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PRIDE AND PREJUDICE IN THE TREATMENT OF CANCER*

BY

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(Concluded from p. 5)

The Throat

Cancer of the throat is one of the most dreadful and distressing of the manifestations of this disease, and never have the sufferings of the victims been so vividly described as they were by Kipling in his tragic poem *A Death Bed*:

"This is a gland at the back of the jaw
And an answering lump on the collar-bone."

"It will follow the usual course of—throats."

"Since it is rather too late for the knife
All we can do is to mask the pain."

In studying cancer in this region it becomes clear that one is turning the pages of one of the most brilliant chapters of British surgical achievement.

The Larynx

Discussion of carcinoma of the larynx should be confined to intrinsic tumours, for the so-called extrinsic carcinoma is really cancer of the pharynx. In operative treatment the teachings of Sir Felix Semon and Sir Henry Butlin were brought to their highest standard of success by Sir StClair Thomson. He recorded 70 cases operated on by laryngo-fissure, with only 2 deaths as the result of operation (*British Medical Journal*, 1928, **1**, 743). Excluding those dying of other diseases, 38 out of 55 patients were alive and well from five to nineteen years after operation—a net five-year survival rate of 69%. This is exactly the same as the rate being attained at the Christie Hospital and Holt Radium Institute, where radium is used according to the Finzi-Harmer technique. This figure is arrived at, however, by a follow-up of only 16 cases treated in 1932 and 1933. But in the course of twenty-eight years StClair Thomson operated on only 70 cases, which shows that fortunately the larynx is not a common site for this disease. With these small numbers it is obvious that the problem in this situation does not lend itself well to statistical study, but the figures cited are significant. Other workers claim equal success by external radiation in spite of the barriers of skin and cartilage.

The results of radiation therapy are obtained with practically no disability or mutilation. But it does not do to exaggerate the change of voice produced by partial laryngectomy. A useful voice is preserved, and among StClair

Thomson's patients were men who continued to follow professions such as schoolmaster and physician, while one was a parson who preached twice every Sunday. The pitfalls of radiation, such as overdose to skin and necrosis of cartilage, have been largely overcome.

The brilliant results from partial laryngectomy by thyrotomy or laryngo-fissure only emphasize the limitations of operative treatment, for any more extensive operation entails serious mutilation and disability. When only total laryngectomy can be offered by surgery the radio-therapist can often retrieve what looks like an absolutely hopeless position, and in the more active and advanced lesions radiation may be of great value when surgical procedures have little to offer.

The Pharynx

In the case of the pharynx most statistical returns do not distinguish between different types of tumour or even give their exact situation. Reports on end-results in cancer of the pharynx must first of all supply figures for each anatomical site. This would give some indication of the nature of the tumour, but it is not enough. The character of the tumour and the histological grading must also be ascertained and recorded, not only for statistical review but also to determine the best line of treatment. The site of origin and the character of the lesion are more important than the extent. The size of the growth is no criterion. A small tumour may lead to disappointment, while a large one may react in a most favourable way. Carcinoma of the tonsil can be cured even if large glandular metastases are present, but quite a small lesion of the anterior pillar of the fauces or the pyriform fossa may be incurable.

Since the tumours range from lympho-epithelioma to hard, warty, localized growths there is a great difference in their radiosensitivity. Exact details of the site and character of the growth are essential, and without these details statistics are valueless. But though we have not these details or statistical proof to guide us in regard to cancer of the pharynx we do know that tumours of the nasopharynx, the valleculae, the pyriform fossa, the deep pharynx, and the base of the tongue can often be made to disappear in a most remarkable manner by radiotherapy. Some of the results of radium beam therapy are most encouraging, but it may be that deep x rays can accomplish as much.

In tumours of the hypopharynx, essentially a disease of women about the menopause, an important consideration

* The Bradshaw Lecture delivered before the Royal College of Surgeons of England on November 27, 1940.

is the possibility of prevention. The Plummer-Vinson syndrome may or may not be the direct cause of tumours of the hypopharynx and it may occur without anaemia, but, as Witts has pointed out, the anaemia which is very common in women suffering from these tumours is due to iron deficiency and can be cured by the administration of iron, which not only repairs the anaemia but also restores the epithelium. The cracks at the corners of the mouth heal, the tongue is reclothed with papillae, the epithelium of the pharynx becomes more normal, and dysphagia is relieved.

The Oesophagus

Treatment of carcinoma of the oesophagus by surgery or by radiation has been disappointing, though there have been brilliant isolated successes. The tumour is of the same histological type as carcinoma of the cervix uteri. But here, unfortunately, we are dealing with a canal with thin walls which is immediately surrounded by vital structures. The growth is nearly always infiltrating the wall of the oesophagus when first diagnosed. The tumour is very sensitive to radiation, and its rapid destruction as the result of direct radium treatment often leads to perforation. External methods of radiation are therefore being more assiduously tried. There have, however, been no lasting cures by radiation in proved cases: reports in the literature refer to cases without histological proof and with inadequate periods of observation after treatment. There are some encouraging cases, but many disasters have occurred from serious changes in the lung. It is to be hoped that with further developments in technique greater success will be achieved.

Surgical excision has been attended with a few successes in the hands of bold operators, particularly in cases in the cervical portion and the lowest part, even with preservation of the channel. A few successes have been achieved also after removal of the middle portion. Garlock of New York (*Surg. Gynec. Obstet.*, 1940, **70**, 556) has reported 7 cases, in 6 of which the patient survived the radical operation. Four are still well—one of them two years and eleven months after operation. In Torek's historic case of transthoracic excision the subject lived for thirteen years and died of old age without recurrence. Grey Turner had one successful case, but the patient died of nephritis nineteen months afterwards. Lately Wookey (*Brit. J. Surg.*, 1940, **27**, 696) reported 4 cases of transthoracic removal, in 3 of which he adopted a new technique by approaching through the right side of the chest with ligature of the vena azygos major.

Grey Turner, who dealt fully with this subject in his Bradshaw Lecture of 1935, advises that if the history is short and there is no evidence of secondaries, and if improvement is rapid after a gastrostomy, radical operation should be considered. But our real hopes for the future lie in finding some method by which radiation can be brought safely to bear on this perilous region. The growth itself is vulnerable to attack, but a way must be found to protect the vital parts in the immediate neighbourhood.

Except as a preliminary to radical excision gastrostomy is now seldom required. By the method of intubation introduced by Charters Symonds and so ingeniously improved and applied by Souttar we can bring relief and comfort to and prolong the life of sufferers from oesophageal cancer.

The Rectum

Surgical treatment of carcinoma of the rectum, based on the scientific work of Ernest Miles, may attain an 83% five-year freedom rate in Stage A cases, and between 40% and 50% in all cases (Gabriel). For many years

efforts have been made to treat the disease in this situation by radiation therapy. Unfortunately the rectal mucous membrane is generally just as radiosensitive as the tumour. Gordon-Watson endeavoured to treat the condition with radium and did pioneer work on the surgery of access, but, as he stated in his Bradshaw Lecture of 1937 (*Lancet*, 1938, **1**, 239), he came to the conclusion that "although brilliant results were obtained in a small proportion of operable cases, the results were too uncertain to justify its use in an operable case with our present knowledge, except when a radical operation is contraindicated on general grounds." He has also reported, however, that although it was only in a small proportion, he had in several instances reduced fixed inoperable cases to a state of complete quiescence, if not cure, and that some of these patients remained in good health for periods ranging from seven to ten years (*Proc. roy. Soc. Med.*, 1935, **28**, 1251). The rare radiotherapeutic successes may be in cases of an undifferentiated type.

Serious efforts are being made to treat the condition by external radiation not only with the usual 200 kV machines but with large radium bombs and x-ray plants working up to a million volts. Ralph Phillips has treated a few cases by the latter method at St. Bartholomew's Hospital, and among them he showed me the notes of a patient aged 41 in whom an inoperable growth has been made to disappear and, two years after the treatment was begun, the colostomy has been closed.

The Uterine Cervix

In cancer of the uterine cervix the best British results from operative treatment are those attained by Victor Bonney, whose pioneer work with Comyns Berkeley laid the foundations, in this country, of the sound surgical treatment of that condition. Table II provides a fair basis for comparison between Bonney's five-year figures and those of the Marie Curie Hospital, where the best results have been attained by radiation treatment.

TABLE II
Victor Bonney: Cases operated on up to the end of 1928

Stage	No. of Cases	Gross Five-year Survival Rate
I	212 (no glands)	109 (51.4%)
II	154 (with glands)	33 (21.4%)
III		
IV	0	Inoperable

(*Transactions of the Medical Society of London*, 1934, **57**, 196.)

Marie Curie Hospital: Cases treated 1925 to 1933

Stage	No. of Cases	Gross Five-year Survival Rate
I	40	34 (85%)
II	170	104 (61.1%)
III	459	147 (32%)
IV	133	11 (8.2%) Inoperable
Total	802	296 (36.9%)

(Medical Research Council Report No. 236, 1939.)

The operation cases have not been separated into stages on the lines of the League of Nations classification, but if Stages I and II are counted as definitely operable radiotherapy is immensely better than surgical treatment, and even if Stage III cases are included among the operable ones, which is giving a distinct advantage to surgery in the calculation, the table still shows that better results are obtained by radiotherapy.

It is stated that 10% of all recurrences develop after the fifth year, and that therefore only ten-year survival rates should be accepted for a true assessment of results.

Table III shows a comparison of the ten-year survival rates, and again the advantage is slightly in favour of treatment by radiation, although the cases date back to a time when the technique was not as good as it is to-day.

TABLE III

Victor Bonney: Cases operated on up to the end of 1923

Stage	No. of Cases	Gross Ten-year Survival Rate
I	156 (no glands)	61 (39.1%)
II	110 (with glands)	19 (17.2%)
III	6	Inoperable
IV		

(Transactions of the Medical Society of London, 1934, 57, 196.)

Marie Curie Hospital: Cases treated 1925 (3 Months) to 1928

Stage	No. of Cases	Gross Ten-year Survival Rate
I	10	8 (80%)
II	37	15 (40.5%)
III	124	29 (23.3%)
IV	45	2 (4.4%)
Total	216	54 (25%)

(Medical Research Council Report No. 236, 1939.)

The results obtained at the Marie Curie Hospital are so good that they naturally stimulate inquiry. It has been said that a large number of the patients are nulliparous women and that maybe some cases were not carcinoma. I found the proportion of nulliparae to be 12%—8% being married and 4% unmarried. This would strike the old teachers of gynaecology as unduly high, but I do not consider it so in a hospital staffed by women, for at a general hospital like the Middlesex, taking the cases for 1936, 1937, and 1938, there were 11 nulliparae among 118 patients with carcinoma of the cervix, or 9.2%, and 4 of the patients were unmarried. It is said that a large proportion of early cases go to the Marie Curie Hospital, but in actual fact the proportion of Stages I and II cases is very low. It is also said that maybe this hospital receives selected cases only, because several unsuitable cases are not sent for treatment; but I am informed that *all* cases seen by the surgeons at their other hospitals are referred to the Marie Curie Hospital for radium treatment, with the sole exception of the Royal Free Hospital, from which *every* third case is referred. The success of the hospital is really due to the following factors. It is very well equipped, the staff is extremely expert, and there is a large personnel; but the most important factor of all is that the most meticulous care is taken in carrying out the treatment, in following exactly the selected technique, and in making every effort to improve the local and general condition of the patient before radiation treatment is undertaken. Comparable results are obtained at other first-class radiotherapy centres, and the figures in Table IV of a general hospital like the Middlesex, with a large radiotherapy department, are also interesting. All the cases were seen first by the gynaecologists, and it may fairly be assumed that Bonney and his junior colleagues, both of whom were his pupils, would have a predilection for operative treatment unless there was some local or general contra-indication.

TABLE IV.—The Middlesex Hospital, January 1, 1932, to June 30, 1935

A: Operation Results

Stage	No. of Cases	Gross Five-year Survival Rate
I (no glands)	39	16 (41.0%)
II } (with glands)	13	4 (30.7%)
III } (with glands)		
IV	0	Inoperable

B: Radiotherapy Results

Stage	No. of Cases	Gross Five-year Survival Rate
I	9	6 (66.6%)
II	16	5 (31.2%)
III	38	11 (28.9%)
IV	35	3 (8.5%)
Total	98	25 (25.5%)

The numbers are not large enough for statistical study, but they are distinctly significant. In Stage I and II cases the radiotherapy results are better, but when Stage III cases are included as operable the percentage advantage is with surgery. But only one-quarter of the radiotherapy cases were Stage I and II and less than a half when Stage IV cases are excluded, whereas three-quarters of the operation cases were Stage I. Moreover, the radiotherapy cases included 4 of palliative x-ray treatment and 5 treated by radium only and judged to be unfit for the full course; while 14, with only 1 five-year survivor, were treated before the Paris technique was adopted.

The operative mortality still remains in the neighbourhood of 10%, to which Bonney reduced it in favourable cases. The dangers of radiotherapy, which at first were a serious consideration, have been so mastered that at the Marie Curie Hospital only 2 cases of fistula have been seen in the last 700 cases.

Study of the available figures leads to the conclusion that better results can be obtained by radiotherapy than by operation in cases of carcinoma of the uterine cervix.

As a final consideration it is well to bear in mind that the radical operation for carcinoma of the cervix is one of great difficulty and that few can attain the results of Bonney and his colleagues. Radiation treatment, on the other hand, can be copied with meticulous care, and, provided the staff and equipment are adequate, good results should be attainable in many centres. Some cases do not respond to radiotherapy. They should be submitted to operation without delay, and they serve to emphasize that the course of safety is for surgeon and radiologist to work together.

The Breast

Consideration of cancer of the breast naturally calls to mind, among men of our time, the names of three of the seven Walker Prizemen of our College—Harold Stiles, Sampson Handley, and Lenthal Cheatle—who have devoted a large part of their lives to the study of this condition. The results of operation in Stage I cases are excellent. In the thorough and capable hands of Gordon-Taylor an 84% ten-year survival rate has been attained in cases traced from ten to twenty-five years. In more advanced cases, however, the results are most disappointing, and it is terrible to reflect that if the axillary glands are involved over 60% of our patients die of the disease within five years of operation.

In order to avoid the mutilation from which patients naturally recoil efforts have been made to ascertain whether radiation could safely be recommended as a substitute for surgery in Stage I cases, but the results achieved do not justify such a course. Keynes's efforts to attain by radium implantation results comparable to surgery were a real contribution to technique, but they revealed the limitations of radium implants with their localized action. The area to be dealt with is very extensive, and Keynes himself has realized that external radiation has advantages over implantation.

When considering reports of favourable results from external radiation alone it must be remembered that the recorded cases are few, that as a rule the diagnosis is not

proved by pathological investigation, and that in early cases there is no unequivocal sign which will enable the clinician to make a diagnosis with absolute certainty. Nevertheless there is no doubt that successful results can be obtained, and if operation is refused or contraindicated radiation treatment is justified in Stage I cases.

In seeking for assistance from radiation therapy while still practising surgical excision, attempts have been made by pre-operative or post-operative, or by pre-operative and post-operative radiation to reinforce the attack on the disease. In favour of pre-operative radiation it may be said that it demonstrates which cases are radiosensitive, and these are just the ones in which radical surgery is likely to fail. It also decreases the vitality of the cancer cells previous to operative disturbance. It may interfere with healing, but this is minimized by proceeding to operation directly the pre-operative course is completed. In regard to post-operative radiation, it has to be remembered that after operation the tissues will not stand a full dose owing to the surgical trauma and the impaired blood supply; and nothing less than the full dose is likely to be really effective. Figures from some centres indicate that a combination of pre-operative and post-operative treatment may be the best.

The view is held by some that radiation alone may be the best treatment in Stage II and Stage III cases. In its favour it is argued that a full dose of radiation can be given without interruption, and that the radical operation is often dangerous, as it involves the risk of cutting into cancerous tissue in the axilla. But we have no convincing statistics to prove that the results of radiation are better than those of operation. Mass statistics, with percentages often based on an insufficient number of cases, are quoted in support of radiation treatment, and even averages of percentages (a most fallacious use of statistics) are marshalled in further support. Our experience at the Middlesex Hospital would not permit us to subscribe to this view.

It may be that we have had enough of statistics based on large series of cases treated on certain definite lines and that what is required is that each case should be treated in the way which appears best after considering all the circumstances. We may thus ascertain whether, with the exercise of judgment, the gross results can be improved, and then, by analysis of those results, find out which treatment is best for each class of case.

Our accumulated experience seems to me to justify us in regarding each case at the outset as a radio-surgical problem, and then proceeding as follows:

In a *clinical Stage I* case give a short intensive course of radiation. If the tumour shows signs of disappearing rapidly it is very radiosensitive and likely to be unpromising for surgery. Radiation should therefore be continued. If the response to radiation is not very striking, then radical operation should be undertaken immediately after about a third of the full dose has been given. The specimen should be examined with meticulous care, and further procedure planned on the two alternative results of the investigation: (1) if there is no evidence of extension to the glands the case is pathologically proved to be Stage I, and no further radiation is indicated; (2) if, on the other hand, the glands are found to be involved the case is pathologically Stage II, and the course of radiation should be completed. Some of the 60% of failures after radical operation in Stage II cases might be saved by this post-operative completion of the radiation course.

If the case is *clinically Stage II or Stage III* radiation treatment is definitely indicated at the outset. A good response would encourage continuance of radiation, for on biological grounds the case is probably unsuitable for operation. If, on the other hand, the response is not good, or there is a residual lump, the breast should be removed without opening the

axilla. Radiation treatment should be completed after operation, for glandular deposits are more constantly made to disappear than the primary growth. The risk of disseminating the disease that is involved in clearing the cancerous contents of the axilla would be avoided by this procedure.

Finally, there is no question of the good that radiotherapy does in some advanced cases in this and other situations and also in the case of some metastases, but it must be admitted that in others it only adds to the patients' sufferings. Radiotherapists should therefore never be pressed to give treatment as a placebo or in cases that are obviously hopeless.

The Cancer Act

From a study of the present position of cancer treatment certain points are clear: first, that about half the patients suffering from cancer need some form of radiation therapy; second, that this difficult work can only be undertaken satisfactorily under the most favourable conditions; and, third, that intensive research is required in every aspect of the cancer problem.

The first two requirements are not being met, for it is estimated that in this country only about a quarter of the sufferers obtain treatment of a skilled nature at hospitals adequately equipped and staffed, and that where diagnosis requires highly technical investigations the proportion is smaller. The Radium Commission made repeated and urgent representations that to secure a reasonable standard of service for the treatment of cancer cases throughout the country there was need for the Government to attack the whole problem along national lines. The Cancer Act is designed to achieve this object. By March, 1942, local authorities, co-operating if necessary with neighbouring authorities, have to submit schemes for the approval of the Ministry of Health, making arrangements to secure that the facilities for the treatment of persons suffering from cancer are adequate for the needs of the county or borough. We are therefore on the eve of a great development of regionalization of hospital services for this specific purpose, and those studying the question of regionalization will do well to bear in mind this particular need, for it may be found that the arrangement of localities necessary for the cancer service will be suitable for other purposes also. Under the provisions of the Cancer Act local authorities are empowered to make grants for extensions of voluntary hospitals and for the maintenance of those extensions. Those who fear for the future of the voluntary hospitals should note the words of Sir Arthur MacNalty, who, when Chief Medical Officer of the Ministry of Health, said that "only by co-operation in hospital services regionally and nationally will the difficulties of expense of voluntary hospitals be overcome and the voluntary principles of which this country is so proud be safeguarded."

Cancer Centres

In an explanatory circular issued to local authorities in May, 1939, it is explained that the provision of adequate facilities for cancer treatment means both by surgery and by radiotherapy, including treatment by radium and by deep x rays. This is satisfactory, for it makes it clear that the centres are to be Cancer Centres and not just Radium Centres. The Minister's view was expressed that treatment must necessarily be concentrated in those comparatively few hospitals which have on their staffs skilled radiotherapists and physicists as well as surgeons, which possess the requisite specialized departments, and which contain enough beds to keep the radiotherapeutic department, with its expensive equipment of radium and apparatus, fully employed. The Minister hoped that there would be full co-operation between the authorities and the voluntary

hospitals, and he enjoined that the hospitals which already hold supplies of radium and which otherwise possess adequate facilities should be utilized to the greatest possible extent.

The Minister pointed out that surgical operation still remains the only practicable, or the most suitable, form of treatment for a large proportion of cases, and that for this purpose it may be found necessary to make use of some hospitals in which radiation treatment is not available. He lays down the condition, however, that "where use is made of such a hospital a patient should be treated there only when it has been decided, after consultation between the appropriate specialists, that surgery without radiation is the proper form of treatment for the case." This applies to at least half the patients receiving treatment. Is such an instruction justified by the present state of our knowledge? And, if so, should not a similar consultation be required before radiation treatment is allowed? In point of fact it is certain that there are not enough experienced radiotherapists available for such consultations.

One of the most important matters to ensure the success of the scheme will be proper central control. It may be true that the Ministry is to appoint an expert advisory committee with representatives of medicine, surgery, gynaecology, radiotherapy, pathology, and public health, and that this expert committee dovetails with the Medical Advisory Committee of the Ministry, which includes the Presidents of the three Royal Colleges. Such Advisory Committees are often chosen but seldom called. The real work will be done by an executive body, and in my view that body will be best equipped for its task if it is made directly responsible for the management of a National Centre. It will then be in constant and immediate touch with those actively engaged in treatment and research. The National Cancer Centre would also be the appropriate place for the establishment of a central bureau for the collection and study of records.

The provision of adequate facilities for cancer treatment entails the establishment of several centres in addition to those already recognized as efficient, and it is estimated that at least a thousand additional beds will be needed. The establishment of hundreds of consultation centres for diagnosis and for the following up of patients will be required, and in this way the essential link between general practitioners and hospitals will be provided.

Each centre must be a fully equipped hospital or branch of a hospital specially devoted to this work. It must have plenty of beds, and it must have rooms for private patients. In the future, even more than in the present, treatment of this disease will have to be carried out in institutions, and all classes of the community must be eligible for admission. There must be an expert staff and every facility for diagnosis and treatment. There must be a full-time radiotherapeutic staff with at least two experienced members. There must be ample radium, so that all methods of application can be employed. There must be a generous equipment of x-ray apparatus, so that treatment and dosage can be prescribed and spread as the radiotherapist requires and not just meted out so that all who demand shall share in what is going. There must be a large staff, so that treatment can be supervised and cases carefully studied. There must be an expert surgical staff, carefully chosen for their special aptitude in diagnosis and operative skill in various regions. There must be well-staffed and well-equipped departments of pathology and physics. There must be well-paid posts for assistant members of the staff, and facilities for those undergoing training, so that there will be a plentiful supply of radiotherapists to fill senior posts as they fall vacant.

Medical Education and Research

When schemes are submitted for approval two aspects of the proposals will be of special concern to our College. One is that facilities for medical education shall be safeguarded, and the other that research shall be encouraged.

In regard to medical education, it must be remembered that, while the treatment of cancer may be very special work requiring much postgraduate study and experience, instruction in diagnosis together with the observation of the results of treatment is essential for the undergraduate. The success of a cancer service depends on early diagnosis, which depends in turn on the recognition of the significance of symptoms, and for this purpose the general practitioner is the first essential link in the chain. Every medical school, therefore, if not a treatment centre, must be a consultation centre for diagnosis and for observation after treatment.

In the Cancer Act no provision is made for research, but the treatment of cancer can be carried on efficiently only in a spirit and atmosphere of inquiry, and if any centres are planned without regard to the need for research the work at those centres will not be of the highest standard and they will fall behind in the effort to bring relief to sufferers from this disease.

In clinical research the records department will assume greater and greater importance, for more detailed returns will be required. Every case should have a record of the exact site, extent, and duration of the lesion, and there should be an agreed "staging" for all sites. The records should include *exact* details of the histology, and the tumour should be carefully graded. Uniformity in methods of making returns is essential.

Immediate Needs

The Cancer Act provides a splendid opportunity. Great hopes are founded on it, but their fulfilment will depend on the genius and foresight of those responsible for carrying out its provisions. Regional schemes cannot be formulated for some time, but there are two urgent needs which should be provided for without delay. As already mentioned, one urgent need is the formation of a central national authority to study the problem and guide local authorities; the other is provision for the training of personnel.

There is a serious shortage of trained personnel, and in my opinion those already experienced in this work should be released from the Services and those anxious and fitted to take up the practice of radiotherapy as a career should be reserved from mobilization.

To fit himself for a career as a radiotherapist a graduate first requires to attain the standard of one of the higher surgical qualifications. He needs at least twelve months' training at a recognized centre, and must obtain a special diploma in radiology and later the higher diploma of the Faculty. But the only training worth while is experience—like the apprenticeship served to medicine and surgery and several specialties. Postgraduate courses are useful for obtaining the hall-mark of a diploma, but responsibility under supervision is the real training. The trainee should therefore hold a resident post in a cancer department, and, before having independent charge of patients, he should serve for about three years in an appointment equivalent to that of a registrar or first assistant. It is obvious, therefore, that the junior posts must carry generous remuneration, that there must be good prospects of promotion, and that the higher positions must be equal to those in any other branch of the profession.

The director's post must carry the full status of a staff appointment. In university centres he should be given

professorial rank, and he should not be barred from private practice in the institution. This can easily be limited by the number of private beds at his disposal. The best men will get the best results, and they are entitled to their reward both in professional status and in income. However lavish may be the provision of armamentarium, in radiotherapy as in surgery it is "the man behind the gun" that counts.

Conclusion

It is twenty-three years since I had the honour of delivering a Hunterian Lecture in our College. That too was in wartime. On that occasion I told the story of the conquest of the hosts of death—of the taming of the typhoid group of organisms by protective inoculation. Many other diseases have been controlled and almost conquered in our time, and even during the last twenty years of peace. I have no doubt that cancer will be added to their number. The possibilities opened up by recent research increase our confidence in ultimate success.

But until many questions are answered and we are armed with full knowledge of the cause of this disease, and thus on the way to prevention, we have to face the task of giving the best treatment to relieve and, as I have shown, oft-times to cure. I hope I have said enough to show that in addition to proved and trusty means of treatment we have powerful new weapons with which to combat the disease; but they are powerful for evil as well as for good, and need skilled and experienced control. I have emphasized, therefore, that the training of more men and women to use these weapons should be undertaken without delay. It is obvious that in the future there must be closer co-operation between surgeons and radiologists if we are to do the best for our patients. Special tumour clinics should be arranged; teams should be carefully chosen and certain regions assigned to special surgeons. A competent team must include surgeon, radiologist, pathologist, and physicist. It is abundantly clear, therefore, that there is urgent need for far greater facilities and a large army of workers.

I have spoken of the sturdy heroic work which has been done in the past and of the successes which have been achieved, but in our College we are only too well aware of the gaps in our knowledge and of the colossal amount of research work still to be done.

"And here will I make an end, and if I have done well, and as is fitting the story, it is that which I desired"—not only because of the vital importance of the subject, but also because I wished to do honour to William Wood Bradshaw, by whose devoted widow this Lecture was founded. But whether I have done well or ill, I hope I shall be acquitted of ungraciousness if I observe that, greatly as I appreciate the honour done me, much of my Lecture goes to show that those who in the future may be disposed to make benefactions to our College will do a greater service to humanity and ensure a richer harvest from their gifts by providing endowments for research than by founding eponymous lectures to be delivered within its walls.

O. Witt Mitchell and O. D. Chapman (*New York State J. Med.*, 1940, **40**, 1308) record thirty-eight cases of *Staphylococcus aureus* septicaemia in patients aged from 3 to 65. Thirty-one were males and seven females. Twenty cases were examples of cellulitis, boils, or carbuncles, and eighteen of osteomyelitis, which with three exceptions were all in children. Half the patients with cellulitis, boils, or carbuncles had primary lesions on the neck or face. Of the osteomyelitis cases the tibia was the first bone to be involved in nine and the femur in six. Fifteen of the patients with primary lesions and seven of the patients with osteomyelitis died.

A SURVEY OF NUTRITION AND DENTAL CARIES IN 120 LONDON ELEMENTARY SCHOOL CHILDREN

BY

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A radiological investigation to study growth in school children was being carried out at University College by the late Prof. Woollard and the late Dr. Matthew Young which necessitated the six-monthly examination of 200 elementary school children between the ages of 5 and 8 years. It was hoped that this investigation would throw some light on the problem of nutrition.

In addition to the taking of radiographs the children were weighed and measured (without shoes), and various other clinical notes were made. It seemed of interest, to complete the picture, to have some information on the condition of the teeth, so a quick examination was made, and the findings form the subject of this survey. The period covered was one year, during which they were examined three times, although only the first and third inspections are considered here. As usually happens in this kind of investigation the numbers of children available dwindled considerably by the end of the year. Those examined appeared to be in fairly good physical condition on the whole and most of them had had extra milk at school.

When making the dental examination the buccal surfaces of the teeth were first tested with a probe for structural defects as shown by varying degrees of roughness, pits, etc., and graded into four categories. The grading was, so far as the personal factor allowed, similar to that used by M. Mellanby. Perfect smoothness of surface was graded as normal or category 0; and to categories 1, 2, and 3 were allotted teeth showing slight, marked, and severe roughness and pitting. It must be emphasized, to avoid misunderstanding, that the types of defects referred to here are those first recognized by M. Mellanby (1923, 1927, 1934) and included by her under the heading of "hypoplasia"; they are much more common, though less obvious, than the generally recognized gross type and present a different microscopical structure. In a dental survey J. D. King (1940) distinguished between the two kinds by calling them "M-hypoplasia" and "G-hypoplasia" respectively, and whereas it has been proved by many observers (Mellanby, King, Hughlings Davies, etc.) that the former type is to be found associated with dental caries, there is some doubt as to whether any association exists between dental caries and G-hypoplasia—in fact, King could find no association between these two conditions in the children examined by him in the Island of Lewis.

Having graded the structure of the teeth, the amount of caries was then noted. Owing to lack of time it was not possible to explore every tooth thoroughly with the probe; the teeth were also in some cases very dirty, so that very early caries must have been overlooked. The carious teeth were graded roughly into three categories, according to the size of the carious area: caries 1 included teeth with cavities up to about the size of a large pin's head; caries 2 included those with cavities larger than grade 1 but involving less than a third of any one surface; and caries 3 included all teeth with cavities involving more than a third of one surface. This method is admittedly rough and the grading arbitrary, but it serves to give an indication of the amount of spread of caries over a period of time, and when assessing the amount of caries per mouth is much more satisfactory than giving a mere percentage of teeth carious, which makes no allowance at all for the size of the carious cavities.

The dental examination was made by me and the observations were taken down at dictation by a second person. A complete survey was first made of the mouth for structural defects, then a second round of the teeth was made to assess