phyto-pharmacological method. A larger series of cases of normal blood and blood from various anemias, as diagnosed clinically and morphologically, were examined and it was found that the blood serum from cases of pernicious anemia behaved differently from that of all the other cases examined.

The tests were made on living seedlings of *Lupinus albus,* described by the author elsewhere. It was found that whereas the index of growth given by a one per cent solution of normal human blood was 75 per cent, the average growth coefficient given by 48 cases of pernicious anemia was 44 per cent; some of the specimens giving as low a figure as 28 per cent and none of them giving a higher figure than 51 per cent. Specimens of severe secondary anemias and specimens obtained from patients suffering with carcinoma, pellagra, lymphatic and myologenous leukemias, and Hodgkin's disease were all found to be but little toxic for the plants so that the author had no difficulty in diagnosing cases of pernicious anemia by examining unknown samples of blood by the phyto-pharmacological method. These observations seem to speak in favor of a toxic etiology for pernicious anemia. They are also considered by the author of considerable value in making a differential diagnosis of pernicious anemia in doubtful cases; and furthermore they should prove useful to investigators in the search for the causative agent of the disease and its treatment. Fuller details will be published in the *Festschrift* of Professor Abel.

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Penetration of ultra violet rays through animal tissues.

D. I. MACHT, F. K. BELL and C. F. ELVERS.

[*From the Pharmacological Laboratory and the Brady Urological Institute, Johns Hopkins University, Baltimore, Md.*]

Studies on the penetration of ultra violet rays for tissues were made on living animals with the quartz spectroscope and spectrograph. For this purpose rabbits, cats and dogs were used. The animals were anesthetized, the skin of the abdomen was cut open and dissected back on one side and then the barrel of the

spectrograph was introduced under the skin. The skin was then radiated from the outside with Krohmayer and Hanovia Alpine Sun Mercury Vapor Lamps and a spectrophotograph of the waves which passed through the skin was thus obtained while the animal was alive and the blood circulating. In this way it was found that a considerable number of invisible ultra violet rays passed through the rabbits', cats' and dogs' skins. Thus in the case of rabbit skins varying from 1 to 2 or more millimeters in thickness, the spectrograph showed the lines in the region of 2800 angstrom units and sometimes even shorter wave lengths. In the case of the rabbit the longer ultra violet rays penetrated not only through the skin but even through the whole thickness of the abdominal wall as shown by spectrographs made with the barrel of the instrument inserted into the peritoneal cavity. Here wave lengths of 3000 angstrom units were frequently obtained with both Alpine Sun and Kromayer lamps, although the thickness of the abdominal wall (skin, fascia, muscle, and peritoneum) was usually about 3 to 4 millimeters.

The permeability of dead tissue was different from living animal tissue, depending upon the state of preservation. Thus, when skin was left at room temperature and began to undergo putrefaction, the permeability was greater than in a normal living skin. On the other hand when skin was preserved either by freezing or by preservatives such as formalin or alcohol, the coagulation of proteins and other chemical changes thus produced rendered it more opaque. Leather for the same reason was found to be much more opaque than living skin. Human skin was studied by obtaining fresh specimens from the operating room, and it was found that when not excessively thick it also allowed the penetration through it of the longer ultra violet waves. A marked difference was noted between white human skin and the skin of the negro. In the latter case absorption of the entire ultra violet region was noted. In rabbits and other animals under anesthetic, injections intravenously into the living circulation of fluorescent substances, such as eosin, produced complete absorption of the ultra violet rays. The present investigation, which was begun in the fall of 1923, reveals conclusively that the penetration of ultra violet rays from powerful modern quartz lamps through animal tissues is much deeper than has hitherto been supposed.