

I should not only weary you, and muddle the clear idea I want you to obtain of this question, but I should have to extend this lecture to an unconscionable length, if I attempted to describe them all, but to render our view complete, I will mention one which is most germane to our subject. Taking test tubes which were purified as I have already described, partially filled with pure gelatine, Fchleisen inoculated them with material from the lymphatics of a patch of erysipelas in a man. When these had grown for a certain time, as evidenced by liquefaction of a portion, he took some of the gelatine of the resulting material, and inoculated fresh tubes, and this he repeated fourteen times, the experiment lasting two months, so obtaining at last the fourteenth grandsons, so to speak, of the bacterium originally taken, and this he injected under the skin of certain animals, and even of man, producing in every case erysipelas at the part injected. In man, erysipelas was produced fifteen to sixty hours after inoculation. These experiments on man were justified by the fact that an attack of erysipelas often arrests the progress of certain diseases, such as lupus, and it was on such cases that Fchleisen operated.

*Animal substances that are simply dead, but not contaminated by the presence of germs, are not harmful.* This is a fact of great importance to us, who are constantly using dead animal substances, as silk, catgut, &c., and leaving them in the wounds we make; and there are certain experiments made by Tillmanns, of Leipsig, in 1879, which show this fact with startling distinctness.

This experimenter took pieces of liver, kidney, spleen, and lung, and hardened them in absolute alcohol for one to three weeks, so they were very dead indeed. Some of these pieces were then introduced with aseptic precautions into the abdomen of rabbits; in all cases several pieces were used. Twenty animals were experimented upon, and about one hundred pieces of tissue were used. The animals did not appear the worse for the operation and their temperature remained normal. When an animal was killed early, one to two days after the operation, the masses of dead tissue were found adherent to the inner lining of the abdomen, and sometimes two pieces attached to one another. When killed fourteen days after, the pieces were found firmly adherent, and much smaller; in some places there was only a thick layer of new material containing a pulpy mass in its interior.

One animal had a whole kidney introduced, and was allowed to live for forty-seven days. When examined, the kidney had disappeared; the only thing noticed was a thickish tough spot at one point, where probably the absorbed kidney had been attached.

Microscopically, this is what was seen: After twenty-four hours the mass of dead tissue was found surrounded by a layer of lymph, which glued it to the wall of the abdomen—the same material which I described in my last lecture as filling the gap made in a wound. Any defects in the margin of the specimen were filled by this material.

After forty-eight to seventy-two hours the cells of this lymph were not merely outside the dead piece of tissue, but had penetrated into its interstices, forming streets and pathways of cells through its substance. These cells develop, blood vessels are formed and shoot amongst them, and as this new tissue develops the old is gradually absorbed and disappears.

But remember that these dead tissues were absolutely free from microbes, so that there was no disturbing influence at work, nothing to eat out the life of the new cells, or of the lymph of which they form so important a part, or to lower the vitality of the animal by the poison which they apparently form.

Let us recapitulate once more. We have seen that pure animal fluids and solids, living and dead, have no inherent tendency to decompose, and may, whilst pure, be introduced into living bodies without harmful effects; moreover, that under the microscope nothing is seen in them but the tissues themselves. We have seen that by exposure to air, by the contact of unboiled water, of clothes, bedding, dirt, dust, &c., something is added to them which produces chemical changes ultimately ending in putrefaction, and that in this condition, when taken into a wound, or placed under the skin, they excite destructive inflammation and poison the patient. That now, too, various organisms may be found in them under the microscope.

We have seen that various severe injuries may be inflicted upon a living body in their absence without producing any other effects than those absolutely necessary for the repair of such injuries; but that when these are present the same injuries produce a destructive progressive form of inflammation, with at the same time an effect upon the general health similar to that produced by poison. That locally the effects produced apparently depend upon the actual presence of these organisms, and that distinct varieties of organisms produce distinct diseases.

And incidentally I may be forgiven for directing your attention to the fact, that it would have been impossible to make these things clear, not only to you, but to Surgeons, so that they and you might have solid ground upon which to rely in determining what their and your practice shall be, without the aid of experiment, or in other words,

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