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CHRONIC CYSTIC MASTITIS—ITS RELATION TO CANCER OF THE BREAST*

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NOT a little confusion of opinion has existed and still exists on the question of the precancerous nature of breast cysts. From this confusion arises uncertainty as to the extent of operative resection necessary to protect patients with breast cysts from future cancer.

It is the purpose of this paper to advance an uncomplicated classification of cystic disease of the breast into two great types which will answer these questions logically and clearly.

The term "chronic cystic mastitis" is perhaps a misnomer, since it is improbable that inflammation plays any active part in producing breast cysts. It is not intended here to inquire into the cause of breast cysts, but, of all the terms applied to the condition, that of "abnormal involution" perhaps comes as near to the truth as any and will be adopted for the purposes of this paper.

We may then diagram involution of the breast as in Figure 1, understanding that in sketching abnormal involution, it is not meant to be inferred that all stages are followed in sequence or that all will be found in any individual breast, but that the scheme is definitely diagrammatic.

Normal breast tissue, when senile or presenile involution occurs, may be changed into either (1) the typical "senile breast" in which there are few gland lobules containing a small number of acini, or no acini at all but only a few ducts, carried in a large amount of fibrous stroma or fat; or (2) it may undergo "abnormal involution."

The chief common characteristic of all forms and stages of abnormal involution is an increase in the number of individual gland elements—ducts or acini or both—and the first stage in the process, shown in the diagram, is one in which there is only increase in the number of gland elements. The lobules are full, contain many acini and are often packed closely together. Each duct or acinus, however, presents a fairly normal appearance under the microscope. There are described changes in the periacinal connective tissue in abnormal involution, but the size and contour of the acini and the amount of epithelium at least remain practically unchanged.

CYSTS OF ABNORMAL INVOLUTION

It is from this point on that the two broad types of abnormal involution diverge, and the divergence is concerned with the amount of epithelium and its arrangement in the single gland element—duct or acinus.

In the *productive* or *hyperplastic type,* on the mains smooth and of the same thickness during the enlargement of the acini or ducts through various stages of ectasia and microscopic cysts to macroscopic cysts. And when such cysts have attained large size their epithelium tends even to disappear (possibly by atrophy from pressure of accumulated fluid contents) leaving a fibrous wall unlined by epithelium. This is the "blue-domed cyst" of Bloodgood—the simple serous cyst.

In the *productive* or *hyperplastic type,* on the other hand, as the acinus or duct enlarges to cyst size, the epithelial lining is proliferated into several layers or into smaller and then larger folds and finally, often, into papillomata of macroscopic size, composed of almost solid epithelium. This process results in single papillomatous cysts, in "duct adenoma," in circumscribed or generalized cystadenoma or a combination of these.

Now, inasmuch as cancer arises from epithelium and only from epithelium, we would not expect to see it often originate where there is little or no epithelium as in the smooth-walled serous or "blue-domed" cyst. Furthermore, it is in general a characteristic of cancer to arise in abnormal rather than in normal epithelium. It would be expected to arise in cysts or in duct adenoma (productive type of abnormal involution) where the epithelium of the individual element is much increased and where also it is abnormal in its growth and arrangement.

INCIDENCE OF CANCER IN CONNECTION WITH VARIOUS TYPES OF CYSTS

These expectations prove to be correct. Cancer is very rarely found arising in a simple, smooth-walled cyst. Bloodgood [1] has never observed cancer in the wall of such a cyst. Cheatle [2] has observed three cases, but has published no detailed description of the relation of the cancer to the cysts in these cases. Bartlett [3] has observed one case of cancer arising apparently independently in the neighborhood of multiple small blue-domed cysts. These are exceptions to the rule. Cancer

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arises no more often in breasts, the seat of simple cysts, than in apparently normal breasts.

On the other hand, papillomatous cysts and cystadenomata not infrequently suffer malignant degeneration. Greenough and Simmons [4] found that of a series of patients operated upon for chronic cystic mastitis, 5 per cent later developed cancer in breast tissue remaining from the first operation. The cases of chronic cystic mastitis discussed in their article were not separated into a hyperplastic and a nonhyperplastic group, but in three of the four cases later developing cancer the description given of the tissue removed at the first operation is typical of the productive or hyperplastic type of abnormal involution.

Bloodgood [1] considers that cancer is to be found at operation in the first instance in 10 per cent (or slightly less) of cystic adenomata and in as high as 50 per cent of diffuse bilateral cystadenoma (Reclus' disease).

In the surgical pathology laboratory at the San Francisco Hospital (University of California Service) there are to date nine specimens presenting unencapsulated cystadenoma of the breast. In six, a lump was present in but one breast (K-243, K-412, K-447, K-925, K-556, K-435); in three, both breasts were diffusely involved (K-667, K-836, K-985). In four of the nine cases, cancer had already developed—in two of the unilateral cases (K-556, K-435) and in two of the three bilateral cases (K-836, K-985). In one of the bilateral cases cancer had already developed in both breasts (K-985). Two of the cases with cancer died within two years of recurrence; in a third, axillary metastases were present. The fourth patient could not be traced. Curiously enough, two of the four cases of cancer were in male breasts.

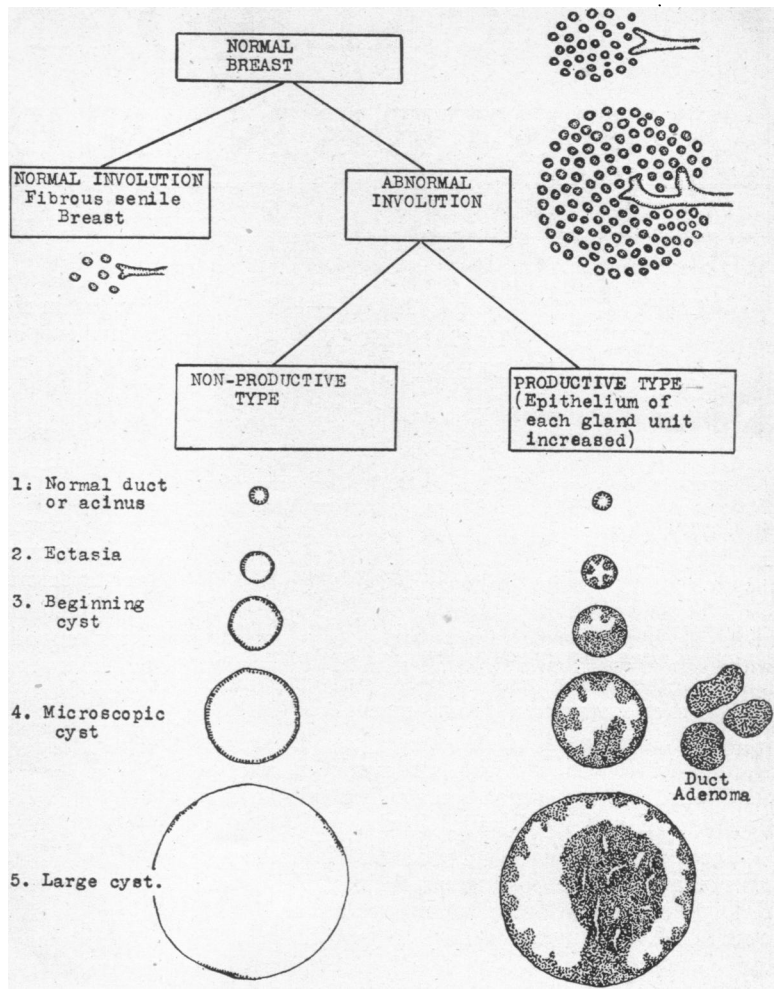

Fig. 1.—Scheme of involution of the breast.

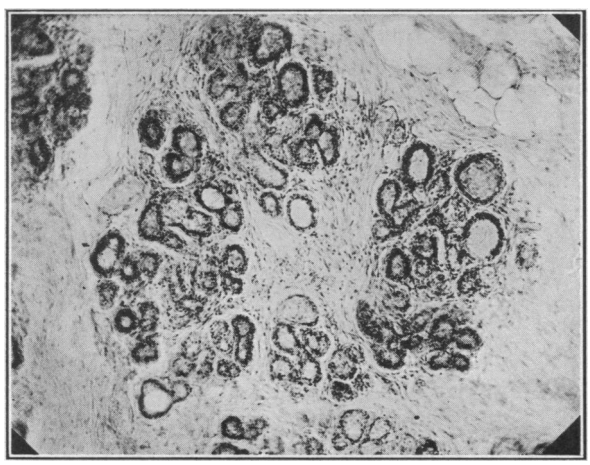

Fig. 2 (K-667).—Early stage of abnormal involution. Increase in number of acini. Beginning dilatation.

In this small group of cases, therefore, one-third of the cystadenomata have presented cancer at the time of operation. On the other hand, thirty breast specimens presenting the nonproductive type of chronic cystic mastitis have been studied and in none of these has cancer been found.

Recognition of the existence of two types of cystic change in the breast is not new. Both are described by various authors, and a very comprehensive discussion of the subject is to be found in Deaver and MacFarland's text on "The Breast." [5] The tendency has been to regard all cysts of abnormal involution as part of one process, if not actually as successive stages of one process, as does Sir Lenthal Cheatle.[6] In their significance, as regards cancer, however, there is urgent reason for clearly differentiating them as has been attempted in this paper.

It was stated earlier that the classification here proposed is diagrammatic. Few processes that go on in human beings divide themselves sharply into hard-and-fast groups, and abnormal involution is

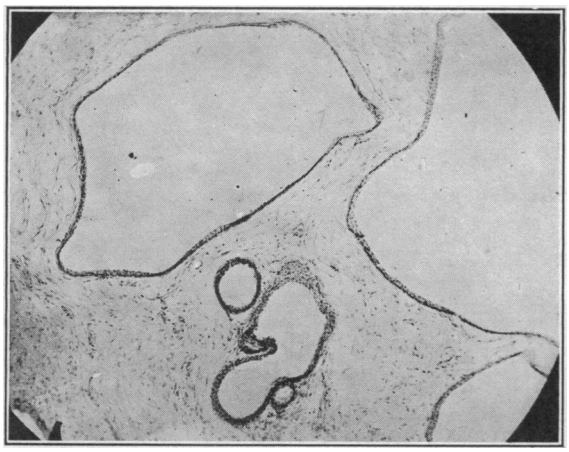

Fig 3. (K-412).—Smaller and larger cysts of nonproductive type. From zone of breast outside a circumscribed area of cystadenoma. Same case as Fig. 5.

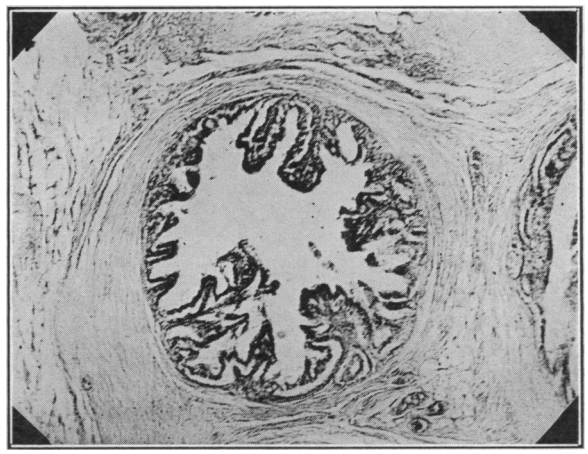

Fig. 4 (K-556).—Early cyst of productive type. Male breast, showing diffuse cystadenoma with one area of typical scirrhous cancer. Died of recurrence two years after operation.

no exception. Bloodgood [1] describes typical hyperplastic changes in the zone of breast tissue about some of his simple serous cysts, and in most specimens of cystadenoma one finds simple smooth-walled cysts, at least of microscopic size, together with those of hyperplastic type. Nevertheless most specimens removed at operation will be found to present a general or at least a local predominance of one or other type, so definite as to present comparatively little difficulty in deciding to which group each belongs.

GROSS APPEARANCE

The two great types of abnormal involution usually present gross features permitting recognition at the operating table. The nonproductive type presents one or many, large or small, smooth-walled serous cysts with breast tissue presenting the usual mixture of fat and fibrous stroma of normal color and fairly normal elasticity. The productive type presents single or multiple papillomatous cysts or a diffuse process of larger or smaller extent, with small cysts plugged with whitish-yellow necrotic material. The entire mass is typically harder and less elastic than normal breast tissue and often presents a distinct yellowish tinge on cut section.

SURGERY

Rational surgery of cystic disease of the breast follows logically from the pathology and the tendency to cancer discussed. For isolated areas of the nonproductive type of abnormal involution, including the single blue-domed cyst, the establishment of diagnosis by exploration and the removal of the lesion and a small zone of surrounding breast is sufficient. Conservation of the remaining breast is entirely justified. The breast is not more likely to develop cancer than is normal breast. There are only two reasons for removing the whole breast: (1) the possibility of small cysts in remaining breast tissue later developing into large cysts, *i. e.*, recurrence requiring the annoyance of another operation, a risk estimated by Greenough and Simmons [4] as not over 10 per cent; and (2) the possibility that if cancer should develop the patient might fail to observe it in the

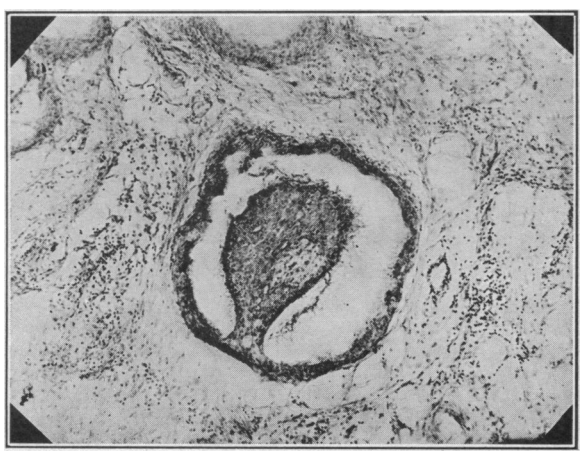

Fig. 5 (K-412).—Papilloma in small cyst of productive type. Circumscribed cystadenoma occupying approximately one lobe. Excision with zone of surrounding breast; remainder of breast conserved. Well three years after operation.

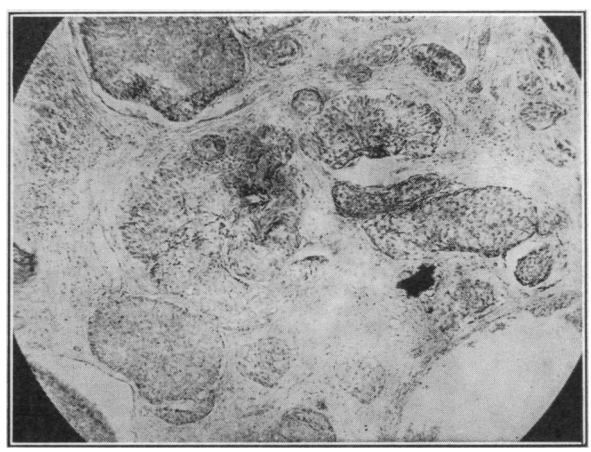

Fig. 6 (K-435).—Duct adenoma, possibly early cancer. Diffuse cystadenoma occupying one-half of one breast. One small area of typical scirrhous cancer found. Immediate radical operation. One axillary gland involved. Dead of cancer two years after operation.

presence of an otherwise "lumpy" breast. Certainly neither of these reasons is an absolute one.

In the productive type, on the other hand, it is essential that all the tissue affected by the process be removed—local removal of an entire localized area—removal of the entire breast or of both breasts if the process be diffuse and general. Furthermore the physical characteristics of cystadenoma make it one of the most difficult of benign lesions to differentiate from cancer at exploration. Since the process frequently involves a considerable amount of breast and frozen sections of one or a few scattered areas cannot be safely trusted to rule out cancer, and since experience shows that cancer is already present at the time of first operation in a considerable number of cases, the surgeon must be prepared to do an occasional radical operation when the pathology is in doubt.

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DISCUSSION

ELMER W. SMITH, M. D. (St. Mary's Hospital, San Francisco).—Doctor Kilgore's paper on the subject of chronic cystic mastitis covers a very important phase of breast tumors, and his classification of conditions is a very good one which I feel serves to clear the field considerably in this line of research.

I quite agree with him that the large blue-domed cyst is probably not a product of inflammation. Though we may find lymphocytic infiltration around some of these cysts, it is not an unusual finding in the presence of any tumor.

My own conception of a chronic cystic mastitis is that of the smaller, multiple, dilated acini that one encounters in regions of proliferating interstitial fibrous tissue, which shows marked collections of lymphocytes. Cysts so produced, I believe never reach the proportions of the single blue-domed cyst or cyst adenoma of Doctor Kilgore's nonproductive type. This condition may be an incitant of cancer. While reports of malignancy, occurring in the cystic adenomata, are relatively rare, I believe that it does occur. A few years ago I saw one removed that was about two centimeters in diameter and appeared to be so typical of the blue-domed type that the surgeon was ready to close the wound, but gross incision showed solid tissue on one side, and a quick frozen section demonstrated atypical epithelial cells with mitoses and other characteristics of a malignant epithelioma. The breast was removed by radical operation. Whether the tumor was a proliferative form of Group 1, or a degenerative form of Group 2, of Doctor Kilgore's classification I cannot say, but it certainly points to the necessity of careful inspection before passing upon the benign qualities of any breast tumor. I feel, in regard to the proliferative type of tumors, that when in doubt about the malignant tendency we should, for the safety of the patient, recommend ablation of the entire glandular structure. For, as Doctor Kilgore says, we may miss actual malignancy by some of our methods of hit-or-miss sections. The operative mutilation is not very great, and I do not feel that the muscles and underlying fascia should be cut unless there is fairly conclusive evidence of cancer.

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JAMES F. PERCY, M. D. (1030 South Alvarado Street, Los Angeles).—As a record of laboratory investigation in breast cancer, the work reported today by Doctor Kilgore is of definite value. With a larger number of cases studied with the same care, data of increasing value that may be utilized for the benefit of the patient when he comes to one's office, or is seen at the operating table, will be available.

Unfortunately tumors of the breast as yet do not safely lend themselves to a quick clinical or microscopic diagnosis. No better confirmation of this can be found anywhere than in the illuminating, striking, and exceedingly valuable articles referred to by Doctor Kilgore in the *British Medical Journal* and *British Journal of Surgery* by Sir G. Lenthal Cheatle. These papers describe actual experiences where the first reports from a frozen section characterized the tumor as benign, to be followed later by one that unmistakable malignancy had been found. Doctor Kilgore recognizes and suggests this possibility when he tells us that "few processes that go on in human beings divide themselves sharply into hard-and-fast groups and abnormal involution is no exception." It is this ever present definite uncertainty that makes the judicious pause when it comes to expressing a decisive opinion as to the exact nature of a palpable breast tumor before removal and careful laboratory study. And yet it is a positive diagnosis that the patient is looking for, and usually he expects it at the first visit to his physician. Unfortunately palpation and inspection is the least certain of all the methods of diagnosis at our command in the early or late case of breast cancer. By the same token the gross appearance on removal of any tissue in question when sectioned will often present presumptive evidence to the experienced as between the productive and nonproductive types of breast involution. But such proof should not be employed as the final word unless it unquestionably seems to justify a radical type of breast removal. If it is, occasional regrettable mistakes are certain to be made.

The most reliable methods in pathology will always remain with diagnostic experts such as is Doctor Kilgore, following the deliberate laboratory study procedures suggested in his paper. But unfortunately this slower but more dependable technique is not ideal from its practical aspects, because of the delay before the results of the investigation can be known. The inherent dangers of this postponement can be greatly minimized and indeed probably entirely overcome if, when practicable, two things are done as the most essential part of the biopsy technique. First, that the involved tissues be removed only with the cautery. And second, that all of the visible and palpable structures in the pathological process be removed. This, from my point of view, is the only perfect and complete biopsy, and when combined with an immediate frozen section, permits of the most reliable determination of the character of the pathology in the breast, especially when passed upon by a trained and experienced pathologist. But even when these all but ideal conditions obtain, I have seen mistakes occur that were most difficult when attempts were made to explain them away. It is the horns of dilemmas such as these that make the articles just referred to of Sir Lenthal Cheatle so illuminating and of so much practical value. The positive frozen section prepared in this way at once settles our doubts and with the least possible chance for untoward results to the patient.

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EDWIN I. BARTLETT, M. D. (490 Post Street, San Francisco).—The failure to recognize and correctly treat carcinoma of the breast in its earliest stages when cures are possible is the greatest tragedy that can befall a conscientious surgeon. The patient, on the other hand, finds herself between two dangers, namely, the loss of her life through incomplete surgery in the

early stages of carcinoma, and the unnecessary sacrifice of her breast. Any woman will unhesitatingly suffer mutilation in order to save her life, but the unnecessary sacrifice of a breast is to her a tragedy of only slightly less degree than loss of her life. The up-to-date surgeon today can assure his patients that they need have no fears regarding mistakes either of omission or commission. He employs the exploratory incision and through a knowledge of the gross and microscopic pictures can proceed with the treatment with absolute certainty.

Bloodgood is accredited with the adage that simple amputation of the breast is not enough for carcinoma and is too much for anything else. There are exceptions to the rule regarding the simple amputation of the breast, and Doctor Kilgore has named and described them. The cyst adenoma which he discusses may either be benign or malignant. Ofttimes the benign form is diagnosed cancer, and this error has resulted in some reported cures of cancer without the complete operation. At any rate, cystadenoma is precancerous if not already malignant, and calls for amputation of the whole breast or the complete operation. It should be emphasized, however, that the exceptions to the rule constitute only a very small percentage and that complete removal of the breast is seldom justified.

Doctor Kilgore's paper is timely and instructive. A surgeon is no longer justified in operating on any breast without a knowledge that will enable him to interpret what he sees at exploratory operation or without a pathologist with that information to advise him. Furthermore the time has come when hospital pathologists must be thoroughly trained in breast-gland histology because the number of breasts to be explored is already considerable and is increasing rapidly. Careful study of this and other articles is highly recommended and, above all, thorough study of all breast specimens both at the operating table and later in the laboratory.

THE FULL-TIME PROFESSORSHIP IN MEDICAL EDUCATION

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FOR over a decade physicians and educators have been concerned with a phase of medical education known as the full-time or whole-time system. The subject is of unusual importance and has provoked one of the most stirring and bitter controversies recorded in medical history. Upon its solution depends, to a large extent, the future of American medical education.

Only to emphasize how critical this question has become, it is interesting to note that Harvey Cushing in his recent biography of Osler still fears to make public Doctor Osler's letter to Remsen on the full-time system because as he says, "It is too intimate to publish in full until the still troubled waters he speaks of shall have temporarily quieted down to await the next beneficial agitation." Any analysis of the system is extremely difficult, for it is dependent on a wide variety of factors, and the results at various institutions are by no means uniform. Nevertheless there are certain remarks which are applicable to the entire system, and changes to be made which should prove generally beneficial.

AMERICAN ORIGIN OF THE FULL PROFESSORSHIP SYSTEM

To define the full-time system may best be done by quoting the original announcement of the General Education Board of the Rockefeller Foundation when, in 1913, the sum of one and a half million dollars was given to the Johns Hopkins Medical School "for the purpose of so organizing the departments of medicine, surgery and pediatrics that the professors and their staffs might completely withdraw from private practice in order to devote their entire time to their respective departments." Needless to say this announcement created tremendous agitation and medical men at once became divided in their opinions on the matter. The benefits of the plan are, of course, apparent to everyone. How much more advantageous it would be if men of ability, unhindered by the trials and financial worries of private practice, could devote all their time to the hospital, the students and to research. The arguments against the plan may best be stated by quoting extensively from Osler's letters (Cushing). It must be remembered that Osler, as Regius Professor of Medicine at Oxford, was not only the leading physician of the day, but a classical student of considerable reputation and an educator as well.

OSLER'S VIEWPOINTS

The first letter was written to Doctor Remsen and intended for the Hopkins faculty only:

" . . . The subject of whole-time clinical teachers, on which I send you the promised note, is one of great importance, not only to universities, but to the profession and to the public at large. It is a big question, with two sides. I have tried to see both, as I have lived both, and as much perhaps as anyone, can appreciate both. . . . These are some of the reasons why I am opposed to the plan as likely to spell ruin to the type of school I have always felt the hospital should be and which we tried to make it—a place of refuge for the sick poor of the city; a place where the best that is known is taught to a group of the best students; a place where new thought is materialized in research; a school where men are encouraged to base the art upon the science of medicine; a fountain to which teachers in every subject would come for inspiration; a place with a hearty welcome to every practitioner who seeks help; a consulting center for the whole country in cases of obscurity. And it may be said, all these are possible with whole-time clinical professors. I doubt it. The ideals would change, and I fear lest the broad open spirit which has characterized the school should narrow, as teacher and student chased each other down the fascinating road of research, forgetful of those wider interests to which a great hospital must minister."

In an address at St. Bartholomew's Hospital the subject is again discussed:

" . . . It is attractive to think of a group of superclinicians, not bothered with the cares of consulting practice, and whose whole interests are in scientific work. It is claimed that as much good will follow the adoption of the plan of whole-time clinicians as has followed the whole-time physiologists and anatomists. Against it may be urged the danger of handing over students who are to be general practitioners to a group of teachers completely out of touch with the conditions under which these young men will have to live. The