

yellowish-green purulent material. The material was planted on ordinary and several special culture media, both aerobically and anaerobically, without the development of a single colony. Smears were made and stained by Giemsa's method, carbol-fuchsin with acid decolorization, and by Gram's. The cellular elements with the polychrome stain consisted almost exclusively of polymorphonuclear leukocytes, together with a small number of large vesicular nuclei, practically devoid of protoplasm.

Leprosy bacilli were present in very large numbers. A few well-formed aggregations or globi were found, but for the most part the bacilli were lying singly or in small groups. A much larger percentage than usual appeared broken up in the form of granules. Certain numbers of pus cells contained a few bacilli but, in general, the organisms were free. Absolutely no other bacteria could be demonstrated in any preparation. In addition to the above case, in which comparatively large pus collections were present, the routine examination by Gurd of a number of leprosy nodules derived during life and at necropsy has shown that polymorphonuclear leukocytes may be found almost constantly in small numbers, although in no case have definite foci of such cells been seen.

43. **Vacuum Desiccation and the Virus of Rabies.**—The essential feature of Shackell's method is that the material is kept solidly frozen during the process of drying. Animal tissues when dried by this method are preserved intact, show no shrinkage, are porous, and resist chemical changes and deterioration. The authors have found that, by using Shackell's method of desiccation, brains and cords may be desiccated *in toto* without destruction of virulence. The time required for complete extraction of water is about twenty-four to thirty-six hours. A number of brains were so treated and the infectivity of all was preserved. After the completion of desiccation, these brains were placed in an ordinary desiccating jar over sulphuric acid, and left continually exposed to light at the ordinary room temperature. One brain has remained infective for four months. The only precaution taken was to guard against moisture. Material thus dried is like chalk, and is easily pulverized. It is, however, very hygroscopic, and, after a few hours' exposure to the air, becomes leathery and rapidly loses its infectivity. Experiments are now being carried on to compare quantitatively the virulence of desiccated cord with that of fresh cords, after the method described by Harvey and McKendick.

44. **Administering Diphtheria Toxin in Collodion Sac.**—In his experimental work Miller found that a guinea-pig may be killed by introducing a collodion sac containing diphtheria toxin into its peritoneal cavity; the slow absorption of toxin from the sac corresponding closely to the absorption of toxin from the false membrane in a case of diphtheria. To save the life of a guinea-pig by the administration of antitoxin after the introduction of a sac, requires an enormous dose or the long-continued administration of moderate doses. The reason for this seems to be that the antitoxin administered subcutaneously, being a foreign protein, is subjected to rapid destruction of the tissues, while the toxin protected from such destruction by the sac continues to diffuse out and kills the animal after the protective power of the antitoxin has disappeared. The essential difference between these sac tests and the administration of antitoxin in diphtheria appears to be that in these tests the antitoxin has no influence on the supply of toxin, while in diphtheria the administration of antitoxin is followed by destruction of the membrane, and consequently the supply of toxin ceases and the patient recovers. This power of antidiphtheric serum to destroy the membrane is probably as important as its antitoxic action but, unfortunately, we have no means of measuring it. When used as a prophylactic, low potency serums protect for a longer time than those of high potency. Antitoxin protects until it is destroyed by the tissues. The more proteid it is combined with, the longer will its destruction be delayed. Diphtheria toxin in a collodion sac undergoes some change by which the sac, although containing less toxin than in the beginning, is able to kill a second guinea-pig in half the time required to kill the first. This difference may be analogous to

the short incubation period of tetanus toxin from the blood of an animal compared with the incubation period of tetanus toxin produced by the growth of the germs *in vitro*. It may also account for certain very rapidly fatal cases of diphtheria.

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56. **Paroxysmal Pulmonary Edema.**—The distinguishing features, clinically speaking, of the condition referred to by Stengel, are its sudden onset, usually with slight provocation; the evidence of intense pulmonary edema; the expectoration of quantities of frothy and blood-stained serum; and the repetition of such attacks without intercurrent complicating conditions. These features distinguish this condition from certain other forms of acute pulmonary edema, which, during their height, may not be especially different in clinical manifestations. The seizures, as a rule, come on in the evening or after the patient has gone to bed. He may awake from a profound sleep with an oppressive cough, followed by the symptoms described. In some cases, vague apprehensions or uncontrollable nervous feelings may precede the attack, but these usually occur after a repetition of the seizures has made the patient familiar with their character and fearful of their recurrence. Various kinds of excitement, physical or mental, may provoke the attacks; but in a large proportion of cases there is no such cause. Repeated attacks of the same character may occur at intervals of days or weeks during a long period of time. Between attacks, the patient may be perfectly well, or, more frequently, may give evidence of some inadequacy of cardiac compensation. In the cases which have terminated fatally, the final result has usually been due to increasing cardiac decompensation rather than to the sudden effect of an attack of pulmonary edema. Morphine, atropine, chloroform, nitroglycerin and venesection are employed to control the attacks. After the first stage of the attack has been controlled by an injection of morphine and atropine, it is desirable to make use of cardiac stimulants to revive the power of the left ventricle and to promote vasodilatation, if this be possible. For these purposes injections of strychnine, digitalin, and nitroglycerin may be employed, and aromatic spirits of ammonia or brandy may be given by the mouth if the patient is able to swallow. The after-treatment in cases in which one or more attacks have occurred consists in strict regulation of the daily life of the patient to avoid fatigue, excitement, cold and physical strains, and some care of the diet so as to prevent overloading of the stomach and superalimentation, particularly at the evening meal. Caffeine may be particularly useful at this time, but strophanthus, digitalis or nitroglycerin may be desirable.