An Address ON THE IMPORTANCE OF EXPLORATORY INCISION IN CANCER OF THE BREAST.*

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LECTURES given to students and addresses given to practitioners are two different things; one dogmatizes in the former, and the student, having no experience, has perforce to take what is offered him. The practitioner, however, is a person who has experience, who has formed his own opinion. We all have our own ideas—some may be right and some may be wrong; but in any case we have formed them slowly and we shall only change them slowly. At the same time, it is difficult to gauge how much of our original teaching tinges our views, biases our minds, and governs our judgement. At first it must do so very largely, as time goes on to a less and less extent; to a less and less extent, too, as we keep ourselves abreast of the times and hear new views. It is with this object in view, doubtless, that you ask men from the teaching schools to address you.

In this sense I come to lay before you my views on what I believe our procedure should be in connexion with the early diagnosis of cancer of the breast. These views represent the present trend of thought, or the direction in which I hope we are travelling; they are by no means final, and will probably be changed in the next generation, but you will find that they resemble in no way the teaching of twenty years ago. These views may seem extreme to some because they are new, and all new views seem at first extreme; but they will presently be accepted by all, taught in our medical schools to the younger generation, and pass in time into the limbo of what is old-fashioned.

In the first place, it will be as well to define what is here meant by "early carcinoma of the breast." To me it is an indefinite something or an undefined thickening—we are not quite sure; it is difficult to make out; at all events, there is not a single sign of malignancy, and nothing even to bring malignancy to mind. That, I consider, is possibly early cancer of the breast. Anything which has any characteristic of malignancy I no longer regard as early; it is sufficiently well established to give rise to signs and symptoms. This early stage is the time at which cancer of the breast can be diagnosed if we will do it, and that is the time, and the only time, that we can almost guarantee a cure to our patients.

The breast is the one place where cancer is seen early; it is the one place in which a radical operation can be performed—that is to say, it is the one place in which the growth, the glands, and the whole lymph field is removed in one. Compare it with carcinoma of the abdominal viscera: in the abdomen we cannot even begin to suspect cancer until symptoms develop; ulceration occurs and blood is passed, diarrhoea is constant or obstruction threatens; but even then we may not be able to locate it, above all we can do nothing approaching a radical operation. Compare it with a superficial growth like epithelioma of the lip; we remove the growth and also the glands of the neck; we do not remove the lymphatics by which spread has taken place, neither can we remove all the glands of the neck, but we rest content with what we do; luckily, epithelioma is not nearly as malignant as cancer of the breast, and therefore our results escape criticism. In cancer of the tongue, to take another example, we remove the growth and we remove as many glands as we can; many glands are, however, left behind, and the lymph

field is untouched; our results are what we should expect in such cases.

All know the signs and symptoms of cancer of the breast, so I need not waste time upon them except to draw attention to the fact that they are all due to one thing—namely, extension of the growth. The growth must extend for these symptoms to be suspected, to appear, and to develop. We need, therefore, only assign their appropriate value to each of them in their order of importance.

Fixity of the skin is the earliest sign of malignancy it is possible for us to have, and is the most suspicious and significant. But the time at which it develops is not constant. Gross saw it develop in about two months, but states that it is usually about fourteen months before it is developed. Fourteen months is a long time to wait in order to get the first sign of malignancy. If the onset of the cancer is in the superficial parts of the gland, then the skin is attacked earlier than if it starts in the deeper portions. It is seen better and earlier in a thin person than in one in whom there is a thick layer of adipose tissue. A cancer may therefore become well established before even puckering, wrinkling, and anchoring of the skin develops at all. There are other conditions, too, in which it is found: old fibro-adenomata, chronic abscess, tuberculous masses, and occasionally in chronic mastitis.

Retraction of the nipple is the next sign of importance, and this, again, is quite inconstant. It is present early in cancer which starts near the nipple, and is absent till quite late, and may never develop, if the cancer starts at the periphery of the gland. Another important fact is that in the rapidly growing carcinomata the opposite may occur, and the breast become prominent and the nipple protrude, while it is well seen in the less malignant and more atrophic forms. It is also present in any chronic condition in which fibrous tissue forms, so that it is met with in chronic abscess and chronic tubercle.

Enlargement of glands in the axilla is a sign to which some attach great importance, but personally I think it one of small significance. Cancer can hardly grow without being accompanied by chronic mastitis, and chronic mastitis nearly always causes enlargement of the axillary glands. In addition every form of inflammatory change will cause enlargement of the glands in the axilla, and therefore very little reliance should be placed upon this sign. Far more important really is the feel of those glands; small but very hard glands are far more significant than large ones.

Often enlarged glands can be felt in connexion with cancer of the breast, and yet when examined after the operation nothing malignant is found in them. On the other hand, during the operation small glands are sometimes found right up at the apex of the axilla; in the triangle between the first rib, the clavicle, and the coracoid process, which cannot be felt, are not enlarged, but yet are infected. Stiles pointed this out long ago and drew attention to the fact that it was impossible to feel them. They become infected as a rule through the lymphatics which run upwards between the pectoral muscles and which pierce the costo-coracoid membrane; sometimes there are infected glands lying on the costo-coracoid membrane.

Age is, I think, a great factor in diagnosis; sometimes, however, it is misleading. The commonest age at which carcinoma of the breast occurs is between 45 and 55; all agree upon this. All agree too that after this age carcinoma is very frequent, and I think in the minds of all of us there is the impression that the older a person is the more likely is any given lump to be a carcinoma, and this is true because the inflammatory conditions in the breast are less likely to occur in a withered and functionless organ. There is the general impression too that carcinoma hardly ever occurs in people under 35; nothing, however, could be more misleading. I know of several cases which occurred in the teens. Thompson and Battle and Mayberry reported cases at 11 years old, one of which was a squamous-celled carcinoma; Commichael one at 12 years; Home one at 15, which was bilateral; and Brewer one at 16.

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If we go to the male sex, Blodgett noted carcinoma in a boy of 12 and Bryan in one of 14. A little while ago Professor Pannett took the second breast from a woman aged 34 in St. Mary's Hospital, having removed her other breast nearly eight years previously. Rodman in a collection of 5,000 cases found that 9 per cent. were in people between the ages of 20 and 30. All through the public records you would be surprised at the number of cases recorded, not on account of the age, but for some other reason, in which the age was under 30. So that you cannot exclude carcinoma merely on account of youth, and we must correct the very strong and almost irresistible tendency we all have to do so. We all, in spite of ourselves, tend to acquit a tumour of the breast of being malignant merely because it occurs in a young person, a thing we are in no way justified in doing.

These are the signs upon which we rely for suspicion of cancer. There are others, such as discharge from the nipple, which is very rare; it is present in only about 3 per cent. of the cases. Fixity to the muscle or chest wall, the condition of "pig-skin," ulceration of the skin, enlargement of the supraclavicular glands, are all very late symptoms, and need not be considered. When they are present the question of diagnosis no longer troubles us; we then only have to decide if an operation can still do any good.

DIAGNOSIS.

There are three different classes of cases clearly distinguished in my own mind into which the patients may be divided.

In the first category there is the patient who obviously has cancer; the first glance at her breast tells us so. Here all the signs and symptoms which characterize malignancy are fully developed. The nipple is displaced, the veins are enlarged, the skin bound down and may be ulcerated with a fungating and discharging sore, pig-skin appearance widely developed over a large area, and small nodes and nodules visible in the skin round about; large masses are visible in the axilla and above the clavicle. The patient is thin, emaciated, and anxious-looking. She excuses herself for not seeking advice sooner, giving every excuse except the real one—that she was afraid. She regards us anxiously, guiltily, and beseechingly, hoping against hope for a comforting and favourable verdict; but in her own mind she has made the diagnosis, and she has made it correctly without any medical training. What more does the picture need? Fortunately these cases are rarely seen, though probably every practitioner has come across one or more such patients who have hidden their condition till the last moment. Here, then, the problem solves itself.

The next category is where there is a definite mass in the breast, the nature of which is doubtful. Here the question of diagnosis is one of the most important which can be put to the medical man—so much depends upon it. The greatest skill, care, and trouble should be taken to arrive at a correct diagnosis. There is no infallible guide: skill, experience, common sense, and that curious faculty we call intuition, all come to our aid in a way it is impossible to explain.

In the case with which we are dealing the signs are not sufficiently developed for us to differentiate clearly, and the question arises, Are we dealing with a malignant or innocent tumour? An innocent tumour is here taken to include all inflammatory conditions as well as innocent. To take first the probabilities. It is estimated from large numbers of collected figures from various sources that 80 per cent. of all tumours of the breast are malignant and 20 per cent. innocent. That is a proportion of 4 to 1 in favour of malignancy. These figures, to my mind, are not quite accurate; they are derived very largely from hospital records, but records are only kept of those cases which are of sufficient importance to gain admission to the institution, and many small innocent cysts, tumours, and miscellaneous inflammatory masses, of which no records are kept, are dealt with in out-patient departments. We shall therefore possibly be more accurate if we say that 70 per cent. are malignant and only 30 per cent. innocent.

I am putting it as fairly as I can. This, in sporting terms, is nearly $2\frac{1}{2}$ chances to 1 that the condition is malignant—a figure which at once must forcibly attract our attention. With these odds in mind, it is only right, it is only safe, to regard all tumours as malignant until we have proved them innocent. This is the only way in which we can do justice to our patient. We have unfortunately a natural tendency which is almost irresistible to do the exact opposite, and to regard all tumours as innocent till malignant symptoms develop.

The things which guide us to a correct diagnosis are all small in themselves, and we can take them in order.

The presence of pain in a small growth is very much against the mass being cancer; similarly, but to a less extent, is the presence of pain on handling the mass. Inflammatory masses are often more or less painful or tender; cancer is a painless malady till the later stages. Pain is associated with cancer in the minds of the laity simply because the later stages of the disease are familiar to them through their looking after or visiting relations and friends in the last stages of the disease.

Cancer in the later stages, as we all know, is a very painful and distressing disease, wearying, even repellent, and fear-inspiring to those who nurse the patients, but in the early stages it is insidious, quiet, and painless. The fact that cancer is painless till its later stages should be broadcasted widely among the laity, as many do not seek advice for tumours because, as they are painless, no alarm is caused.

The presence of masses in both breasts is against cancer and in favour of interstitial mastitis; cancer very seldom starts in both breasts at once. It is said that if at this stage a tumour can be felt with the fingers, but is impalpable to the flat of the hand, this is against its being cancer; but it is a sign that I am rather chary of mentioning, as great stress is often laid upon it as a way of telling whether cancer or chronic mastitis is present, though as a sign to tell this it is quite useless and, as we now regard matters, mischievous and misleading; a small cancerous mass is quite as impalpable to the flat hand as is chronic mastitis. Moreover, chronic mastitis may be present in which cancer is starting, but has as yet none of the characteristics of cancer.

The margins of the tumour should be carefully considered, for the margins of a scirrhus are usually much better defined than those of an inflammatory mass. This, however, does not hold good if the scirrhus is rapidly extending, while sometimes the edges of a chronic abscess are remarkably well defined.

Dimpling or the slightest adhesion of the skin, as already stated, is very much in favour of malignancy, but is not pathognomonic. The hardness of a scirrhus is rarely attained by any other tumour, but sometimes the mass is too deeply situated for this to be made out, and hardness can easily be simulated by a tense cyst. Enlarged veins seen coursing over the tumour are in favour of malignancy.

Lastly, there is the important fact that cancer rarely takes origin at the time of lactation; it does so sometimes, we all know, but it is rare, while this is the favourite time for inflammatory conditions to start.

These, then, are the various points which guide us in difficult cases. Sometimes, of course, they are insufficient to guide us correctly, and therefore an exploratory incision should be made before performing the radical operation, or else with the best intention in the world serious mistakes will be made. Now this is the ordinary case which presents itself to us in the usual course of events, and it is the one which some are still inclined to call "early cases" just because malignancy is not written across the chest by the display of every malignant characteristic.

The third category is the one to which our attention is especially directed. Here there is only an indefinite lump. We may suppose it is deep seated in a voluminous breast so that nothing definite can be made out. Examination prompts us to say that there seems to be a vague thickening in the breast that should not be there, but beyond this there is nothing whatever to be felt. There is not even the certainty that there is anything, beyond perhaps some-

thing that feels like a slight mastitis; signs and symptoms of malignancy do not arise. This is the problem which I am going to ask you to regard as the problem of the early case. The patient is 50 years of age; what advice is to be given to her? Yours is the responsibility.

Well, there is the ordinary thing which is so easy to do, which is a ready way out of the difficulty, and which will be pleasing and acceptable to the patient; that is to say to her, "Yes, perhaps I can feel a little thickening in your breast, but that is not surprising at your time of life; in fact, it is almost normal; do not take any notice of it. Come and see me in a month's time." A month passes and there is no perceptible change. Another month, and yet a third pass, and perhaps the mass is a little larger; it is deep seated; it is very difficult to say definitely; you reassure her, and perhaps you do not see her for two or more months; you have said, "There is nothing to be alarmed at," and she is not nervous about it. In any case you say to yourself, "There certainly is no sign of malignancy—no harm can come from waiting." Six or eight months pass, and now there is a mass for sure; perhaps the skin does not slide over it quite so freely, but if the mass is deep seated and the person is fat the skin may be quite free, so that even yet there is no sign of malignancy. Perhaps the practitioner suggests a consultation, not as necessary really, as you have already committed yourself by saying the condition is nothing, but merely advisable; the patient demurs—she feels so much better, the liniment is doing her good, she is sure the lump is smaller; and in this way ten to twelve months may have passed before a consultation is arranged and an operation suggested.

An operation is performed and cancer is found. We still regard the condition as early, but if it is early now, what was it twelve months ago? I do not think that I have drawn the picture inappropriately or exaggerated it; we have lost a year. We have acquitted the lump of being cancer merely because it was small, had not spread and infiltrated the tissues sufficiently to enable us to say that it was malignant. We have been oblivious to the obvious fact that cancer must begin in a microscopic area and has at first no sign of malignancy, and we have forgotten the $2\frac{1}{2}$ chances to 1 that it was malignant to start with; we have failed to treat the condition as malignant until it was proved innocent. Many writers have endeavoured to calculate the average time the mass has been suspected before it comes to the surgeon, and different observers have varied from a year to thirty months as the time lost.

This method of procedure does not seem to be unusual; we were brought up "to watch such cases carefully." It is what we are used to, and it does not seem strange—in fact, you say it is the obvious, the ordinary, and the best thing to do. But it means, in blunt English, that we are going to do nothing *except waste time*. Curiously enough, we do not realize this. But let me put it to you, Is there any other condition in which the chances are $2\frac{1}{2}$ to 1 in favour of malignancy in which you would knowingly waste a year in order to be certain? If there is, then I do not know it. Let us reduce the matter to absurdity: Why have you waited? You will say, In order to be certain. But you were not certain when you operated—why not wait another six months till all the symptoms of malignancy gradually blossom forth? You then really will be certain. You say, That would not be fair. My reply is that it is as fair to wait now as it was to wait then, with the chances always $2\frac{1}{2}$ to 1 against the patient. You waited at the only time when operation held anything approaching a certainty of cure. You should have held the mass to be malignant until it was proved innocent. What right had you to say to the patient, "It is nothing," simply because you did not know?

The Johns Hopkins School teaches—and I believe it is right—that the development of any malignant sign whatever diminishes the patient's chance of cure by 25 per cent. Moreover, what has been done while we have waited? Ointments and liniments have been energetically applied to the breast, which has been well massaged. And when we consider that the spread of the cancer is by the cells passing

along the lymphatics, is not massage of this sort the very last treatment we should care to apply? Yet I can assure you it is ordinary treatment, and the only form of treatment if anything is done at all.

Having waited, then, till some symptoms of malignancy have developed, the patient is operated upon. The best results we have of operations at the present day are—39 per cent. living and well at the end of five years, 61 per cent. dead or dying. This analysis is from America; no other analysis gives such favourable figures. There is a very marked difference in the results we get from private cases and those we get from hospital cases; the former are much better than the latter, the difference being due to the fact that we see private cases usually at a much earlier date. I should be surprised if 20 per cent. of the hospital cases were alive and well at the end of five years. Surely this is a poor result for surgery. No wonder every form of treatment has its loud-throated advocates, and every form of treatment can always produce its cancer cures, from violet leaves through the range of pastes up to the more orthodox procedures such as injections of selenium, lead, and gold, right up to the palliative treatment supplied by α rays and radium. If these are the results of surgery, surely every one of these methods is justified. The only thing that the surgeon can boast is that, bad as his results are, they are infinitely better than those of any other form of treatment.

Such, then, is the result of adopting the plan I have indicated. Is there no better plan? I think there is, and one I would earnestly ask you to try.

The woman is 50 years old, with this indefinite thickening and no more, and we are to advise her to the best of our ability. By no possible means of examination can we make a diagnosis by the ordinary methods, therefore we must adopt new ones. The answer to our doubt can be given to us without delay, and without dubiety, if we will remove the suspected mass and have it examined under the microscope by an expert. If it proves to be simple, we then can say to the patient, "It's nothing—you can now set your mind at rest," and we have now good authority for saying so which we never had before. If it proves to be malignant it can be removed at a time when she has the greatest possible chance of cure.

We need not go into the technique of the procedure, beyond saying that a circumferential incision can be made in the sulcus between the breast and the chest wall, the breast turned upwards, and the mass removed from the back of the breast. Radiating incisions are made outwards from the nipple, and a piecrust-shaped piece removed. The edges are seared with a cautery to prevent the escape of cancer cells in the event of its proving to be a carcinoma; the raw surfaces are sewn up and the breast replaced. The nipple is not interfered with, and there is no visible scar left. If preferred the pathologist can be present, and by means of a freezing microtome examine the mass then and there, and if necessary the complete operation can then be proceeded with in the event of the mass proving to be cancer. I prefer, however, the more methodical examination in the laboratory, where it can be conducted without haste, as I think a truer estimation can then be formed. Sir Lenthal Cheate shows how difficult it is to decide, even by the microscope, as to whether the mass is really early cancer or not by the examination of only one or two sections. In these early cases the whole mass must be carefully searched and any suspicious piece cut separately. The search must be carried out by a skilled person; it cannot be done by the laboratory boy.

By this means we can avoid the delay which accompanies the other and the commoner method of arriving at a diagnosis, and we place our patient in a far happier position with regard to the result.

I have drawn attention to the best statistics we have of the results of operation, and they are poor enough, and I have also conscientiously gone through all the cases of breast carcinoma of St. Mary's Hospital since 1900, and have written to a great many of the people operated upon in recent years. I cannot give the exact figures as I have

not made them out, but our hospital results are not anywhere near as good as the figures of private cases. I tell all my breast cases to come and see me after the operation, and I try to keep an eye upon them every so many months. I do not believe 20 per cent. of them are alive and well after five years. Surgeons will give many instances of people alive and well after the five years mentioned, but I believe the bulk of these are private patients; I myself have them up to seventeen years. But in private, whatever the delay may be, we see them, as a rule, far earlier than we see the hospital cases.

For my own part I freely admit that in the best cases I have the operation on the breast in the first place was not done with any idea of cancer, but always for chronic mastitis, and the cancer found later and the whole breast removed. That is the secret of the best of my cases, and that is how the importance of avoiding delay became impressed upon me. I believe that if operations for cancer of the breast could be carried out at this time there is no reason why we should not have 75 per cent. alive and well at the end of five years.

In the last twenty years the operation on the breast has quadrupled its gravity, but I do not think it has as much as doubled its benefit to the patient, and much even of that benefit is due to earlier operation, for the dread of operations is less now than it was. The extent of the operation has reached its limit, and if our results are to improve, as I am confident they can, then it must be by earlier diagnosis; and earlier diagnosis along the lines I have just indicated is bound to come.

I know the objection that will be raised is that many early cases would be operated upon in which no malignancy was found, and therefore the operation need not have been performed and is therefore unjustifiable. But the preliminary operation is a comparatively slight one; it leaves no visible scar, and if nothing serious is found the patient's mind can be set at rest; she is rid of the mass, and she is all the better for being rid of it. Does not getting rid of the mass and the giving of a definite diagnosis compensate and justify the proceeding? Think, too, what we gain every time we do find a cancer. How many cases of obscure abdominal disease undergo an exploratory operation and nothing is found? but the operation is not held to be unjustified. How many cases of obscure abdominal trouble are operated upon, and an apparently normal appendix removed? But it is not therefore said that the operation was unwarranted. How many times are gall stones diagnosed and at the operation no gall stones are found? We all know these cases, but we do not say that we have done more than take proper precautions.

Those who were at hospital twenty-five or more years ago can recall how few were the operations for gall stones or for appendicitis then seen. We were only beginning to operate upon these cases, and now they are more than common. Before that time exploratory operations upon the abdomen were unheard of; now they are a matter of common practice, and are carried out on quite slight grounds—the suspicion of gall stones or appendicitis, enteroptosis, chronic constipation, slight obstructive pains the cause of which is obscure; they are exploratory and diagnostic, and therefore considered necessary for diagnosis. The likelihood of cancer is certainly present, but it is not the formidable bugbear it is when we are dealing with the breast. Nothing is thought of exploratory abdominal operations, but the same people will often object to having an exploratory operation performed on the breast, though no one could compare the severity and seriousness of the two operations.

Believe me, the same change which has come in your lifetime in the case of appendicitis and gall stones is going to come in the case of the breast, and exploratory operations will in time be common, and greatly to the benefit of the patient. It may be a new doctrine now, but in a few years it will be the ordinary teaching of all medical schools, and the "wait and see" policy will be a thing of the past; it will be that policy which will be called unjustifiable, and the more we think of it the more unjustifiable it is from every point of view.

THE CAUSATION AND PREVENTION OF RICKETS.*

BY

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(From the National Institute for Medical Research.)

RICKETS is a disease of civilization, and is so frequently found in the large cities of America and Europe that it is doubtful whether the children of the poorer classes ever wholly escape it. Good evidence of a seasonal variation in the incidence of rickets has been shown by many observers—Schmorl, Hansemann, and others. It reaches its height in the winter and declines in the summer. Palm was the first to correlate this seasonal variation with the incidence of sunlight, and thus to anticipate by many years wider discoveries.

CAUSATION.

Many theories have been advanced to explain the cause of rickets: overfeeding, starvation, intestinal intoxication, defective hygiene, disorders of the ductless glands, and acidosis. The first great impetus to the modern intensive study of rickets was given by the work of Mellanby in this country in 1918. He varied the diets of young growing puppies until he found diets that would invariably produce rickets. To these diets he added various substances, and noted if any effect was produced in the process of calcification. He experimented on a large number of puppies and brought out many interesting facts. His most important conclusion was that rickets was really a deficiency disease—that is, it was caused by the absence from the food of a vitamin, and that the particular vitamin concerned was vitamin A or something closely associated with it. He found generally that fats richest in vitamin A were the most potent in preventing rickets, cod-liver oil being by far the best.

Soon after the publication of Mellanby's work the American investigators, McCollum, Simmonds, Shipley, and Park, and Sherman and Pappenheimer, showed almost simultaneously and independently that rickets could be produced in the rat by diets that were abnormal in their inorganic constituents. Their investigation showed that apart from any vitamin deficiency the essential thing in the production of rickets was to impoverish the diet in the raw materials of the skeleton—that is, in calcium and phosphorus. They found that rickets could be produced by diets poor in phosphorus or in calcium, or by diets that contained these elements in unbalanced amounts. More especially was it shown that a diet with a minimum amount of phosphorus could be made a rickets-producing one by the addition of excess of calcium. Although bone owes its rigid structure to its calcium phosphate content, most previous workers on the subject had, curiously enough, confined their attention to the part played by calcium in bone formation only. It is obvious that calcium without sufficient phosphorus to combine with it is useless to the organism for bone formation, and the work of the American investigators gave this point due consideration. Sherman and Pappenheimer more particularly proved that the form in which the phosphorus was given—that is, as a simple inorganic phosphate or as an organic phosphate in various types of combination—was important. They showed generally that soluble inorganic phosphates were more efficient in preventing rickets.

This work on rats paved the way for extensive work on the part played by deficiency substances in the etiology of rickets. Cod-liver oil was introduced as a specific for rickets by the Frenchman Bretonneau. Trousseau and other physicians had convinced themselves of its effectiveness by clinical observation. By means of a histological test—the so-called lime test—McCollum, Simmonds, Shipley, and Park showed that cod-liver oil caused a remarkable deposition of lime salts in the cartilage of the rachitic rat close to its junction with the metaphysis. Howland and Park demonstrated also, by means of the x rays, the

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