

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.

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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 Oberflächenspannungsmessungen besonders nach der Abreizmethode . . ." (*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 Oberflächenspannungsmessungen 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.

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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

the fruit is quite small. The epidermis of the fruit around the calyx end becomes shiny and tight in appearance. Coincident with these manifestations, the calyx lobes are forced out so that they appear to be set on top of a "peak." As the fruit develops the calyx end either turns black, involving the epidermis as well as the flesh, or else it becomes very hard and gritty. In either case the fruit finds no commercial value.

A canvass of the state pear sections the past summer showed that in practically every case where the abnormal fruit was developed the Bartlett was growing on the Japanese root, *Pyrus serotina*, and in only a few scattered cases on the French root, *Pyrus communis*. The latter were found where the trees were growing in soils that were very heavy and wet for a considerable length of time. As far as the one season's work is concerned, it appears as though there is a relation between the development of the abnormal fruit and the rootstock being used.

In addition to the rootstock studies mentioned above histological studies of the fruit have been undertaken in order to determine whether any structural changes occur in the abnormal as compared with the normal fruit. Also, experimental work is under way along control lines.

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SCIENTIFIC BOOKS

Man and Weather. By ALEXANDER MCADIE. Cambridge, The Harvard University Press, 1926. 99 p., 19 illus.

THERE is so much good in the best of it, but so much bad in the worst of it, that this latest little book by McAdie left the reviewer depressed. The trouble seems to be this: Here is an author whose leaning toward the popular presentation of science is being almost constantly demonstrated, who nevertheless seems in this book not thoroughly careful as to how he goes about it. In fact, one is in some quandary over deciding what effect McAdie really wanted to produce in the minds of his hearers (the book is "essentially a series of lectures delivered in the Lowell Institute Course in December, 1924"). For on page 21, in the chapter on "Weather in Peace," he reminds them of the benefits to be derived if we could but forecast the character of the weather far ahead, and then, as on pages 27 and 28, says: "... It does appear that it is now possible to forecast periods of excessive rainfall and on the other hand droughts."

"... it is not difficult to forecast scanty rainfall and the absence of floods. As mentioned above, the month of March, 1915, ushered in a period of scanty rains which continued until midsummer... Or take another illustration... the drought of 1921 in northwestern Europe, which resulted in less than half a normal rainfall." The shortening of sentences in these quotations in no wise increases the effect of the author's words as an implication that conditions in March, 1915, or those preceding the drought of 1921 foreshadowed the coming droughts.

There is no other interpretation of the words than that the meteorologist's dream of being able to make satisfactory long-range forecasts has come true. And there is nothing of which the meteorologist is more keenly aware than that the dream has *not* come true. To be sure, in India, the comparative simplicity of the factors which affect seasonal rainfall in that country has made possible a fair degree of success in seasonal forecasting. For parts of California also, there seems to be evidence that we are on the eve of attaining similar success. But that is no justification for leading the non-meteorological public to infer far more than the most sanguine meteorologist dares to, on the basis of his present knowledge.

In the chapter on "Drought, Floods and Forecasts" the lecturer (referring to the California rainy season) again similarly confuses hindsight with foresight, thus, on page 97, "When the continental hyperbar is displaced to the northwest, the general drift of surface air being from northeast, the winter *will be* (reviewer's italics) dry."

Quite so, if you change that careless *will be* to *is*. So also with a statement of conditions favoring on the one hand heavy, and on the other hand deficient, precipitation. The thing reads as if we could predict, on the basis of current pressure conditions in the autumn, what the pressure conditions and therefore the rainfall are to be, in the winter. No one is in a position to forecast, for California or any other part of the country, the distribution of atmospheric pressure even a week ahead, to say nothing of a month or a season. Yet here is long-range forecasting advertised by the Abbott Lawrence Rotch professor of meteorology in Harvard University and the director of Blue Hill Observatory, as a *fait accompli*. One may reverently hope that the shade of Rotch was not present at those lectures.

We note the seemingly inevitable illustration from the "Tower of the Winds"; some good cloud pictures scattered in no discoverable relation to the text; a picture of a "Cumulo-stratus," the term being obsolete in cloud classification; the repetition, in a chapter on "The Strategy of Weather in War," of material from an earlier, delightful book by the same author;