Steatorrhoea

A final topic that must be considered briefly is whether diseases involving defects in fat absorption have taught us anything about the physiology of the process. In certain fields of physiology it is true that a study of disease has helped to throw light on physiological processes, but that can hardly be said of disorders in which fat absorption is at fault. It is true that biliary obstruction causes steatorrhoea, but that fact has not explained the reason why. Similarly, pancreatic disease, or in extreme cases complete pancreatic obstruction, interferes with fat absorption.

Those who uphold what I have termed the classical view of the mechanism of fat absorption would state that this was due to defective hydrolysis of fat caused by the partial or complete deficiency of pancreatic lipase. That would seem to be a satisfactory explanation. At first sight it also counters the modern view that fine emulsification is all that is necessary in order that fat absorption may take place. But we have to remember that the failure of both bile and pancreatic juice to enter the small intestine may result in the non-production of the necessary conditions for that fine dispersion of fat which is regarded as essential for its absorption. Hence the faulty absorption which is associated with diseases of the pancreas and bile ducts has not helped in explaining the mechanism which we wish to have made clear.

Another disease in which steatorrhoea occurs is tropical sprue. I am indebted to my colleague Dr. D. A. K. Black for his views on the defective fat absorption which is a well-known sign in this condition. First, there is no evidence of a selective failure of fat absorption. The steatorrhoea seems to be part of a general impairment of absorption. This in itself does not help us in our search for the true mechanism of the absorption process. Secondly, the percentage absorption of fat does not vary with the amount of fat in the diet. In five patients, for instance, whose daily fat intake was increased from 65 g. to 95 g. the percentage absorbed did not show any significant change. This does give a clue to the kind of mechanism which is involved. The defect cannot be a purely physical one, otherwise the absolute amount of fat absorbed would not depend on the quantity in the diet. Thus some biochemical defect, such as one in the enzyme systems concerned in fat absorption, is indicated. It is interesting that Munk, in his studies of fat absorption in dogs, in the absence of bile found a similar relationship to hold, provided that the normal capacity for dealing with fat was not exceeded.

A third discovery which Black and his colleagues made is in harmony with the view that the defect in tropical sprue is a biochemical one—that is, that administration of yeast extract in this condition has a favourable influence on fat absorption. This suggests that some accessory food factor is possibly lacking. Apparently it is not nicotinic acid, riboflavin, or folic acid. Its identity, therefore, if there is any truth in this suggestion, still remains to be discovered.

Conclusion

Perhaps I have said enough to show that I regard the processes of fat absorption as still not completely understood. The intelligent use of some of the new isotopes which the physicists are now putting into our hands could undoubtedly help in solving some of the outstanding problems, and I hope that in due course these new methods may be made use of. I can certainly commend to any young physiologist the study of fat absorption as well worthy of his attention.

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MODERN TRENDS IN RADIOLOGY*

BY

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In this paper it is my intention to stimulate thought by taking stock and critically examining the prevailing tendencies and so obtain a perspective which will enable us to see where we are going.

The radiological age may be divided into three periods—(1) that which heralded the advent of radiology; (2) the period of distrust; (3) the period of idolization—the modern trends.

When Roentgen's remarkable discovery was made known to the world, the Press (Brailsford, 1946a)—both medical and lay—heralded it as a means of sparing patients not only the pain associated with disease but also that which was, and still is, inflicted when other methods of examination are conducted. First impressions are often the most important and deserve the fullest consideration, and these first impressions were so strong that they stimulated radiological research throughout the world to such a degree that during the year 1896 most of the possibilities of radiology were envisaged, techniques developed, and explorations begun. Continuous progress since then has been essentially refinement of technique, concomitant with ever-improving equipment. Unfortunately many enthusiastic workers in the earlier years did not preserve the scientific accuracy in their observations that is so essential for progress. Because interpretations were read into radiographs which were far in excess of what was reasonably possible—a tendency which has not been entirely overcome—clinicians were taught to distrust radiology; but the more careful workers in radiology, by painstaking study of the normal and by correlation with pathology, convinced clinicians that they could render much help in the elucidation of clinical problems. Some radiological evidence is self-explanatory even to the layman, and this has resulted in the misconception amongst the inexperienced, both qualified and unqualified, that all radiographs are self-explanatory. In the light of the previous high standard of clinical medicine it is amazing that this serious misconception,

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associated as it is with the five following very remarkable omissions, should have been allowed to prevail.

Omissions in Medical Practice

(1) Failure to realize the importance of, and to carry out, a thorough clinical examination before any radiology—radiology being regarded as an easily obtained substitute requiring little personal effort. On the serious errors in diagnosis and treatment which this has occasioned a great deal could be written. Careful attention to the clinical condition of the patients in these cases would have spared them much mental and physical pain, and the clinicians the blame the fruits of which they escape perhaps too often. There would be fewer errors in the interpretation of radiographs if radiology was always preceded by a sound clinical examination: if one of these must be omitted the least harm will come from omission of the radiography and most from omission of the clinical examination.

(2) There has been a failure to learn the bounds and appearances of the normal, and even the character of the artifacts produced by faulty material and techniques. Radiographic methods have been applied to the examination of structures made visible by contrast media, and operations have been conducted to remedy "defects" long before the appearances of the normal have been learnt: when sound knowledge of the normal has with time and experience been acquired the operative measures for the correction of some of the "defects" have been abolished. This was very noticeable in gastro-intestinal radiology. I am confident that in the realms of other specialties, notably thoracic surgery and neurosurgery, the same sequence will occur, for in these our knowledge of radiology, with and without contrast media, is still inadequate and incomplete; yet surgical explorations based upon the radiology are many.

(3) It is often not realized that the initial changes in many conditions are indistinguishable from one another, and that serial radiographs with continuous clinical examinations over a short or long period may be necessary for elucidating a problem.

(4) Many have failed to appreciate that the onset of disease is not associated with immediate changes in the radiographic appearances, and that it requires time—what I have called "the latent negative radiographic period," sometimes only a few days, but sometimes a year or more (Brailsford, 1946b)—before the changes are sufficient to produce enough contrast density or irregularity of contour to alter the radiographic appearances from the normal; by the time these changes are recognizable they are extensive—in some conditions more extensive than the radiographs suggest—in some cases healing may have commenced. Even fractures and other more serious conditions of bones and joints may be masked, if displacement has not resulted, until secondary changes have developed.

(5) There has been a failure to realize that, though the disease has ceased its activity, the radiograph may show spectacular appearances even to the end of an apparently normal life—the positive radiographic symptomless period. It is questionable whether surgical measures with their attendant risks would be so often undertaken if the full importance of this were understood. In some cases failure to appreciate omissions 4 and 5 have, on the other hand, led to the disregard of active clinical signs or recent injury when radiographs have shown no sign of change or only the typical evidence of old healed lesions. You may ask what evidence I have of these omissions. I believe you could obtain such evidence from the activities in many

hospitals, but the strongest evidence is in the boosting of mass radiography.

Mass Radiography

I have recorded elsewhere (Brailsford, 1945a, 1948a) the serious limitations, erroneous interpretations, and liabilities of mass radiography and the relative poverty of its contributions to preventive medicine. Undoubtedly it has an important propaganda value, but it is the propaganda of fear by which the public—yes, and the medical students—are being frightened into the erroneous belief that active progressive disease is symptomless and only the radiograph can reveal it. It can be proved to have been responsible for the infliction of much unnecessary mental and physical pain.

Mass surveys are essentially bureaucratic regimentation measures designed by officials and enthusiasts who appear not to have the knowledge of the five omissions or the experience to judge the efficiency of the measures adopted, and, while they themselves are spared the rigours and anxieties of the general practitioners attending to the sick, would decry the contributions of these latter doctors to the reduction of the incidence and mortality from tuberculosis. Mass radiography has not added anything new to our knowledge of radiography of the chest. The evidence obtained by it has been used to re-emphasize the fact that about 4 per 1,000 of the population have signs of active tuberculosis; but not enough importance has been placed on the other confirmatory evidence it has yielded—i.e., that at least ten times as many persons, or 40 per 1,000, have had fairly extensive disease and recovered from it without knowing of its existence and in most cases without having lost time from work. Had radiography been applied to all these at the stage when the appearances suggested activity it would have inflicted on them the dreaded stigma of tuberculosis and seriously interfered with their lives without contributing any good. A little reasonable education in hygiene would have accomplished much more, at less expense in money, equipment, buildings, personnel, and above all in feelings.

Because there would appear to be conditions of medical service which permit certain cases of pulmonary tuberculosis to be overlooked by medical officers is an indication not that the progressive disease is symptomless but that the clinical examinations are poor; for when such patients return home the diagnosis is made by the parents, confirmed as grave by the general practitioner, and registered as deadly by the consultant a few days before death. The greater the percentage of cases of unknown progressive tuberculosis discovered by mass radiography, the poorer the clinical medicine that has been applied.

Spectacular radiographic evidence of tuberculosis, as well as other conditions, may persist for many years, during which it is symptomless because it is quiescent or healed and of little importance from the point of view of infection. The most successful surgical results have been obtained in cases which have previously healed themselves and are symptomless. Reversal of the radiographs—i.e., showing the last in the series first and the first last—is worth doing, for it will often indicate what appears to be a miraculous cure, particularly when the series includes a number of radiographs taken at intervals in the early days, during which no change occurred prior to the surgery.

I find it difficult to reconcile the views of modern clinicians on tuberculosis. If one examines the serial post-operative radiographs, tries to evaluate the risks run by the patients, and compares the end-radiograph with the

one which incited the surgery, one finds it difficult to believe that the latest radiograph satisfies, or that it justifies the measures adopted. If the inciting radiographic features were unaccompanied by signs and symptoms these post-operative radiographic appearances of mutilations are certainly not without them. There would appear to be no more justification for removing a healed or quiescent lesion of the lung (which would not have been suspected if there had been no radiograph) than of any other structure, or in fact for removing any normal tissue; since valuable healthy lung is removed.

Though patients derive great benefit in those sanatoria where mental and physical rest, good fresh air, and food are the essential characteristics of treatment, they have to return to the debilitating influences of the poor home which broke down their resistance. The best place to treat tuberculosis is the home, and only those efforts which are designed to make the latter fit for living in are likely to cut out tuberculosis effectively and permanently. The best preventive medicine is that aimed at prevention, not that which is aimed at treatment of disease that could have been prevented. The lack of sincerity and fairness in this propaganda is shown in the recent report of the Brookings Research Institute, which states that tuberculosis is three times more prevalent in coloured than in white people and syphilis six times more common. The unfortunate individual labelled as tuberculous is subjected to all the disadvantages which the stigma of this disease brings—i.e., inability to insure, estranged social and business contacts, and other serious interferences with life and liberty; whereas the stigma of syphilis, the loathsome contagious disease to which innocent persons can be subjected, is treated with all privacy, though with effective measures it could be stamped out.

Radiography and Clinical Medicine

In spite of all these drawbacks to mass radiography of the chest I believe it could be used for the groups I have enumerated. But there are signs that the degeneration of clinical medicine is spreading with the aid and at the expense of radiology: it will ultimately bring radiology into disrepute. In a recent English newspaper it was stated that "one in every 20 people in Britain—or over 2,000,000—suffers from rheumatism. So it has been decided to mass-radiograph the joints of groups to ascertain the extent of the disease. When the unit is in operation it is proposed that every one of the 73,000 miners in the area will be x-rayed whether he has rheumatism or not." As pointed out by an orthopaedic surgeon in a letter of appreciation of my opposition to this type of activity, "The whole thing is really an attempt on the part of some people to increase the number of attendances of their patients to astronomical figures and to increase similarly the work of other departments, and on the strength of this to increase the number of staff. The result of this is, of course, that with a very large staff the man in charge must be a very great person."

Mass radiography of the stomach is being used in one famous American hospital (surprisingly enough, in one to which a former physician brought great fame by his contributions to clinical medicine) for the detection of early malignant disease, and claims have been made of tests which reveal its presence. This might well incite further extensive mass radiological investigations. I believe one's energies in this direction could favourably be reserved until a cure for malignant disease has been discovered; then it could be applied enthusiastically with all skill.

There are other spheres in which the use of radiology not only fails to spare the patient pain but actually incites

the infliction of pain by the performance of investigations, including surgery, which can be regarded as little else than meddlesome. I heard a professor of medicine at one of the universities urge that ventriculography was a useful, harmless, and painless method of investigating the cause of headaches. I saw the exhibition of radiographs of a patient with three aneurysms of the aorta, one of which showed radiographic evidence of erosion of the sternum and ribs. This patient sought the doctor because he had pain, and it should be our first duty to relieve that pain; yet this evidence did not incite the observer to pity, but to inject the aneurysm with opaque media to provide spectacular evidence of the extent of the lesions—knowledge which could not be of the slightest use to the patient, but which apparently satisfied the callous inquisitor.

Radiology in the Curriculum

Radiology is being brought increasingly into the medical curriculum. Unfortunately, I repeat, its chief use appears to be to obtain quick answers with the least effort on the part of those demanding it. It has been brought into the study of anatomy. Instead of realizing that it merely gives additional information, and in no way diminishes the need for training in the dissecting-room, we find the hours devoted to anatomy and the basic science being reduced to provide time for specialized subjects. Students are being taught to be "scientists" and not doctors. The truth of this is seen in the difficulty in getting young men to practise in the country, where they have not at their elbow x-ray equipment and laboratory services, on which they have been taught to depend. To provide them with these facilities is not the answer for good clinical medicine, since their training in this has been ineffective and in these specialized fields but superficial. Recently I was amazed to hear that a medical student, induced by a spectacular film on rehabilitation to give up the doctor's course and take up physiotherapy, had been told by the Physiotherapy Society that the university course in anatomy was not of a sufficiently high standard to permit of exemption from their preliminary examination in anatomy. Surely the medical course ought to be superior to that used by any auxiliary medical services, for the work of the latter must necessarily be under the direction of the doctor, and any contribution which radiology makes to this down-grading in training should be eliminated. I know that radiologists are called upon every day to demonstrate not less but more anatomical structure, and we do it at the demand of the clinician. More attention to anatomy may deprive the student of hours of specialized scientific research, but it might spare him (and the patients) the pain expended in unnecessary investigations of little use in treatment.

At a recent discussion on the role of radiology in the teaching of anatomy it was stated that, while it was reasonable to give students barium meals and allow their colleagues to study the passage throughout the alimentary canal, it was not considered reasonable to allow their colleagues to inflict barium enemata upon them. I urged that as a teacher I felt it was a duty to teach the subject in a manner that the students would not forget, and therefore it might be a good thing if they performed upon one another every type of injection, including ventriculography, myelography, arteriography, etc. In this way they would be taught in an indelible manner by the unskilful hands of their colleagues just what such examinations mean to the patient. It might cause them to consider the patient and to insist on skill and the reservation of such investigations to the last resort, after all other investigations had

been made and it could be reasonably thought that such investigations would be of value.

If after a thorough clinical examination by an experienced clinician, assisted by such plain radiography as that indicated, it is thought that injection of opaque media would help in the treatment of the patient's condition, I am of the opinion that that injection should be done by the clinician desiring the information—presuming, of course, that the latter has sufficiently studied the technique and acquired the necessary skill. It is probably on the evidence so obtained that operative or other treatment will be employed; therefore it must be done with every care and with skill, recognizing the great responsibility. Too frequently it is left to inexperienced house-men, as will be seen from radiographic studies of the results; these are often vitiated by faulty techniques unskillfully applied and therefore useless. Such injections should not be given merely to obtain “a pretty picture” or to satisfy curiosity, for they are done at the expense of mental and physical pain and unknown risk to the patient, who has come to us trusting in our faith and high calling to relieve pain. Scientific data are too frequently sought at the expense of human and animal pain and sacrifice. In the long run this action can result in atrocities, cruelties, or licensed murders, as we have learned from the report of Czechoslovak doctors on medical atrocities in prison camps. Little credit is due to those who would “wade through slaughter to a throne, and shut the gates of mercy on mankind.”

By radiography we can now ascertain the nature of the majority of bone tumours (Brailsford, 1948c); we can say whether they are due to developmental irregularities, deficiencies, or endocrine disorders, to trauma, inflammation, or neoplasm. Regarding the last-named, we can recognize the usual simple tumours, and by serial radiography and continuous clinical observation determine in a large proportion of such cases whether malignancy exists. All this we can do without inflicting any pain, and the more attention we pay to such radiography the fewer will be the cases which we fail to diagnose. There is a modern tendency to cut down and explore every bone tumour. Spectacular radiographic appearances are allowed to incite this activity even when they are discovered accidentally during other investigations, and such radiography is doing more harm than good. There seems to be a widespread erroneous belief that the last word in the diagnosis of bone tumours can be obtained by histological examination. We can show (Brailsford, 1948b) that, given adequate study, radiology offers greater accuracy and that the infliction of biopsy with all its risks is unnecessary and of little value.

Radiology is a whole-time study, and the careful radiologist will discover something new each day, so infinite are the variations of and departures from the normal. To say that we have not seen a certain thing, and by so doing imply that it does not exist, is not a testimony to great experience but a confession of ignorance. The chances are, as my experience shows, that within a few days or weeks an example or examples of such a condition will occur in practice, and many more will probably be found in the literature. In a previous paper (Brailsford, 1945b) I have recorded the abuses to which radiology is put; they still continue.

A Modern Tendency

There is a modern trend for the members of various specialties to gather together and seclude the radiographs illustrating conditions with which they deal, and the x-ray

departments and hospitals are so much the poorer because this valuable material is lost to the general use of the hospital and the special use of the radiologist. Radiology knows no bounds of specialization. The radiograph is a measure of the relative density and a record of the contrast outlines and structures of all tissues on and between the two skin surfaces which bound the area. We therefore need radiologists who understand all the evidence presented to inspect the whole, for there is a tendency on the part of specialists to be obsessed by evidence which appears to involve their specialty. Only good can come from whole-hearted co-operation, but harm will result to patients from seclusion and isolated activities, for which the responsible person may be called upon to bear the blame.

Requests for x-ray examinations are made on forms which have a space with some such heading as “Conditions revealed by the clinical examination on which radiological evidence is required.” Those clinicians who co-operate and desire all the help which the radiologist can give, the men who really taught me my radiology, fill in this space with facts gleaned from the clinical examination that are invaluable to the radiologist. Those men who ape a knowledge of radiographic technique and want the radiographs, but no assistance otherwise, use this space for giving instructions with certain cryptic signs, designed to impress the radiologist with their great knowledge of radiographic technique, such as, “A.P. and L.,” and if they wish to display their profound knowledge they add also, “P.A. and oblique.” Such requests fail to convey any suggestion of confidence in the radiologist, and certainly do not invite him to share the responsibility; consequently he loses the stimulus for good work and the patient suffers accordingly from the defective interpretation of the radiographs.

Radiography, together with other ancillary services to clinical medicine, is being used extravagantly and is one of the chief contributors to the increased cost of medical service.

An American Experience

During my tour of the United States I went into one large department and was shown the latest and most expensive equipment operated in conjunction with a photo-electric cell, the latter replacing the brain of the technician. The films were processed in an automatic developing unit, from which they issued as a finished product. I asked to be shown the next unit, and in reply to the question, “What is that?” gave the answer, “The machine for turning out the reports.” “Take a seat and wait a few minutes,” I was instructed; “I think we can show you that.” A junior member of the staff appeared a few minutes later, took out a stamping-machine from a cupboard, and began to stamp a large pack of reports. One of these was handed to me with the remark, “Does that satisfy you?” The report sheet with the name of the patient had been stamped with the report “Normal” and the radiologist's signature. On inquiry I was told that about 80–90% of the reports were of this nature. I said, “Now, this is interesting, for I have just come from San Francisco, where the President of the North American Radiological Society gave an address in which he said that three of the leading radiologists of America had examined a large series of radiographs and their reports showed a difference of opinion amounting to something like 30%.” I asked whether it would not be better simply to stamp all the reports “Normal,” for then we should have a discrepancy of only between 10 and 20%; or would it not be advisable to avoid radiology

entirely owing to its expense: probably the best thing would be for clinicians to use radiology intelligently and thus cut down hospital expenses and treatment of the patient.

Radiology an Aid to Study

It is thought, by those least qualified to judge, that radiological knowledge is now so general that there is no need for anyone to specialize in radiology. But is not clinical medicine or surgery a full-time study, leaving little or no time to acquire adequate knowledge of radiology? I would remind you of the valuable contributions which were made to medicine and surgery before the advent of radiology, when clinical medicine was unhampered by multiple ancillary departments. There is a tendency to-day to desire quantity rather than quality; to report on 1,000 incompletely investigated cases in which calls have been made on all ancillary departments, rather than on one case after careful clinical examination over a period. Sir James Paget studied one case of osteitis deformans during the 20 years of its development and then described it. His description is as valuable to-day as when he contributed it. He had not the advantages, perhaps the disadvantages, of distraction of the ancillary services of radiology, biochemistry, etc., yet his description of his one case was so complete that little has since been added to our knowledge of that disease by many who have made great demands on these ancillary services in the investigation of many thousands of cases.

Radiology is now recognized as an essential aid to the study of anatomy, physiology, pathology, clinical medicine, surgery, and midwifery, and medical students must now be taught something of its possibilities throughout their university studies. This will result in a better and more complete knowledge of the possibilities of radiology, but this wider knowledge will mean that the radiologist, if he is to retain his high status and earn and keep the respect of his colleagues, must shoulder greater responsibilities and acquire an ever-increasing knowledge, for he can claim to be the general practitioner of the specialists. He should be in a position satisfactorily to render full co-operation to each.

Conclusion

It is fitting that in this City of Brotherly Love one should preach the gospel that radiology attains its highest perfection in the contribution to the relief of human suffering only when it is directed to spare the patient pain.

Wilhelm Konrad Roentgen (Brailsford, 1946b) was a man with sagacity and great ability. His observations were keen and extremely critical; he recorded them clearly, concisely, yet exhaustively, and with scrupulous care. His modesty, honesty, sincerity, and integrity to his science and his friends helped to secure his immortality. We follow in the footsteps of a great master, and it is fitting that I should end with the words of your great countryman:

"Lives of great men all remind us
We can make our lives sublime,
And, departing, leave behind us
Footprints in the sands of time."

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VALUE OF SPHINCTER-PRESERVING OPERATIONS IN CANCER OF RECTUM

WITH SPECIAL REFERENCE TO RECONSTRUCTIVE ABDOMINO-PERINEAL EXCISION

BY

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In 1908 Ernest Miles published the details of his operation for cancer of the rectum. Based as it was on close anatomical studies of the potential zones of spread of the disease, the abdomino-perineal excision came to be regarded as the standard operation for the treatment of cancer affecting any part of the bowel between the lower sigmoid and the anal canal. No limitation of the excision was regarded as permissible, no matter at what level the growth was sited, and it is only in recent years that doubt has been cast on the necessity for sacrificing the sphincter mechanism in those cases in which the neoplasm lies above this region.

Surgery in this country has remained very true to the teachings of the great master of proctology, and little has been published in the English journals in favour of sphincter-preserving operations. But in America much has been written and many divergent views have been expressed, and as great a surgeon as Rankin (1947) has said, in condemning all such operative procedures: "Sphincter-saving operations are little more than local excisions for cancer below the peritoneum. I had thought that the question of colostomy had been definitely settled 20 years ago, but apparently a new generation insists on a re-exploration of an already discredited field." On the other hand, Babcock (1932) and Bacon (1945) champion such operations in the majority of cases. Lynch (1945) goes so far as to say, in commenting upon recent pathological investigations: "It permits one to discard entirely such radical and unnecessary operations as that popularized by Miles."

Perhaps a far more acceptable opinion is that of Wangenstein (1947), who has recently said: "A tempered ambition to save the rectal sphincter, as well as to cure the cancer, is a praiseworthy objective in suitable cases of cancer of the upper rectal ampulla."

Support for this point of view is to be found in the follow-up figures of Babcock, in which, of over 80 patients considered suitable for a sphincter-preserving operation, 50% survived disease-free for five or more years. Such figures can hold comparison with any series in which the wider abdomino-perineal operation has been performed for similarly sited growths.

Until the late 'thirties the idea of sphincter-preserving operations had lain largely dormant for three decades. Before Miles came to tower over his contemporaries limited excisions and anastomoses had been explored by the great surgeons of the latter end of the last century and the beginning of this. But enthusiasm for their methods was quieted by the logic of the great man. Maunsell (1892) had described a combined abdominal and anal approach in which continuity was achieved after excision of the rectal growth. Balfour (1910) described C. W. Mayo's method of resection and anastomosis, again by a similar approach, but these very limited excisions were rightly relegated to the past. Later, Lockhart-Mummery (1934)