

Original Communications.

THE PAST, PRESENT, AND FUTURE OF ANÆSTHESIA.

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IN a progressive subject such as that of anæsthesia it cannot be regarded as unprofitable to pause from time to time to consider the position which that subject occupies; and the completion of the first half-century of painless surgery constitutes a fitting occasion for such reflections. It is not intended in the present article to dwell upon the importance of the discovery of pain-prevention. Everyone must feel a deep debt of gratitude towards those bold pioneers who, some fifty years ago, lifted nitrous oxide, ether, and chloroform out of the obscure lives they were then passing in the chemical laboratory, and opened up for them brilliant futures in the operating-theatre. Nor will any attempt here be made to settle the numerous disputes which are still rife as to the respective merits of those who first employed anæsthetics in surgery. This part of the subject is touched upon elsewhere. It will rather be my endeavour to discuss certain questions which seem to me to press forward for consideration—questions which must present themselves to everyone who has at heart the interests of this branch of practice.

WHAT ANÆSTHESIA HAS DONE.

Amongst these questions the following may be cited. What has anæsthesia done for the world at large, and for the medical profession, in addition to having actually relieved or prevented pain and shock in some millions of cases? What was the position of the subject in the early days of the dis-

administration rested with the operator. The methods then in vogue favoured prolonged struggling, which was looked upon as a necessary accompaniment of the process. Failures to anaesthetise were by no means uncommon. From the point of view of the anaesthetist patients were arranged in three classes—those who “took” anaesthetics well; those who “took” them badly; and those who would not or did not “take” them at all. The personal equation in the actual administration was vaguely if at all recognised, principally because there was little if any scope for its display. If the patient drove terror into the hearts of his relatives by moaning, praying, swearing, shrieking, or rushing about the room destroying the furniture, little or no attention was paid to the matter. Trifling inconveniences such as these sank into insignificance when, at the conclusion of the operation, the fact became established that no pain had been experienced. The rapidity in operating which had been gained by those accustomed to operate upon conscious patients rendered re-applications of the ether or chloroform unnecessary in many, perhaps in most cases. The surgical dissections of to-day were unknown. The dangers of an overloaded stomach, of the sitting posture, and of obstructed breathing were not realised, as the historical case of Hannah Greener, the first victim to chloroform, forcibly illustrates. When difficulties or dangers presented themselves during the use of anaesthetics they were conveniently, if not always accurately, ascribed to peculiarities in the patient. Even when a fatality took place, it was not the anaesthetist but the anaesthetic which was to blame.

THE WORK OF SNOW AND CLOVER.

Gradually, as in other technical departments of practice, experience began to tell; and it became clear that there were such elements as skill and success in chloroform-giving. Anaesthesia had up to this time run wild; but in the hands of Snow, and later on in those of Clover, she was broken in, so to speak, and brought into useful subjection. We are indebted to Snow for the most valuable research upon chloroform which has ever been written, and for laying down the

practice is of any avail. This, after many years, leads to the development of certain perceptive faculties which are essential to success. The anaesthetist of experience recognises certain types of subjects, and knows that certain methods will be appropriate in certain of these types and inappropriate in others. He knows that certain subjects will present certain difficulties. He disregards symptoms which possibly alarm the tiro, and he feels anxious when the casual and untrained observer sees no need for alarm. He is quick to observe certain changes of countenance and of colour; to hear certain respiratory sounds; to feel different degrees of conjunctival reflex; and to detect pulse variations. Much of his knowledge is undoubtedly purely empirical; much of it, indeed, may be possessed without the possessor knowing that he has it; but it is none the less valuable in preserving the equilibrium of safe anaesthesia. The remark of Mr. Teale that an anaesthetist should not be deficient in sensitiveness is a very true one; and this sensitiveness, even if not naturally possessed, comes with experience. With such considerations before us it is not difficult to understand the increasing favour with which this specialism is being regarded, not only by operating surgeons but by the public. The more educated section of the community are quite alive to the importance of the matter; and even amongst the lower orders it is not uncommon to find patients who are as solicitous about the anaesthetic as about the operation itself. There are, indeed, several operations in which the risk, so far as the procedures of the surgeon are concerned, is practically *nil*, whilst that of the anaesthetic is, under the circumstances present, a tangible one. Let us suppose, for instance, that an inexperienced practitioner is about to give chloroform for the removal of enlarged tonsils and adenoid growths; the operation is regarded as a minor one; the patient's breathing is considerably obstructed; and precautions as to food have not been rigidly enforced. Under such circumstances as these an accident may easily occur. Numerous other examples might be given. It would, of course, be absurd to urge the necessity for special anaesthetists in all operations. But, for reasons which I have given, I contend that, whenever possible, experienced anaes-

modern operating-theatre. Past practice in anæsthesia, when chloroform was given to a degree which would not now be tolerated, cannot, I think, justify the expression of dogmatic views for the guidance of anæsthetists. Many of the theories and opinions so glibly put forward by distinguished physicians would certainly need modification or abandonment were these gentlemen to take duty for a few months as anæsthetists at any of our large hospitals. Physiology has undoubtedly aided us a good deal; but here again I am confident we should make much more real progress if those who interest themselves in anæsthesia from a physiological standpoint would first obtain practical experience in the theatre. They would then approach the problems crying for solution in a different and less restricted light. They would soon realise the important fact that in anæsthetising human beings numerous factors come into play which are either not met with at all in the lower animals, or are met with only in a modified degree. Not long ago I paid a visit to a well-known physiological laboratory. In one of the experiments the question arose whether a particular animal had or had not ceased breathing, and to my astonishment I saw that respiration was regarded as proceeding so long as certain feeble and fitful muscular contractions about the chest and abdomen persisted—contractions which were, and for some time had been, utterly unable to cause the slightest ingress or egress of air. This incident shows that what is by some physiologists regarded as respiration is to the anæsthetist nothing of the kind, and that a practical acquaintance with anæsthetising human beings would materially assist the physiologist in his researches.

RECENT ADVANCES.

Although the present state of our knowledge leaves much to be desired, we may, I think, congratulate ourselves upon the advances which have been made during recent years. The practice of administering one anæsthetic irrespective of the nature of the operation and of the type of subject is now a thing of the past. The most successful administrators are those who vary their anæsthetics and their methods in accord-

deaths will show how frequently perfectly normal hearts have been met with. It would, of course, be foolish to say that extremely asthenic persons and those in the last stages of heart disease are the best subjects for anaesthetics. But this we may say, that such subjects do not constitute anything like the proportion of those who annually die under anaesthetics that we should expect if Sir B. W. Richardson's views were correct. Another comparatively recent addition to our store of knowledge is the fact that it is an excellent plan, when chloroform anaesthesia is desired, to tide over the earlier stages of administration by giving the patient a short "course" of ether, and then to continue with chloroform. This is most conveniently effected by starting the administration with "gas-and-ether," or "A.C.E.-and-ether," and then proceeding, with certain precautions, to the anaesthesia of chloroform, which will then be found to be altogether different in type from, and certainly safer than, the chloroform anaesthesia obtained by administering this anaesthetic *ab initio*. Then a word as to nitrous oxide gas. We now have at our command a perfectly practicable method of obtaining anaesthesia from this gas without objectionable asphyxial phenomena, so that nitrous oxide is robbed of its one danger, whilst its anaesthetic properties are actually intensified. Lastly, it has been pointed out that in administering anaesthetics certain postures are inadvisable, whilst others are actually advantageous, so far as the anaesthetic is concerned.

WHY DEATHS STILL OCCUR.

With all these additions to our storehouse of knowledge the question may well be asked "Why do not deaths from anaesthetics show signs of diminution?" The reply is that the responsibilities involved in administering anaesthetics are not yet fully realised; that the administration is too often placed in the hands of comparatively unskilled men; that the natural tendency possessed by patients under anaesthetics to become the subjects of obstructed breathing is not yet sufficiently recognised; and that chloroform is too frequently chosen as the anaesthetic when safer agents such as nitrous oxide or ether should be used.

covery; and how does that position compare with the present? What developments have there been since Snow gave to the world his perennial work on chloroform—a work which is as clear and readable to-day as when its final words were written with a pen which was never again to feel the touch of its master? Have we attained perfection, so far as our methods are concerned, with the anæsthetic drugs now known to us? What have the physiologist, the chemist, and the physicist done to help us? What are the present aims and objects of those most interested in the subject? What is the future of anæsthesia?

Anæsthesia was born a slave; and she has ever remained the faithful handmaid of her master Surgery. The gigantic work which has been and is still being accomplished by the latter would never have been possible without the aid of the former. By the assistance which Anæsthesia has rendered, countless advances and developments in surgical science have resulted. Moreover, Anæsthesia has calmed the public mind. In past years the services of her master were only requisitioned as a last resource; they are now as often invoked in doubtful or obscure cases, and in those in which inconvenience rather than actual suffering has to be remedied. By her influence, too, the very nature and disposition of her master have been modified and softened. The constant infliction of pain to which he had grown accustomed tended to dull the edges of natural sympathy, and to bring about in him an apparent if not a true heartlessness of demeanour and disposition. All this has been changed by Anæsthesia. There is nothing, indeed, to prevent the surgeon of to-day from practising his calling with that gentleness of manner and kindness of purpose which have hitherto been regarded as belonging more particularly to the physician.

THE EARLY DAYS OF ANÆSTHESIA.

In the early days of nitrous oxide, ether, and chloroform, the rôle played by the anæsthetist was as simple as it was unimportant. It was his duty to administer a small quantity of the anæsthetic from time to time, and to prevent the patient actually feeling pain. The responsibilities of the

principles which should be followed in using this anaesthetic. To Clover our thanks will ever be due for having placed not only the administration of nitrous oxide but that of ether upon a permanent and scientific basis. And we are indebted to Bert for the discovery of the practicability of obtaining nitrous oxide anaesthesia without the occurrence of those asphyxial symptoms which had hitherto been regarded as a necessary accompaniment of the administration of this useful agent.

THE NEED FOR SPECIALISM.

Snow and Clover devoted their professional lives almost exclusively to the study and practice of anaesthesia, and this devotion had a marked influence in the development of the subject. They occupied the field at a time when progress was most needed, and they occupied it well. The need for specialism in this branch of practice is, I think, as obvious as can well be, despite what has been advanced to the contrary. The administration of an anaesthetic for a modern surgical operation involves a risk to life which may be very considerably lessened—in fact, reduced to infinitesimal proportions—by placing the administration in the hands of experienced and thoroughly competent individuals. There are numerous delicate and minute surgical operations, moreover, which require for their successful performance absolute and continuous quietude of the patient, and unless such quietude can be maintained, partial or complete failure of the operation may ensue. As illustrations, may be cited: certain operations upon the palate, eye, gastro-intestinal tract, larynx, nasal cavities, etc. It is not very uncommon to hear that in a particular case the patient took the anaesthetic so badly that the operation had to be unduly hurried or altogether postponed. Such a state of things may readily arise when anaesthetics are imperfectly given. Again, errors of judgment as to the patient's real state may easily be committed by the inexperienced, and an operation capable of saving life may thus be abandoned. The occasional administration of an anaesthetic, even if spread over several years, cannot make a man a reliable anaesthetist. Nothing but constant

thetists should be called in, and that every large hospital should have its anaesthetist just as it has its surgeon and its physician. I would even go a step further, and express the conviction that, failing the introduction of some simpler methods of pain-prevention than those now known to us, the next half-century will witness the appointment to our hospitals of men more highly qualified than those who now hold these posts.

A PLETHORA OF LITERATURE.

The subject of anaesthesia has suffered much at the hands of its literary exponents. Nearly every member of the profession seems, at one time or another, to have contributed something; and the consequence of this is that the comparatively few trustworthy and really valuable articles which have been written have become undeservedly inaccessible. The widespread ignorance of the subject which at present prevails is no doubt accountable for the acceptance by our journals, and for the appearance in print, of essays which should never have passed the stage of manuscript. Hundreds of monographs might be quoted which are deficient in any tinge of originality. One writer contributes his first hundred cases of ether or chloroform administration; another advances a theory based upon a single experiment; another laboriously collects statistics; another "invents" an inhaler and describes it before he has used it a dozen times; another "modifies" the apparatus of others; another coins misleading and inaccurate terms; and so on *ad lib.* A forcible instance of the last-named endeavour to advance the subject is to be found in a recent article in which the writer suggests the term "nitrogenised ether" for a mixture of nitrous oxide gas and ether vapour.

PHYSIOLOGY AND PRACTICAL EXPERIENCE.

The subject has also suffered considerably, and is still suffering, at the hands of certain physicians and physiologists. The giving of anaesthetics is essentially a practical matter. I venture to submit, indeed, that no one is competent to express opinions upon it who has not himself had experience in the

ance with the circumstances of each case. In addition to the *sine quâ non* of safety, modern surgery requires one patient to be absolutely flaccid and immobile; another to be less deeply anæsthetised; a third to be comparatively lightly under the anæsthetic; and although exceptional cases must occasionally arise, I think I am right in saying that, with our present resources, we are able to conform to these requirements. Another important phase in the development of the subject has been the recognition of the advantages, in the vast majority of cases, of profound as opposed to light anæsthesia. And we have also learnt, within recent times, the equally important fact that during anæsthetic sleep the respiration of the human subject has a remarkable tendency to become mechanically obstructed at various points, so that, unless the anæsthetist is ever on the alert, he may, with the utmost ease, fail to recognise the occurrence of this obstruction, and a dangerous degree of asphyxia may result. There is, I think, good ground for the belief that this overlooked obstruction to breathing has been the primary factor in many if not in most of the so-called cases of "syncope" under chloroform. Again, experience is teaching us that, within reasonable limits, the state of the patient's heart may be disregarded. Formerly it was customary to gauge the patient's fitness for an anæsthetic solely by means of the stethoscope; and even at the present time there is a distinct unwillingness to discard this erroneous custom. The fact is that patients with the strongest hearts are really more liable than those of feebler circulation to pass into states of imminent danger under chloroform. Sir B. W. Richardson, in a recent paper, speaks of fatalities under anæsthetics as if they must necessarily occur in a certain proportion of cases annually. He speaks of the "*morituri*"—of persons whose circulatory systems are so balanced that the slightest interference may bring them to a standstill. Now such a view as this is, unfortunately, opposed to all practical experience. Patients suffering from *morbus cordis*, or other affections of the vascular system, are known to do exceedingly well under anæsthetics, provided that the respiration is not interfered with, and that suitable anæsthetics are employed. A brief reference to the *post-mortem* records of chloroform

POSSIBILITIES OF THE FUTURE.

Finally, what is the future of anæsthesia? It would, no doubt, be a great boon if an anæsthetic were to be discovered which would possess the simplicity, the agreeableness, and the potency which characterise the administration of chloroform, the safety which distinguishes ether, and the freedom from after-effects which is such an advantage in the case of nitrous oxide. But it is somewhat unlikely that such an ideal anæsthetic will be found. A writer on this point looks forward to the discovery of some agent capable of producing general analgesia, and believes that such a discovery will revolutionise our present systems. But it is more than likely that there would be weighty objections on the part of most patients to remaining conscious during surgical operations, even if no pain were experienced. Such chimerical forecasts are not, however, likely to improve the present position of anæsthesia, which should be our immediate aim and object. Putting on one side the possibility of the discovery of some new anæsthetic or analgesic agent, there is every reason to believe that our present systems and methods are capable of considerable development and improvement. Numerous possibilities suggest themselves. A far wider range of utility may be in store for certain drugs which are known to have anæsthetic properties, but which, for some reason or another, have not come into favour. Novel successions or combinations of anæsthetics are very likely to be worked out and to prove useful. Chloroform anæsthesia may yet be rendered as safe as that of ether. The anæsthesia of nitrous oxide in the presence of oxygen may have a great future before it. Our knowledge as to the best lines of treatment for different types of subjects is rapidly on the increase. And, lastly, let us hope that we may discover means for preventing or minimising the after-effects of ether and chloroform. To say that the subject is worked out is but to confess to a lamentable ignorance of it. Much is needed, and by patient observation and experiment much will be discovered. The first step should be an educational one. By sending out into practice men who have a proper appreciation of the responsibilities and requirements in anæsthetising, an improved position of the subject, and a notable saving of human life will inevitably result.