

the result of the special radium reaction. A radium tube had been introduced inside the tumor through the ulcerated apex, and the exterior had been treated by the crossfire method, *i.e.*, by means of placing flat varnish apparatus opposite each other and circumventing the base. Thus an enormous quantity of radio-active energy was introduced, literally saturating the tumor.

The technique was conducted in such a manner as not to produce any irritation or burning of the surface. After the tumor was entirely reduced, there were left under the skin some hard, fibrous nodules. These nodules ought to have been surgically extirpated, for a year after they were the site of a recurrence that we are now fighting.

If we return to our breast case we see that in the last cancerous lobe, the one situated at the extremity, opposite to the apparatus, and six and a half inches distant from them, the histological modifications still exist, though very much less pronounced.

The demonstration given by this case, that radium in a given "radioactive strength" can act strongly at a depth of  $3\frac{1}{2}$  inches and even farther, is most interesting and of practical importance, especially as some observers in Paris have limited the penetrative action of radium to about one inch.

Now I will show you a more precise and definite demonstration of the selective action of radium on cancer cells.

This is, on the same section, a glandular acinus and a little deeper a cancer nodule. The latter received fewer rays than the acini glands, as it was farther from the skin. Nevertheless the first have remained unchanged, whilst the second are undergoing degeneration.

The selective action of radium is thus clearly shown and explains why it is possible to transform deep subcutaneous as well as superficial cancers without causing any irritation of the skin.

How must we understand the transformation? Is it the expression of a real specific action of radium having a special character, special laws? It may be, and I think it is so. But we cannot up to the present say precisely whether this transformation is anything else but a degree of destruction, a more or less resistance of the tissues. In fact, if we increase the doses of rays we find that the changes involve not only the cancer cells but some of the surrounding normal cells; and if we continue to increase the doses we bring about an equal destruction of all the elements irradiated, so producing complete necrosis.

Nevertheless, it must be known that the different tissues which respond to selective action are more or less susceptible to