THE CANCER PROBLEM[1]

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First of all, the cancer problem represents that great group of diseases which are put together because of certain characteristics which they have in common. Medical scientists have for a hundred years struggled against a stone wall trying to find the solution of the cancer problem. These attacks have been made through institutions and instrumentalities specially adapted for the purpose. The institution in Buffalo is the oldest in the world for the investigation of cancer. By that I mean the first modern institution, not including cancer hospitals such as the one in Middlesex, England, which have existed a long time for the care of incurable cases. The institution here was the first which was planned for an organized attack upon the cancer problem, and its conception was due to the late Roswell Park, a man of great imagination, insight and purpose. Since the organization of this institution in 1808, from appropriations by the state, institutions of this sort have sprung up all over the world. In the United States we have five or six separate academies or institutions employing scientists engaged in the study of the so-called cancer problem.

Now, after all these years of research and disappointing struggle, we have come to the point where there are a great many things which the profession at large might know of cancer research, and which might interest nurses.

First of all, cancer is not one disease. It has taken us fifteen years to definitely and conclusively satisfy ourselves that that is so. Cancer of the breast is a disease just as absolutely different from cancer of the uterus or cancer of the stomach as an infection of the throat is from an infection of the arm. The reason why the cancer problem has been so complex is that men have thrown together into one group a great group of diseases which have in common the fact that they cause tissue proliferation, and produce certain effects, such as infiltration and the transportation of the cells to other regions of the body in their growth. Years ago men used to talk of abscesses, descending abscesses, cold abscesses, etc., but today you seldom hear any reference to an abscess. If you refer to an abscess you are asked,

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"What kind of an infection is it?" One does not talk of "abscesses" any longer. In that state of our knowledge we simply classified and studied the results of infection, and we dealt with abscesses as though they were definite things. We know today that they are simply accumulations of leucocytes associated with local areas of infection. Similarly, every tumor was put into the so-called cancer group, and everything from embryonic misplaced tissue, associated with growth, to outspoken types of sarcoma, was put together in one group.

Now, through the study of cancer in the lower animals, we have begun to find out the great difficulties, and have learned something about the underlying principles of this group of diseases. Until three or four years ago there was the most continued and bitter controversy, which dates back to almost the beginning of cancer research, as to whether cancer is infectious or not. Today there is no such argument, for the reason that there are, already, a group or two of tumors in the lower animals that we have been able to prove definitely are caused by infectious agents. The best examples and most definitely worked out types of tumors, in this connection, are the sarcomas in chickens, studied by Dr. Rous of the Rockefeller Institute. These chicken sarcomas are of different kinds, at least we have learned the cause of three kinds; a spindle-celled sarcoma, a sarcoma of a peculiar type that grows the blood cells in it; and the osteochondro sarcoma, due probably to a peculiar condition of the chicken. Dr. Rous has been able to get a filterable virus, which , in normal chickens, will cause new tumors to grow through its action upon the connective tissue. All these tumors spring from the same type of undifferentiated connective tissue, and yet each one has a virus which is so specific that it causes the connective tissue to respond in a specific manner and produce a definite type of tumor. Therefore, derived from the undifferentiated connective tissue, you have a spindle-celled sarcoma, caused by a virus, which always and only cause that tumor; you have a spindle-celled sarcoma growing in a peculiar way because blood vessels are always involved in it; you have an osteochondro sarcoma, produced by a virus that can cause connective tissue to form cartilage and bone. If in a little group of tumors such as we have described, there are three absolutely separate viruses always causing the same type of tumor, it is absolutely certain that cancer is not a homogeneous thing. The viruses we have been able to discover are filterable. They are organisms, yet they lie at the very border where no man can tell where the living ends and the inanimate begins. You know from radium the enormous changes in the field of physics; we are told that an atom of uranium contains two or three hundred thousand particles,

like a swarm of bees. I often think when I look into the stars passing into the distance that when we look through the microscope there must be things there too, that go away down beyond our comprehension.

In these filterable viruses we are dealing with things that we cannot see, even with the microscope. A mathematician could figure out just how large they are. When we look at them we see simply a world of cosmic dust dancing about through the field, because every particle of that size goes through the filter. Some of these particles have no characteristics. You can't tell them from an ordinary, inanimate piece of protein or fragment of dust that has gone through.

An interesting thing about the filterable viruses is that today there is quite a difference of opinion as to whether things of that size are alive or not. I don't think that that matters, for this reason: that we do not today know where the border line is between the things which are living and the things which are not living. We already know of certain live viruses which are so small that they upset our entire theories of organisms. There is, for instance, the virus of a chicken pest which is so fine that it will go through a Berkefeld filter that will hold back hemoglobin in solution. We have always thought of a living organism as having at least a few molecules to react one upon the other; but this virus is so fine and will go through such an impervious filter that it undoubtedly falls into the realm of the ultra-microscopic. Yet the chicken pest is so infectious that it goes through ckickens and kills them in twenty-four hours; and runs like fire through a group of individuals. Whether it is animate or inanimate, such a thing must be always considered infectious.

We know that the one best established fact in regard to cancer is that chronic trauma and chronic irritation are more commonly associated with its beginnings than any other known factor; and we have specific types of cancer associated with them. A history of trauma can be elicited in a very high percentage of cases. One might ask himself what kind of trauma is associated with cancer. The answer is that there is no specific kind associated with it. For instance, sarcoma has started as the result of fracture; on the other hand, men have gone their entire lives with lesions and no cancer ever developed. In the Institute, one of our workers, Mr. Marsh, has been working now for three years on susceptible strains of mice with all types of trauma, and he has just about exhausted his ingenuity.

You can breed white mice so susceptible to certain types of cancer that every living individual in a given generation will die of some type of cancer, a rather striking thing. By interbreeding certain strains

of mice you can get 50 to 90 per cent of susceptibles. Breeding the other way you can get some that will resist cancer successfully.

Some men would be very radical, and would assume from discoveries made in cancer research that cancer is caused by infectious agents. I don't think that follows. Cancer is such an enormously broad field that there is room for almost exerything. It would be just as well to say that a large proportion perhaps, certainly a great many types of cancer, will probably be found to be caused by specific agents. There may be some things we call cancer which are not in that group at all and not caused by specific agents. Some day we will break the whole group down and talk of things specifically, by a specific name. We will have a term for cancer of the breast and call that a disease; and also for cancer of the uterus.

It is of great importance in the early recognition of cancer, to look for trauma and chronic lessions. In a woman over thirty-five a lump in the breast is a dangerous thing. It is almost always the beginning of fibro-adenoma, and that is really cancer. Such a lump should be immediately taken care of by a surgeon.

We have heard a great deal about the inter-relation of benign and malignant tumors. Some so-called benign tumors are not benign. They are probably the first stages of cancer. They do not always produce cancer, but there is a reason for that.

Some years ago we discovered that there is a definite and specific immunity to cancer. An animal may develop an immunity sufficient to cause spontaneous recovery, and when that occurs the animal is immune and can never be given that type of cancer again, as far as our experience goes. We have tested animals for two years, which is practically the length of life of a mouse. At the time we published our original work on the subject we were able to collect nineteen or twenty cases of spontaneous recovery in human beings. Some of these cases had had recurrences and evidence of metastases, even, but in the last stages, had recovered.

In the experiments in which the existence of spontaneous recovery was established, we found that the chance of spontaneous recovery is greater in the first stages, immediately after inoculation, when almost 50 per cent will recover. In the last stages, when the tumor is large, only perhaps ½ of 1 per cent recover. It is probable that the nineteen cases in human beings which we find in the literature (which were forced in there, nobody wanted to believe it), represented those very rare cases occurring in the last stages of the diseases. The chance of spontaneous recovery is in inverse proportion to the size of the growth.

Why do so many old people die of cancer? Perhaps one explana-

tion is that toward the end of life their vital processes begin to wane, particularly their splenolymphatic system becomes atrophied. I believe that they are susceptible because their general immunity is beginning to fail.

The immunity to cancer is of exactly the same type as the immunity to infectious diseases. The discovery of immunity to cancer was made in 1904, and yet the realization of that fact is only two years old. Men thought it must be extremely obscure and indefinite, and that it could not be shown by experiment. It took about five years to kill that theory. You know the effect of a great authority, when he goes wrong, is powerful in medical science, and I suppose it is the same in nursing.

It was definitely shown by Dr. Murphy of the Rockefeller Institute that if you take a chicken egg, incubated to the point where the blood vessel system is established, you can inoculate with mouse or rat cancer or almost anything; you can grow normal tissues by planting them into the so-called breathing membrane of the chicken, and they will grow. You can't grow rat cancer in a mouse or vice versa, or mouse cancer in a rabbit; in other words there is a complete species specificity. But a chick, being incubated in an egg, depends for its resistance upon the shell, it has no immunity of any kind, and if you break that shell and put something on that embryo it will grow until the chicken is hatched. After that it begins to develop the specificity of the chicken and you cannot inoculate it successfully.

Dr. Murphy hit upon a remarkable experiment. He discovered that if you implanted a tumor from a mouse, rat or chicken, in a chick embryo, and then planted along with it a little spleen tissue, if the spleen tissue grew the tumor would not grow. Then he found after the tumor started that if you put spleen tissue in it the tumor would go away. He therefore concluded that the establishment of the splenolymphatic system was what established the immunity. That raises the very interesting question as to whether or not all immunities are not the result of reaction to environment. We have a potential of immunity in us, but it takes the insult to bring it out.

Dr. Murphy then took mice and injured their spleens with the X-ray. If he injured their spleens just enough he found he could grow a rat cancer in a mouse, and vice versa.

Some years ago we found in the Institute that if an animal were inoculated with a tumor which then remained stationary, if the animal were bled it was frequently possible to make the tumor grow. We also found that if the animal were anesthetized for three or four days in succession the same thing would happen. Surgeons are just be-

ginning to realize this. Long and severe operations, with anesthetics like chloroform, are very injurious to the immunity.

One thing which a cancer patient depends upon for recovery is the concomitant immunity which develops along with the disease. It is not always enough to hold the disease in check, but it is enough to produce latency. Why is it that cancer does not return for ten years, and then all at once returns? It has been there all the time. We do not today know how to use that immunity, how to build it up and reinforce it, and use it as a basis to combat cancer. If a patient recovers from an early operation for cancer it is not necessarily because the surgeon cuts it all out at first, but because the patient has some immunity. That is the reason the nurse should be on the lookout for early cancer. Better still is it that if you know that a mole, which can be irritated, or a cracked lip on a man who smokes, is a dangerous thing. It is infinitely better to remove those simple things by surgery and be done with it and never know whether it was cancer or not, than to wait and find it is cancer.

For the past few years we have examined any specimen which any surgeon in the state of New York has sent to the Institute. In the first years of that work every case we got was cancer. Dr. Simpson, who examines the specimens, writes letters to the country practitioners, and gives them all the advice he can, and to-day about one-half the cases sent in for diagnosis are not cancer. They are border-line things where the pathologist is not sure. So you see we are making progress. It is not worth while for any healthy individual to take a chance with any lesion that is any way associated with cancer, because in the beginning they are almost all simple things which can be, and ought to be, taken out. There is perhaps just one exception and that is an adenoma of the breast or lumps. In young girls they are simple and can be practically ignored, but beyond the age of thirty or thirty-five no lump in the breast, especially in a woman who has borne children, is a thing to be overlooked. I suppose you know that beyond thirty-five one woman in every eight dies of cancer and one man in every eleven. Tuberculosis, which used to be twice as great as cancer, is now on the toboggan, going down 4 or 5 per cent in a decade, but cancer is increasing at the rate of something like 20 or 25 per cent every ten years, and it is something about which we know nothing. Some of this increase is unreal, being due to the way statistics are kept, but in every civilized country there is a great increase in cancer.

The thing of today is to know that the first stage of the disease is the time in which something can be done. See that patients do not hide lesions or put off visiting the surgeon; and particularly should

the nurse talk to women. The surgeons are partly to blame, because they operate on cases that are too far gone. A patient sometimes will not go to the surgeon because she knows the Mrs. So-and-So, down the street had cancer and five operations and died anyway. The result is that she conceals any lump in her breast.

Surgeons are beginning to realize that it is perfectly useless to operate in the last stages. Their attitude always was that they must do something for the poor patient. We are coming to a realization of the fact that in the last stages of cancer we cannot help it. We can only prescribe early surgery. There is a limited field in skin cancer for the X-ray and for radium, but the best thing of all is to remove the cancer before it has developed.

NATIONAL CONFERENCE ON CHARITIES AND CORRECTIONS

An American conference on practical social adjustment during the war might be written as a sub-title for the National Conference of Charities and Correction meeting at Pittsburgh June 6–13. The abolition of poverty and other preventive considerations were uppermost in the minds of those who planned the Pittsburgh meeting a year ago. These distant goals will be kept in view in spite of the turn that has been given to program plans recently. The management of the Conference, however, finds that the well nigh revolutionary effect of war demands upon community relationships and upon the outlook for practical social service cannot be ignored.

"Charity and social work cannot go on in the usual way during the war" is the statement of Edward T. Devine of New York. Professor Devine is chairman of a special division of the Conference devoted to social problems of the war. With the coöperation of Ernest P. Bicknell, Director of Civilian Relief of the American Red Cross, he has outlined a series of conferences with a view to stabilizing and giving direction and force to humanitarian efforts during the war. Several speakers of note are scheduled in this part of the program, including Herbert C. Hoover, William H. Taft, Samuel Gompers, and Miss Helen R. Y. Reid. Miss Reid is Director and Convener of the Ladies Auxiliary of the Canadian Patriotic Fund.

Except for the manifest need of consultation this large gathering would not be called together at this time. Frederic Almy will preside at the Pittsburgh Conference. He has announced as the subject of his presidential address "The Conquest of Poverty." Plans are under way in the Conference for a higher degree of concentration of social forces in America in the future.