body weight respectively, and killed them 48 hours, 1 week, 1 month, and 5 months after the injection. Our findings do not materially differ from those already reported. It is therefore unnecessary to give an account. However, two points have been insufficiently emphasized by previous reports. (1) A week or so after the injection the thorium-loaded cells always tend to group together in the form of cell-masses. Only a few of them seem to get into the lumen of the venous sinuses and are carried with the blood into the right heart and into the capillaries of the lungs, which they may obstruct. In the lung they also may be eliminated. But most of them persist in the spleen, liver, and bone marrow for a considerable time. In our histological preparations we are unable to find any elimination of such aggregated masses through the kidney. (2) A shifting of the thorium from the spleen to the liver takes place about one to 2 months after injection. In both small and large dosage specimens the thorium present in the spleen becomes decreased about 40 days after injection and meanwhile the amount in the liver is increased.

7115 C

Experimental Bronchomoniliasis in Sensitized Rabbits.

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We reported[1] on the production of experimental bronchomoniliasis in rabbits following intratracheal administration of living cultures of pathogenic *Monilia tropicalis*. It was shown that the development of the disease was dependent upon pre-existing damage brought about by repeated intravenous injections of small doses of chaulmoogra oil. We also succeeded in producing regular sensitization of guinea pigs with cultures of various *Moniliae*. This led us to assume that perhaps sensitization of rabbits with monilia cultures may also result in an increased susceptibility of these animals to their subsequent inoculation.

The present experiment is an attempt to test this assumption. Five normal rabbits were anesthetized with ether and 0.5 cc. of a thick suspension containing 1/5 of a 2 or 15 day agar culture of *Monilia tropicalis* was injected into the trachea of the animals.

[1] Lim, C. E., and Kurotchkin, T. J., *Nat. Med. J. China*, 1930, **16**, 537.

Seven days later a similar injection of the same *Monilia* was repeated. For the next 2 weeks the animals showed no change in their general state. At the end of this time all animals were killed and their lungs examined; the autopsy findings indicated that those inoculated either with 2 or 15 day culture showed no detectable lesions in their lungs. Cultures made from the lungs and various parts of the large bronchi showed no growth of the *Monilia*.

A second group of 5 normal rabbits received intratracheal injection of 1 cc. of anti-monilia serum followed by 2 injections of a living culture of the *Monilia* at 7-day intervals. Two weeks later the animals were killed and examined. The result of this experiment was essentially negative, except for one rabbit injected with 15-day culture. This animal showed at the upper part of the right lung a single small, firm nodule containing a small amount of caseous white material from which a few colonies of *Monilia tropicalis* were cultivated.

A third group of 8 normal rabbits received intravenous injections of heat-killed culture of *Monilia tropicalis*. Three injections at 5-day intervals were given, each dose being equal to 1 cc. of agar culture suspended in 10 cc. of saline. Precipitin tests on the blood of all these animals performed 10 days after the last injection were positive, giving 4 plus readings with the specific carbohydrate derived from the same fungus in concentrations of 1:400,000 to 1:500,000. Considering this high precipitin content the animals were regarded as sufficiently hypersensitive. As in the previous 2 experiments, 2 subsequent inoculations of the *Monilia* were given at 7-day intervals. Three animals received 0.5 cc. each of a suspension containing 1/5 of a 2-day agar culture, and 5 animals were given the same dose of a 15-day agar culture. Two weeks after the last inoculation all rabbits were killed and the lungs examined. Two out of the 3 animals inoculated with 2-day culture presented marked nodular lesions in the upper parts of the right lung. The nodules were small, and firm and contained whitish caseous material. Microscopical examination of the stained smears prepared from the material revealed no definite *Monilia* elements, but culturally a few colonies of *Monilia tropicalis* were grown in each case. Four rabbits out of the 5, inoculated with 15-day monilia culture, developed in their lungs a nodular process, situated as in previous instances, in the upper parts of the right lung. In 2 cases the formation of nodules was associated with large and clean cavities. One rabbit developed an extensive pneumonic process involving the whole right lung. Several small nodules with caseous material were present in

this pneumonic area. In general, the pathological process found in the lungs of this group of animals differed from that observed in the second group of rabbits in that the nodules were considerably larger and contained more abundant caseous material. Microscopical examination of the material from nodules was negative for *Monilia,* but culturally *Monilia tropicalis* was obtained in 2 instances.

These results suggest the conclusion that previous sensitization renders rabbits susceptible to the subsequent intratracheal administration of *Monilia tropicalis.* The lung process which may be designated as experimental bronchomoniliasis is confined to the formation of multiple firm nodules containing caseous material. The positive culture examination of this material indicates that the development of lung lesions is dependent upon the pathogenic activity of the fungus. A similar experiment with passively sensitized rabbits gives an essentially negative result. It is also shown that old fungous culture rich in filamentous growth is somewhat more effective in the production of lung lesions than a young culture containing mostly budding cells.

7116 C

Stimulating Effect of Alum and T.A.B. Vaccine in Tetanus Prophylaxis.

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Ramon and Zoeller[1] in their study of active immunization against tetanus with tetanus toxoid have referred to the use of an immunizing agent consising of toxoid plus T.A.B. vaccine on human beings in the first dose to be followed next by toxoid alone. Glenny[2] by the addition of potash alum to tetanus toxoid produced on experimental animals far better results than the use of the original toxoid and he attributed the increased antigenic response of alum-toxoid to delayed absorption. As alum is very irritating to the tissues, it may cause much discomfort when applied to human beings; while T.A.B. vaccine associated with toxoid will have the advantage of serving the dual function of preventive against enteric fever

[1] Ramon, G., and Zoeller, C., *C. R. Soc. de Biol.,* 1929, **100,** 92.

[2] Glenny, A. T., *Brit. Med. J.,* 1930, **2,** 244.