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A phyto-pharmacological study of a menotoxin or menstrual toxin.

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Macht and Livingston have already shown in connection with a study of cocain and its derivatives that various drugs affect animal and cell protoplasm very differently. Thus it was shown that while cocain is very toxic for animal tissues, it is comparatively little toxic for plant protoplasm. On the other hand, sodium benzoate which is practically non-toxic for animal tissues was found to be extremely toxic for the root of *lupinus albus*. These observations suggest the idea that plant cells may be much more sensitive to some animal toxins than animal cells or tissues might be. This idea was a starting point for the present investigation. Shick has recently revived or called attention to the ancient popular belief as to the contaminating or deleterious effects of the touch of women at the time of menstruation. He performed a few experimnts on cut flowers seemingly corroborating this idea. The present authors decided to investigate this whole question in a more scientific and accurate way by the use of whole living plant organisms and not cut flowers, inasmuch as the latter method is unreliable for obvious reasons. The procedure was very much the same as in the study of Macht and Livingston on cocain and its derivatives.

Seedlings of *lupinus albus* were grown in a perfect nutrient medium (Shive solution) and the rate of growth of the single straight well defined root was measured to within one-half of a millimeter. Similar seedlings were grown simultaneously and under exactly the same conditions in Shive solution containing a definite amount, usually 1 per cent. of normal blood serum, and on other occasions exactly the same kind of experiments were performed with solutions containing blood serum obtained from menstruating individuals. Whenever possible normal and pathological blood was obtained from the same subjects. The effect of normal serum on the growth of seedlings as compared

with normal Shive solution was determined and in a similar way the effect of menstrual serum on the growth of seedlings was ascertained. It was found that while the average growth of the seedlings in a 1 per cent. solution of normal blood serum in Shive solution gave about 75 per cent. of growth as compared with the normal Shive, a similar solution of menstrual serum affected the seedlings in a much more toxic way. This toxicity expressed itself in two ways, in the first place the absolute growth in the length of the roots was much less, on an average about 50 per cent., as compared with the normal seedlings. In the second place, the rootlets no longer grew in a perfectly straight direction, but were curled and distorted in various ways. Numerous experiments repeatedly performed in the above way with numerous samples of sera from normal and menstruating subjects as compared with normal ones. The greatest toxicity was usually found at the beginning of menstruation and was demonstrable even during the premenstrual period of a day before the actual onset of the catamenial flow, growth in such cases being as low as 30 per cent. of the normal.

Similar experiments were made with samples of saliva obtained from normal and menstruating subjects and difference in toxicity was conclusively demonstrated in the case of that secretion also. It was also found that what we may call the "menotoxin" was present likewise in the red blood cells and some very striking experiments revealed the presence of the same menotoxin in the skin secretion of menstruating individuals. Experiments are in progress with a view of ascertaining more intimately the chemical nature of the menotoxin. Various glandular extracts, such as ovarian, corpus luteum, thyroid suprarenal, pituitary, etc., have been examined and more definitely known chemical compounds have also been studied. Fuller data will be published in due time.