the patient may be prostrated with a high temperature, intense headache, vomiting and exhaustion. In the case of lead, the kidneys may be affected so that nephritis results, and in a few cases uræmia and death have been caused. It is of the utmost importance therefore to make absolutely sure, before commencing treatment, that the liver and kidneys are healthy, or, at any rate, are capable of adequate function. Then the dose must be fixed, and this can only be done by commencing with a small dose and gradually increasing it until the limit is reached. Finally the patient must be constantly watched to make sure that the drug is not accumulating in his body to a dangerous degree. It is clear, then, that this method of treatment can only be safely and efficiently carried out by an experienced person—experienced both in the manipulative details of the intravenous injection, and in the control of treatment by observation and examination of the patient.

Many attempts have been made to combine radiation treatment with chemotherapy. As I have already described X-rays penetrating a tissue give rise to secondary rays and it was thought that by giving a metal, *e.g.*, lead, intravenously and then irradiating the patient there would be a greater production of secondary radiation than without the metal. Unfortunately the method does not work in practice. In the first place, a metal injected into a vein does not reach the essential cells of a cancer. These cells are collected in masses surrounded by strands of fibrous tissue, and it is in the latter, the normal fibrous tissue, that the metal is deposited. This might prove a not very serious objection if secondary rays originating in the fibrous tissue could thence reach and pass into the malignant cells; but Mayneord has shown that so short is the range of activity of the secondary rays that they are utterly unable to penetrate into the cancer itself. Theoretically, then, the method is hopeless, practically it has proved useless.

Another substance, fluorescein, has recently been used in the same way and for the same theoretical reasons. The results are still being investigated. One hesitates to prophesy that it will fail; but if it succeed it will not be for the supposed reason, for it has been shown that fluorescein is one of the few substances which do not fluoresce in X-rays; and even if it did the secondary rays could not effect anything.

Attempts are now being made to establish immunity to cancer. For centuries it has been known that a person who has suffered, say, from smallpox, is immune from another attack. Later this principle was developed in various ways, *e.g.*, it was found that if dead typhoid bacilli be injected into a healthy person, that person becomes immune from typhoid for a number of years. Further, suppose the red cells of a sheep are mixed with the blood serum of a rabbit, nothing happens—cells and serum remain unchanged. But now let some of the sheep's cells be injected into a rabbit and the injection be repeated every week for five or six weeks. If at the end of this time sheep's red corpuscles be mixed with the rabbit's blood serum the cells are destroyed. That is, the introduction of the blood cells of one animal into another causes the formation in the latter of anti-substances which destroy the cells introduced. This is true not only of blood cells but equally of any other cells. Any cells of one animal injected into another animal of different species causes the formation of anti-bodies which destroy cells of the type injected. No such anti-bodies are formed if the cells of one animal be injected into the body of another animal of the same species.

Efforts are being made to utilise this principle in the treatment of cancer. The cells of a rat tumour have been injected into a rabbit and then the serum of that rabbit injected into another rat with a tumour. Some suggestive results have been obtained but none which is yet applicable to human cancer.

Finally a factor has been discovered in certain foods which appears to restrain the growth of cells: a factor which is apparently the converse of the vitamins. It is now well known that an animal—a young animal fed on a diet deficient in vitamin A does not grow as it should do. The animal remains stunted and does not increase in weight, or only very slowly. If vitamin A be given to such an animal it immediately commences to grow rapidly. The factor now discovered apparently works in the opposite direction—if given to a young, growing animal, growth is slowed down or prevented. It seems reasonable to suppose that if the growth of a young animal can be prevented in this way it may be possible to prevent also growth of the young cells in a malignant tumour. Investigation of this problem is proceeding, but nothing definite can yet be stated concerning it.

THE TUTORIAL GROUP.

ARTIFICIAL FEEDING.

The following paper, prepared by Miss Elizabeth Macintyre, S.R.N., F.B.C.N., Sister-Tutor at Fulham Hospital, on "Artificial Feeding," was read, in her absence, by Miss Le Beau, at a meeting of the Tutorial Group at 39, Portland Place, W.

Artificial feeding may be administered through the following orifices.

1. *The Mouth.*—When the patient is unwilling or unable to feed himself, owing to extreme weakness, paralysis, mental disorder, chorea, or in the case of infants suffering from hare-lip and cleft palate, or who, owing to weakness, may be unable to suck.

2. *The Nose.*—In mental disorder; after certain operations, *e.g.*, operations on the jaw and tongue; in severe inflammation of the fauces, *e.g.*, septic scarlet fever; in some cases of cerebro-spinal meningitis where there is marked head retraction, or opisthothnos; after intubation of the larynx; in diphtheritic paralysis of the soft palate or pharynx.

3. Directly into the stomach following gastrostomy.
   Directly into the œsophagus following œsophagotomy.
   Directly into the intestine following jejunostomy.

4. *The Rectum.*—Artificial feeding in the form of nutrient enemata or suppositories may be given after an operation where there is severe vomiting, until the stomach quietens; in corrosive poisoning; in carcinoma of the œsophagus, if the patient is too ill for gastrostomy; in cases of hysterical vomiting; in severe sea-sickness.

Rules for Artificial Feeding.

1. The temperature of the food to be 99–100° F. unless otherwise ordered.
2. Food must be carefully measured.
3. The prescribed quantity to be given at regular intervals.
4. Everything required must be prepared before starting, then covered with a clean towel, and placed on a table at the right side of the patient.
5. Great gentleness and tact must be used, and no force employed.
6. Scrupulous cleanliness must be observed as to the nurse's hands, the orifice through which the food is to be passed, and the apparatus used.
7. As a rule the nurse can manage alone, but in the case of hysterical, mental, or delirious patients help may be necessary. In the case of a child restraint can be applied,

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