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THE USE OF EXPERIENCE*

BY

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We are constantly receiving impressions by all our senses—by touch, sight, sound, taste, and smell—and all these impressions are experience. The baby starts to convert experience into knowledge: before it can talk it is already grouping impressions by their likeness or their difference, and forming vague conceptions like “mother,” “food and hunger,” “dangerous and friendly.” The growing child, the adolescent, the grown man and woman, continue the same process. Impressions crowd in upon them, giving them the raw material—experience—which is converted into the finished article—knowledge—in the factory of the mind.

Experience comes to all. It comes equally to rich and poor, old and young, just and unjust. Yet some learn from it no more than a reflex existence, the knowledge to eat and sleep and breed, to read the thoughts of others on the printed page or live the emotions of others on the lighted screen, to exchange a small assortment of hackneyed phrases with other robots. Some build up knowledge and become wise: they develop a personal outlook that enriches others and adds to the store of their time. The reason for these differences lies not in the quality of the seed but in that of the soil on which it falls. Impressions are fleeting things. They cannot live unless they are welcomed, studied, compared, classified, and grouped. Experience can be made useful only by certain qualities of the mind, some given by inheritance, some by parental example, some by the influence of teachers or writers.

Failure to Learn from Experience

People fail to learn from experience for three reasons. First, because they have not learned the habit of thought. They bolt their impressions without savouring them, as a dog bolts his food. They do not take their raw material into the factory, but let it pass straight from the delivery gate to the refuse dump. They never classify—that is, they never say to themselves, “Something like this happened before in the same circumstances.” Thus they never take the next step, from experience to experiment, to deciding, by repeating the circumstances, whether the likeness observed between two experiences was an accident or a consequence.

Secondly, because they have classified too much, or rather because they have allowed their habits of thought to become automatic. They have organized their factory for mass production, so that it cannot deal with the unusual order.

They unconsciously shut out all new experience by classifying everything under headings already fixed. Thus astronomers dismissed for years the observed experience of the variations in the perihelion of Mercury by classifying them under the heading of instrumental error, and correcting for them by averaging observations. Thus scientists in the last war boosted a valueless antiserum for gas gangrene because it had been proved in the laboratory to protect mice from the effects of the intraperitoneal injection of cultures of *Clostridium welchii*, and supported their advocacy by a series of meaningless observations in the field, while ignoring the significant experience that men transfused early and adequately with whole blood seldom got gas gangrene.

Thirdly, because, having made the whole of one branch of knowledge their province, they fail to attain that last achievement of education, the knowledge of where their experience is inadequate, of where their knowledge ceases and their ignorance begins. Having acquired supreme mastery of one department of learning they are apt to assume that the whole is theirs, to forget that the highest wisdom is the realization that no man can know everything, that he is indeed wisest who knows his ignorance and where to turn for help when he needs it. One of the greatest physicists since Newton died needlessly and before his time because he treated his own strangulated hernia with household remedies and turned only many hours too late to those who had made such ailments their life's study and who could have saved him.

The beginner fails to use experience because to him it is so multitudinous that he cannot handle it until he has acquired some of the technique of the warehouseman or filing clerk. The learned man is often blind to new experience because the mass of knowledge he has acquired seems to him complete, and he sits, old, weary, and disinterested, among his hoards, looking with lack-lustre eyes on any new treasure that is offered to him for acceptance. The ideal is the man of learning and wide classified experience who is yet able to see and appreciate at its proper value the new fact which does not fit into its appropriate niche. Such are our geniuses. Such was Hunter. Such are Einstein and Fleming.

Broad Principles

Where so many fail, how are we, who wish to do better than the plodders but can never hope to catch the leaders, to make the best use of the experience that life offers to us? Most of us realize that such use as we have made of experience has been due to chance rather than to conscious planning on our part. Most of us cherish the belief that

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were we to start again on a well-designed and documented system we should get much further. We can, however, agree on certain broad principles.

First, we should make our experience as rich and as varied as we can; not hunting sensations, for the conscious search for new stimuli soon deadens the ability to receive any and abolishes that eager scrutiny with which we should examine those fresh experiences that come naturally, but welcoming experiences from whatever source. We should keep our receptors uncovered and sensitive. We should not refuse to see, hear, touch, or taste anything because we have been warned against it or because it comes to us in unpalatable guise.

Secondly, we should examine each fresh experience with careful scrutiny and an open mind. Even though it be one of a group with which we are already well familiar, does this one contain anything new? Does it repeat and confirm the category to which we had already allotted the others, or does it bring some fresh aspect which should impel us to pull the others out of their pigeon-hole and look at them again?

Thirdly, having examined and accepted it we should turn it over more carefully in our minds, appraise it, classify it, and allot it to one of the trays on our mental desk—"action," "pending," or "finished."

Fourthly, in all our use of experience we should jealously preserve our individuality. Each of us is something new in this world. There has never been anything quite like us before and there never will be again; and that "us-ness" is our most precious possession. We must look at the guidance and the knowledge we get from books and from teachers as a help but not as a directive.

Fifthly, we should pause from time to time for a complete spring-cleaning. We should haul out all our treasured stores of experiences, dust them, and stand back and look at them. Are they all worth keeping? Would some of them go better in another place? Do some of the bits that seemed to be disconnected when we put them away fit together now? Where have we got to? How did we get there? What lies on each side of us? How are those faring who are going along the same road? What lies ahead? Is it the right path, or have we reached a turning-point? Whichever is our goal, how do we get there?

Lastly, we should all the time remember that we are at one stage of a journey. So far so good; or is it? A further journey and possibly better things lie ahead. As we travel we must keep a spirit of alert and adventurous inquiry. We must never look on any conclusion as final, but merely as the best we have been able to do with the material we have encountered so far. We must seek Truth, remembering that when we meet her it may be in a guise we do not expect and coming from a quarter we have despised, and when we have found her we must follow her.

Experience and Judgment

What have any of us learned from experience? If we are honest with ourselves we must answer, "Not as much as we should have." Without a lifelong and unflinching honesty with ourselves we can learn nothing. We may dress the shop window as we like, we may develop a sales personality that is convincing to others, but unless our accounts and our stock-taking are entirely honest we shall finish as cheapjacks. The greatest of the men before us said, "The art of Medicine is long and time is fleeting. Experience is fallacious and judgment difficult." But with experience, carefully recorded and sorted, judgment will come.

Experience properly used gives us a set of standards by which fresh experiences can be judged. We learn to sum up our patients quickly and fairly accurately as human beings—if they are genuine, self-dramatizers, or humbugs, if they are brave or timid, if they are minimizers or exaggerators, if they are concealing something or merely nervous—and in the light of this assessment we are able to allot a correcting ratio to the symptoms they relate that gives it an absolute value in our diagnostic assessment. We learn to evaluate pain, particularly its severity and its nature, and to construct a scale of our own by which we associate certain pains with certain diseases. We learn that too much pain in too many places is just as much an indication that nothing is seriously wrong as no pain. We learn to know when a patient is ill, when one who has been ill is getting better, or when one who was on the road to recovery has taken a turn for the worse. We come to say by instinct rather than reason, "That child is too ill to be suffering from appendicitis," "That pain is not severe enough for gall-stone colic." We learn what disease to expect at certain ages, in either sex, and in persons of certain appearance, occupation, or bodily habitus. We become so familiar with all the characters of common complaints that one single unfamiliar feature strikes a warning note without our having had recourse to the intellectual process of reasoning.

Physical Signs

We learn to use physical signs, first by rule of thumb, later as conveying certain specific but limited information that is entirely accurate within those limits. Some of the physical signs that were drilled into us as students have no more value than in repeating an obvious fact in alternative and less simple language. All the eponymous signs linked with the exophthalmos of Graves's disease, Stellwag's sign, von Graefe's sign, Moebius's sign, tell us nothing except that the patient is pop-eyed, a fact we already know. Before any of those signs are present the experienced eye can detect an early exophthalmos in a slight puffiness of the upper lid that separates the appearance of the patient from that of the many thousand normal men and women whom we observe daily with no more than a casual glance in the bus and the tube. More important than the names of these buried worthies and the elicitation of their signs is the establishment, without leading questions, that the eyes have, in fact, become more prominent. This can be done by asking if friends have remarked on any change in her appearance, or by looking at a photograph taken before the illness started. The fact that a tumour in the flank can be pushed between a hand in front and one in the loin does not necessarily mean that the tumour is renal; all it tells us is that the tumour and the kidney move as one. In most cases a tumour that gives this sign is one arising in the kidney, but I have recently seen a large mucocoele of the gall-bladder and a cystadenoma of the head of the pancreas give the same sign.

We must regard the rules of diagnosis with the same critical impartiality. Courvoisier's law, that in obstruction of the common bile duct by stone dilatation of the gall-bladder is rare while in obstruction due to other causes it is common, is nearly always reliable, but Courvoisier's explanation of his law, that in cholelithiasis the gall-bladder cannot distend because it is fibrosed, is rubbish. The gall-bladder full of stones is often normal in appearance, concentrating power, and microscopical structure, and if the stone obstructs the cystic rather than the common duct it can distend to the most enormous size. In any case fibrous tissue, however dense, becomes plastic when it is inflamed, and in the presence of low-grade infection even the toughest

fibrous structures in the body, the capsule of the hip-joint and the atlanto-occipital ligaments, can stretch. The gall-bladder in common-duct obstruction by stone does not dilate, because the obstruction is partial and intermittent.

We learn by experience the simple truth that our task is to treat the patient and not the disease, that very often the disease that is so obvious to us is not the trouble that is worrying the patient, or perhaps that it is just part, and not necessarily the most important part, of a general derangement of function. The disproportion between the lesion and the general health of the patient in cancer is a matter of constant wonder to the observant doctor. Often we see a patient on the cemetery side of 50 whose sallow complexion and rapid loss of weight and strength tell the unmistakable story of malignancy, yet we find nothing until a routine radiograph shows a small carcinoma of the lung. Yet again we see a man or woman with advanced cancer in a state of rude and robust health.

The temptation to treat a clamant lesion is almost irresistible, particularly to the surgeon.

A public-school boy was recently sent to me for internal derangement of the knee. He could produce a crack like a pistol-shot from both knees by kneeling down and then bending forwards. I could reproduce the same crack in a muffled form, and found it came from the posterior horn of the internal cartilage, and not, as I expected, from the external one. It was very tempting to suggest bilateral meniscectomy. But these cartilages, though they cracked, never locked his knees; though they were abnormally mobile they were not dislocated. He had a history of asthma and fainting attacks and a pronounced cardiac arrhythmia, and his knee noises were part of a general locomotor atony that was obvious in a laxity of all his joints and that would have been made worse by meniscectomy at this stage. He required careful observation and nursing through the hazards of adolescence by a wise physician, with surgical intervention as a possible side issue in the future.

During the summer a lady of 73 came to Guy's with veins the diameter of a fountain-pen running their tortuous course from the groin to the axilla on each side, but not approaching the umbilicus. She clearly had obstruction of the inferior vena cava. In a search for the cause of this obstruction I asked for a barium meal, which showed the largest duodenal diverticulum ever recorded, a cavity the size of a tennis ball full of air and bismuth. I admitted her for laparotomy, but, fortunately for me and for her, I was served by a registrar who is wiser than I. "Why operate?" he said. "The lady has an obliterated inferior vena cava, but that is a historic event; her compensation is complete, she has no oedema of the legs, and her renal veins are not involved. She has an enormous diverticulum, but that is no more than a show-ground exhibit; it may originally have had something to do with the thrombosis, but it is now symptomless and harmless. She is as fit as any woman of her age, fitter than most." So we sent her out, with strict instructions to come again to Guy's if she felt ill, for though her lesions may not need operation they certainly need preservation for posterity.

War Experiences

War is the winnowing-ground of experience. During the recent war we learned much of the fundamental problems of injury and infection. We also had the opportunity, never offered in peacetime, of studying the common ailments in significant numbers. In this way we learned some things that are surprising, even shattering. We learned that non-specific epididymitis, which is barely mentioned in textbooks, is eight times as common as gonococcal epididymitis and 28 times as common as tuberculous epididymitis. We learned that stress fractures, peacetime rarities, become quite common when adolescents are suddenly called from sedentary jobs to strenuous exercise. We learned that the average operation for the repair of an inguinal hernia in a

young man, performed by the average British surgeon in the average British hospital, has a recurrence rate of 20%, and that three-quarters of the recurrences take place in the first six months. We learned that the treatment of varicose veins in this country is not much above that of the African witch doctor. The recruit seen to have visible veins on the lower limb was sent automatically to a vein clinic, automatically transferred to hospital, and automatically treated by the method in vogue at the moment, just as a pig that walks up the ramp of a Chicago factory is pretty sure to come out the other end as two hams, two sides of bacon, and several pounds of sausage.

I and my fellow consultants came to two firm conclusions—that the presence of visible veins along the saphenous system or even of mild aching in hot weather after long standing is not necessarily an indication for treatment, and that the injection of sclerosing substances has no place as the sole or as the primary treatment of varicose veins. I personally would discourage the injection of varicose veins at any stage. They should either be left alone or be treated by high saphenous ligation, a safe but no means simple operation that is nearly as badly done to-day as is that for hernia. The communications between the superficial and the deep veins must also be closed. This may be done by several methods, only one of which is really reprehensible—retrograde injection of sclerosing solutions through a ureteric catheter. I know of two deaths that have followed this procedure. I have also seen a young officer changed thereby from a good rugby threequarter to an oedematous invalid.

The Hollow Needle

This needle has been a mixed blessing. It must bear the responsibility for spinal anaesthesia, and for a number of procedures that substitute blind chemical destruction for clean anatomical removal, such as the injection treatment of veins, haemorrhoids, herniae, hydroceles, ganglia, bursae, and other local swellings. On the other hand, it has allowed the intravenous administration of fluids—a method that may be life-saving, but one that is greatly misused to-day. Some people never seem able to allow their patients to use the channels designed by nature to receive nourishment and to evacuate waste. Food and fluids given by the alimentary canal allow the tissues to select and keep what they want, and to reject what is harmful or surplus to requirements. Fluids given intravenously by-pass all the defences set up by the body to protect itself against excess of any constituent, against bacterial entry, against thermal, chemical, or physical damage; they give the patient what the surgeon thinks his tissues need and what they are dammed well going to get. Nearly all drips set up at the start of an operation are not merely unnecessary but harmful. At least half of the drips set up afterwards are an automatic routine or an assurance against worry rather than a considered form of therapy.

Experience and Wisdom

But I would return to my main theme, that from experience we should derive wisdom. Let us remember that experience is never finished and wisdom is never complete; that we are always more likely to meet the common than the unusual, but that what appears at first to be a simple and familiar clinical problem may yet be something we have never met, even something hitherto unrecorded; that no problem is so straightforward that it does not need careful study, or so difficult that some solution will not appear if we seek steadfastly.

As a surgeon gets older he tends to accumulate the rarities, the difficult decisions, the doubtful issues that his colleagues are only too pleased to pass on. I will mention a few that I have had in the past year.

An old man came to hospital with vague indigestion. An indefinite swelling could be felt on the left of his abdomen. A barium meal showed that the whole of his alimentary canal was to the right of the vertebral column, indicating that it was displaced by a retroperitoneal tumour. An intravenous pyelogram showed two renal pelves on the same side of the abdomen. For a moment I jumped at the diagnosis of a fused kidney, till I realized that the two pelves were not on the side of the swelling but on the opposite side. Operation disclosed a large retroperitoneal lipoma, extending from the pelvic floor to the diaphragm and from the flank to the midline. It was removed with little difficulty and not much bleeding, and was found to weigh 14 lb. (6.35 kg.).

Another man presented with indigestion, wasting, and glycosuria. Radiographs showed that he had a chain of large stones in his pancreatic duct. I could get no advice from books or from my friends how such a problem should be tackled, but I remembered how Roscoe Graham had learned that even a small adenoma could be felt in the head of the pancreas if the pancreas and duodenum were lifted together off the right kidney and palpated between finger and thumb. When I did this I was able to push the stones towards the ampulla of Vater and remove them through the duodenum.

Even the simplest case may be more complex than it looks.

A man arrived at Guy's complaining of a small sinus in the right iliac fossa but otherwise perfectly well. The students immediately suggested actinomycosis, but all of us were astonished to find that lipiodol injected into the sinus outlined all the burrows of a honeycombed liver and then passed through the diaphragm to give a perfect bronchogram.

On the other hand, a case that seems to be desperate may turn out to be quite trivial.

A lady of 50 had been known to have a duodeno-colic fistula since she was 18. Such a lesion is extremely rare, but repeated radiographs had shown that it was, in fact, the cause of the recurring attacks of postprandial diarrhoea from which she had suffered. Between attacks she enjoyed excellent health, and concurred with the advice of her medical attendant that the only risk she ran was that of falling into the hands of a surgeon. However, at 50 an attack that started in the usual way went on to steady deterioration. Her diarrhoea became more profuse at every meal, and finally the stools contained almost unaltered food. She lost weight rapidly.

When I saw her she was a skeleton. Three days later she had lost another 4 lb. (1.8 kg.) and weighed 5 st. 2 lb. (32.66 kg.). Operation, which I had wished to postpone till she got into better shape, had to be undertaken as an emergency. I expected, from the recent history, to find that an old fistula had become carcinomatous. Actually I found a little tube like a section of appendix joining the third part of the duodenum to the back of the ascending colon. A snip with scissors and two purse-string sutures, and the job was finished. A collection of calcareous lumps showed that the original fistula had been caused by a caseating tuberculous gland opening simultaneously into the two viscera; recent ptosis had distorted and blocked the duodenum distal to it.

Surgery of Cancer

In much of major surgery the surgeon knows the size of the job he has to undertake and the strength of his material. By forethought and preparation he can often simplify the task and fortify the material, and if he finishes with those two requirements of a successful operation, a job well done and a live patient, he can look forward to lasting success. In the surgery of cancer, which forms such a large part of his work, he is in the dark. He can assess the size and site of

such metastases as are visible, palpable, or radiologically demonstrable, but he cannot even guess whether malignant cells have already got by the lymph stream to further or aberrant glands or by the blood stream to distant parts of the body. Such cells, if they are few in number, will be undetectable by any means, and they may not declare themselves for years.

In 1937 I performed a conservative resection for a rectal carcinoma in a woman of 50. Throughout the war she lived happily and functioned normally. In November, 1945, she developed jaundice, and sank rapidly. She died in January, 1946, nearly ten years after her resection, believing she had gall-stones. The metastases which killed her must already have been present but impalpable at my original operation.

In many cases, particularly when no alternative method of treatment is available—and this applies to all cancers of the alimentary tract—the attempt must be made to eradicate the disease. Operation may seem a desperate chance, but the alternative is no chance at all. The patient is like a man in a burning aeroplane and we are offering him a parachute; to jump is his only chance. A surgeon would have no hesitation in taking the chance were he the patient. Dixon, of the Mayo Clinic, used to say, "If ever I get cancer, I am going to a surgeon with good hands and not too much sense."

Cancer surgery is full of disappointments, but it also has its pleasant surprises.

In 1935 I saw a man of 55 with a carcinoma just above the pelvi-rectal junction. At laparotomy I found that the growth was fixed in the pelvis. On freeing it I found that the right wall of the pelvis, the appendix, and the ileum 4 in. (10 cm.) above the caecum were all involved in growth. I removed the appendix, then resected 3 in. (7.5 cm.) of ileum and joined the intestine end to end. I removed the pelvic colon and its mesentery widely down to the upper third of the rectum and did an end-to-end anastomosis, and finally I cut away the peritoneum on the right pelvic wall where it was involved in growth and touched the remaining bare area with the cautery. This patient is as fit to-day as any man of 69, and brought his wife over from Guernsey just before Christmas to have her varicose veins done.

Shortly before I went to Africa in 1940 I saw a woman with a carcinoma at the pelvi-rectal junction in the Southern Hospital, Dartford. At operation I found the whole pelvic floor so widely involved that, though I removed all visible and palpable growth and metastases as widely as I could, I felt that cure was out of the question. I therefore did a Hartmann's operation, leaving the levatores ani and a stump of rectum and anal canal. I saw her again when I came back in 1944. She had returned to her work as a school teacher, had put on weight, and showed no sign of recurrence, so in 1943 Mr. Sol Cohen detached the colostomy and reimplanted it in the stump of her rectum, giving her once again the supreme satisfaction of normal defaecation.

High cure rates and pleasant surprises are usually associated with cancer of the large bowel, but even cancer of the stomach, that most dread form of malignant disease, sometimes belies its reputation.

Just before Christmas, 1946, a proctological friend, who had arranged for a patient to come into the Royal Masonic Hospital for investigation under the provisional diagnosis of carcinoma of the transverse colon, asked me to take charge as he was about to leave for Switzerland. The radiological investigation revealed a large carcinoma of the stomach, invading the transverse colon and its mesentery. I did a high subtotal gastrectomy, removing the stomach in continuity with the middle third of the transverse colon and its mesentery—a satisfactory technical job, but a dismal prognosis. I warned his wife that he was unlikely to live more than three months at most. This summer

he rang me up and asked if he could show me how well he was. Certainly, eighteen months after my hopeless forecast, he looked as well as any man of his age in Europe and showed no sign of cancer. Fortunately he was pleased about it and did not threaten to sue me for £6,000 damages.

Fallacy of Statistics

Such experiences, indeed my whole experience, have left me with profound mistrust of statistics. I have not published mine since I was young and credulous; indeed, I do not know them now unless I ask my registrar to look them up for a particular purpose, and I do not pay any attention to those of others. Personal statistics, as I have said on many occasions, are at the bottom of all unsound teaching; they are either too good to be true or too true to be good.

Those who see statistics in the making are well aware how errors may creep in or be pushed in. Falsification may appear in many ways. The ailing may be transferred to another ward, another block, another hospital, there to die; they may develop complications and be entrusted to the care of a physician and disappear from the surgeon's series; the unsuccessful cases may be indexed under another diagnosis, or appear in the list of operations done by the assistant or the registrar. Quite apart from the temptation to dishonesty, there is, in the keeping and publishing of statistics, an almost insuperable temptation to the surgeon to depart from the only criterion of surgical rectitude—the best interests of the particular patient who is in the ward to-day and will be on the table to-morrow.

The surgeon who never does a severe operation has the fewest deaths, but he saves the fewest lives. The man who limits his operations on hypertension to a small group of young people who respond well to all tests has a wonderfully low death rate and high cure rate, but he passes by all those who need help most. The surgeon who closes up a high proportion of his cancer laparotomies as "inoperable" and reserves his resection for the early growths can show a fine record on paper; how will he himself show up before the recording angel? I personally suspect the man with huge figures and a negligible mortality of being a surgical spiv.

One gastric surgeon surprised the world some years ago by recording 500 gastrectomies for ulcer with 0.6% mortality. Fine! He then reached a total of 1,000 cases with a mortality of 0.6%. Grand! A little later he popped up with 2,000 with a mortality of 0.6%. Marvellous! He now has 3,000 with a mortality of 0.6%. Incredible; especially as the gastrectomies are all done under inhalation anaesthesia with open ether in a clinic where the science of anaesthesia is much where Morton left it. It is clear that to this man, a skilled surgeon, the figure of 0.6% is a symbol, a creed, a banner beneath which he goes into battle. It is his story, and he is going to stick to it. As for myself I shall leave him stuck. The only figures which I find statistically significant are those recorded anonymously and analysed impartially by someone with no personal interest in the verdict. Such are the many statistics published by Colonel Harnett on behalf of the British Empire Cancer Campaign, and Truscott's analysis of twenty years' records of cancer of the breast at the Middlesex Hospital.

I have said, in my Rutherford Morison lecture, that a man is brought into surgery by a love of his fellow men and a sincere wish to help them. As the years go by experience will increase that love and, if he uses it right, will make his power to help more effective. But he must leave it to others to judge in how far he has succeeded.

SEROLOGICAL CLASSIFICATION OF VIRIDANS STREPTOCOCCI FROM SUBACUTE BACTERIAL ENDOCARDITIS, TEETH, AND THROATS

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In a previous report on the treatment of 18 cases of subacute bacterial endocarditis with penicillin (Ward, Meanock, Selbie, and Simon, 1946) it was stated that the biochemical characters of 14 strains of streptococci isolated from these cases indicated that some were similar to *Streptococcus salivarius*, described by Andrewes and Horder (1906) as the most common organism of this type in the mouth and nasopharynx and of frequent occurrence in subacute bacterial endocarditis, while the others were similar to a number of strains isolated by Okell and Elliott (1935) from cases of subacute bacterial endocarditis and from blood cultures in cases of dental sepsis.

It thus appeared likely that our strains of streptococci were of a type often found in subacute bacterial endocarditis and of common occurrence in the region of the mouth. In our further investigation of streptococci from these sources it became evident that biochemical tests were of little value for the classification of the viridans streptococci because of the inconstancy of biochemical reactions within the defined species or groups, as originally pointed out by Andrewes and Horder (1906). We therefore decided that an attempt should be made to classify these streptococci by serological methods.

In this communication it will be shown that when streptococci from cases of subacute bacterial endocarditis are tested with a number of antisera prepared by injecting rabbits with selected strains the reactions so obtained form a pattern on which a serological classification can be based. It will also be shown that streptococci from throat and teeth also react with these antisera to form a similar pattern, indicating a close relationship between the streptococci of subacute bacterial endocarditis and those commonly found in the region of the mouth. Some data are also presented on the relationship between streptococci isolated at different stages in several cases of subacute bacterial endocarditis.

Material and Methods

The investigation was based on 28 strains of streptococci isolated during the past three years at the Middlesex Hospital from 19 cases of subacute bacterial endocarditis and one case in which this condition was suspected, and two cultures of a strain of "streptococcus s.b.e." (Loewe, Plummer, Niven, and Sherman, 1946)—one from a case of subacute bacterial endocarditis and one of the same strain after passage through a rabbit—which were provided by Dr. Erna Altüre-Werber, of the Jewish Hospital, Brooklyn, N.Y. When the work was sufficiently advanced to show that these streptococci and similar streptococci from the throat, teeth, and other sources could be classified