

which he concluded that gray tubercles and cheesy infiltration were different.

Colin, 1867-1868, one of the commission appointed by the Paris Academy, made two reports embracing experiments on forty-six animals, rabbits, guinea-pigs, dogs and sheep. He deduced the following conclusions:

1. Inoculation of gray and yellow tubercular matter produces tubercles.
2. It is most probable that the tumors produced by inoculation are partly due to the material inoculated, and partly to the suppuration produced around the inoculated material.
3. The extent of the lesions produced is in proportion to the quantity of material inoculated.
4. It is the tubercular material itself and not any virus, which is taken up by the lymphatics and deposited in the different organs.
5. The deposits in the lungs, when they are firm, shining and semi-transparent, are certainly tubercular; when they are opaque and yellow, their nature is not so certain.

Behier, Pidoux, Vulpian, and Empis inoculated with various results.

Clark of London, 1867, produced gray tubercles in rabbits by inoculation with gray tubercles, and in two cases with non-tubercular matter.

Saunderson, 1868, produced gray tubercles in guinea-pigs, by inoculation with gray tubercles, pus, non-tubercular products, and by causing chronic suppuration with setons.

Wilson Fox, 1868, inoculated 117 guinea-pigs, and 12 rabbits.

He inoculated gray tubercles; red, gray and cheesy hepatization, pus, sloughs from wounds, waxy liver, putrid muscle, and used setons. He produced military tubercles, in the lungs, bronchial glands, spleen, liver, omentum, and intestines. These tubercles were identical microscopically with those in man. Of 117 pigs 58 became tubercular and 6 doubtful.

Verga, Biffi and Mantegazza, 1868, in Italy, inoculated rabbits with the same results.

Waldenburgh, 1869, Berlin, inoculated seventy-one rabbits and twenty eight guinea-pigs. He inoculated gray tubercles, cheesy glands extirpated during life, cheesy pus, gray tubercles, and cheesy glands preserved in alcohol, and catarrhal pharyngeal sputum treated with permanganate of potash. He also injected gray tubercles and inflamed glands rubbed up with aniline blue, and found the aniline in the military tubercles produced, in the white blood-globules and in some of the tissues.

He also inoculated a goat nine times with fresh matter and tissues preserved in alcohol. The animal's health was not affected, but tubercles were produced.

Most of the animals died of the disease. The tubercles produced were true gray military tubercles. They were found in the lungs, intestines, omentum, liver, spleen, kidneys, lymphatic glands.

Out of 100 animals thirty-four became tuberculous. He inferred that the tubercles were produced by the absorption of the fine particles of the inoculated matter, the circulation of these in the blood, their deposit in

the different tissues, and their presence causing irritation and new growth.

Klebs injected tubercular matter into the abdominal cavity, and produced tubercles of the peritoneum and other organs. He regards the tubercles as formed in and propagated by the lymphatics.

Cohnheim and Frankel, 1868, inoculated by introducing into the abdominal cavities of rabbits and guinea-pigs portions of tubercle, of fresh and putrid tissues of all varieties, also pieces of India-rubber, of paper of lint, etc. The result of these procedures was always peritonitis. In many cases this killed the animals, in others the foreign body became encapsuled and was found surrounded by cheesy pus. In these cases military tubercles were found throughout the body. Cohnheim inferred that cheesy pus was the excitant of tubercle, and in proof of this he found that such cheesy pus, mixed with a solution of salt, filtered and injected into the blood vessels, produced tubercles in dogs.

All these experiments, therefore, which seemed at first to demonstrate that tubercles could be inoculated like small-pox, resulted in this conclusion. In certain animals—guinea-pigs, rabbits and dogs—if we excite inflammation by introducing under the skin or into the peritoneum any foreign substance, the inflammation thus produced will often assume the scrofulous character. If it does so, there is usually a collection of cheesy matter at the point where the inflammation was excited; near this the lymphatic glands will be enlarged, and in the lungs and other viscera we will find military tubercles. It seems to be a natural conclusion from this, that scrofulous inflammation with cheesy degeneration produces foci of cheesy matter; this cheesy matter is absorbed, infects the entire body, and thus produces military tubercles.

This doctrine was very soon applied to the tuberculosis of man. It is now very generally believed that in many cases military tubercles are the result of auto-inoculation from a cheesy focus. Thus Niemeyer says that patients with chronic cheesy pneumonia are always in danger of infecting themselves and becoming tuberculous. Rindfleisch says that tuberculosis in individuals who are not scrofulous is a thing unknown. Hueter lays down the rule that if we find a cheesy lymphatic gland in any part of the body, we must extirpate it at once to prevent tubercular infection.

You will find, however, that in this country there are some difficulties in the application of this doctrine. These difficulties seem to depend on the fact already mentioned that here scrofulous inflammations are less frequent and less extensive. It is impossible to ignore the fact that we meet with cases of general tuberculosis without cheesy foci; and that we meet with extensive cheesy deposits without tubercles. So that we may be permitted to doubt whether the law of the production of tubercles from self-inoculation with cheesy products is as absolute a one as has been stated.

II. Our next step must be to inquire what products of chronic inflammation do we meet with in the lungs? These products are all comprised under two heads—products of inflammation within the air cells and bron-