly observed.

P. G. NUTTING

U. S. GEOLOGICAL SURVEY

A CRITERION FOR DISTINGUISHING IDENTICAL TWINS FROM FRATERNAL TWINS

APART from the examination of the placenta and foetal membranes at birth, there is no safe criterion of distinguishing the identical twins from the fraternal twins. In the course of study on my collection of finger prints and hand and sole prints of some twins I have come to realize that, generally speaking, the same hands or feet of the identical twins resemble each other more closely in their patterns than the two hands or feet of the same individual. To represent in symbols, let r and l stand respectively for the right and left hand or foot of the one twin A, and r′ and l′ respectively for the right and left hand or foot of the other twin A′ which is identical with A, then:

$$r-r' \text{ (or } l-l') < r-l \text{ (or } r'-l').$$

This statement holds good in principle also for the several identical twins studied by Wilder (04, 19), Pol (14), Bonnevie (23, 25), Kuragami (26) and Montgomery (26); while such a condition can never be found in twins of different sexes nor in twins of the same sex bearing evidence for their being fraternal twins. Thus, we seem to be justified by saying: "Such twins are identical twins in which the same hands or feet of different individuals are more alike than the different hands or feet of the same individual."

But this statement must not be taken as involving the notion also that, if the former resemblance is less than the latter resemblance, the given twins are fraternal, since there are some twins which are apparently identical and yet do not show the condition mentioned above. Anyway, this will probably serve as a criterion for identifying some identical twins.

Some writers on twins and twinning, such as Bateson (13) and Newman (17), seem to hold the view that the identical twins are comparable with the right and left halves of the body of one person. The view could not be quite correct, should it imply that the resemblance between the identical twins is in principle equal to the resemblance between the right and left halves of one person. As a matter of fact, speaking generally, the resemblance between the identical twins is more than that between the halves of one person. Aside from the fact that the viscera show a marked asymmetry and the situs inversus viscerum is exceptional, even among identical twins, there are several cases known where such twins have the same defect or abnormality on the same side of the body. Moreover, as mentioned above, the hands or feet of the same side of different twins show closer resemblance than the two hands or feet of the same individual.

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THE "TEARING METHOD"

DR. K. HOROVITZ, who is working at present in my laboratory, has just pointed out to me a very important paper which I had unfortunately overlooked, and which gives strong support to the letter I published in SCIENCE (Feb. 11, 1927, p. 160). This article, by no less an authority than P. Lenard, is entitled, "Über Oberflächenspannungmessungen besonders nach der Abreiszmethode . . ." (*Ann. der Physik,* 1924, lxxiv, 381–404), and contains a highly interesting study of the "tearing method" (a horizontal rod being used instead of a ring). The conclusions of the paper are that: "Es ist dadurch . . . der *einfachste und zugleich zuverlässigste* Weg zu *genauester, absoluter* Oberflächenspannungmessungen leicht gangbar gemacht." ("The *most accurate absolute* measurements of surface tension . . . ")

In his determination, Lenard uses the method which I described in 1919, namely, a torsion balance. I may furthermore recall that the plate illustrating my first description of the tensiometer showed the instrument with a rod and not with a ring; the ring was adopted later, mainly on account of the smaller amount of liquid required for the measurements, and of the fact that no correction was required for the capillary action on the two perpendicular rods of the frame.

LECOMTE DU NOUY

ROCKEFELLER INSTITUTE
FOR MEDICAL RESEARCH

STUDY OF BARTLETT PEAR BLACK-END UNDERTAKEN IN CALIFORNIA

AN extensive study of the black-end of the Bartlett pear has been undertaken by the division of pomology, University of California. This disease, which is physiological in nature, has been taking heavy losses during recent years in practically all pear sections of the state. In view of the fact that the losses seemed to be increasing from year to year it was thought advisable that a systematic study be made of the disease and also possible methods of control worked out.

The early stages of the black-end are evident while