

RECENT DEVELOPMENTS IN THE TREATMENT OF CANCER.

We print below the conclusion of a Lecture on "Recent Developments in the Treatment of Cancer," delivered by Dr. Stanley Wyard, M.D. Lond., Assistant Physician at the Cancer Hospital, Fulham Road, S.W., and Fellow of the Royal Society of Medicine, at the British College of Nurses, 39, Portland Place, London, W.1.

THE LECTURE.

(Concluded from page 241.)

U.V. rays are of little service in the treatment of cancer. They are of much shorter wavelength than the light rays which we can see, but much longer than even the longest of the X-rays. They are extensively used in medicine nowadays, and one sees it written, or hears it said, that it must be good for us to be exposed to them. This is really utterly wrong. U.V. rays cannot penetrate the thinnest sheet of tissue paper; a coat of hair or fur is absolutely impervious to them. No beast, therefore, is ever exposed to U.V. rays. And why should man differ from beasts in that respect? It may be said that since man lost his covering of hair or fur it was intended he should be so irradiated. Not so. Those peoples who do not clothe themselves—nations of tropical climes—are protected by a layer of pigment in the skin which has the same effect as hair; while white people, if they expose themselves to U.V. rays rapidly develop that, or a similar, protective pigment. The value of U.V. rays is very limited and they should be used with the utmost caution. In the treatment of cancer they do sometimes help to get a malignant ulcer clean and promote the growth of skin over the ulcerated area.

From what I have already said concerning the extension of cancer throughout the body it will be appreciated that investigators have naturally turned their attention with increasing frequency to the discovery of some remedial agent which will act not merely locally on the primary or visible growth, but will gain access to all parts of the body, seeking out and destroying all the malignant cells even in their most remote hiding-places. The most obvious route is the blood stream which does, in fact, reach every organ and tissue. But two difficulties arise. First, the blood supplies all cells alike, both normal and malignant, so that it is necessary to find, if possible, some substance which, in certain concentration, will kill malignant cells and leave unharmed the normal cells. Secondly, only some substances, when introduced into the blood stream, are capable of leaving the vessels and getting into the cells, so that any curative agent must be one of these. But it is well established that blood vessels are not formed in malignant growths, the only vessels present in them are those already present in the tissue before it was invaded by the growth. All cancers are, therefore, poorly supplied with blood and so any substance introduced into the blood will tend to accumulate in greater concentration in the normal tissues than in the abnormal. Nevertheless, certain drugs have been employed in this way, and the method of treatment by the introduction of chemical compounds directly into the blood stream is called chemotherapy. The two essential features of chemotherapy are the direct injection into a vein of a substance of known chemical composition.

For some years copper was thus used without any rational excuse, but was found to be valueless. Then selenium came into favour, equally irrationally, and proved equally useless. The first reasoned effort at chemotherapy was made by Blair Bell who, learning that seeds grown in soil containing small amounts of lead either failed to grow at all, or grew only very slowly; and knowing that lead adminis-

tered to a pregnant woman causes abortion, applied these facts to the treatment of cancer. He first argued that cancer cells are embryonic in type, that they have reverted in their characters to the cells of the embryo that produced them. He then examined the embryos of rats and other animals which had been made to abort by lead, and thought he found a definite poisonous action of the lead on them, while the cells of the mother were clearly not injured since they lived. The animal embryonic cells, and the plant embryonic cells, contained in the seeds mentioned, were both poisoned by lead, therefore malignant cells which, he said, are embryonic, should also be poisoned by lead. It is probable that both his observations are wrong—that malignant cells are not embryonic, and that lead does not cause abortion by poisoning the embryonic cells, but that is by the way. The next step was to prepare lead, which is ordinarily extremely poisonous, in such a way that relatively large doses could be given with comparative safety. This he eventually did, and many others tested the treatment. Three years ago everyone, with two or three exceptions, who had tried it condemned the method. The two or three have not since brought forward any evidence in its favour, and the treatment is apparently completely discarded by all except, perhaps, its originator. There is no evidence that any case of cancer was ever cured by lead, or even benefited by it. All available evidence shows that little, if any, lead ever reaches the tumour. Much of it is excreted in the urine, what remains accumulates in the normal tissues, such as the spleen and liver.

As an outcome of these experiments, Todd tried the effect of lead and selenium combined. After some years of work he has apparently come to the conclusion that lead is useless, but he considers the selenium of value. I do not know if any of you know anything about phosphorus. Anyhow, it is a substance which occurs in two forms—a yellow and a red. The yellow is a very active material—it catches fire and burns in oxygen, it is liable to do so in air and is therefore kept under water; it is luminous in the dark; and it is extremely poisonous, acting on the liver and destroying its cells. Red phosphorus, on the other hand, is extremely inactive—it does not catch fire in oxygen or air, is not luminous in the dark, and is not poisonous. Yet these two so totally different bodies consist of exactly the same matter, just as do charcoal and a diamond. In the same way selenium exists in two forms, a red and a yellow—the former inert, the latter active. The former is easy to obtain, the latter is only obtained with great difficulty and is very unstable, *i.e.*, it tends to change more or less rapidly into the red variety. Todd believes that whereas the red variety is valueless, the yellow variety has curative properties when used in the treatment of cancer. It is still too early to decide as to the value of this method. Very careful and thorough investigation is being made by Todd and his collaborators in Bristol.

All chemotherapeutic measures are difficult of application because the preparation has to be placed accurately inside a vein. They are extremely irritating substances, and a few drops inadvertently placed in the subcutaneous tissues may cause great trouble. At best there is intense pain and swelling of the part. The skin is indurated, hot and tender. In the worst cases sloughing occurs, and a small or large ulcer may form which is extremely refractory to treatment and takes a very long time to heal. But not only are local effects to be feared, the introduction of any of these substances into the blood stream causes more or less reaction. Blood makes a complete circuit of the body in about three minutes, so that one of these preparations when introduced into a vein reaches all parts of the body in that time. If the dose is very small no symptoms may result. With a larger dose there may be no more than a little headache, fever and malaise. With a still larger dose.

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