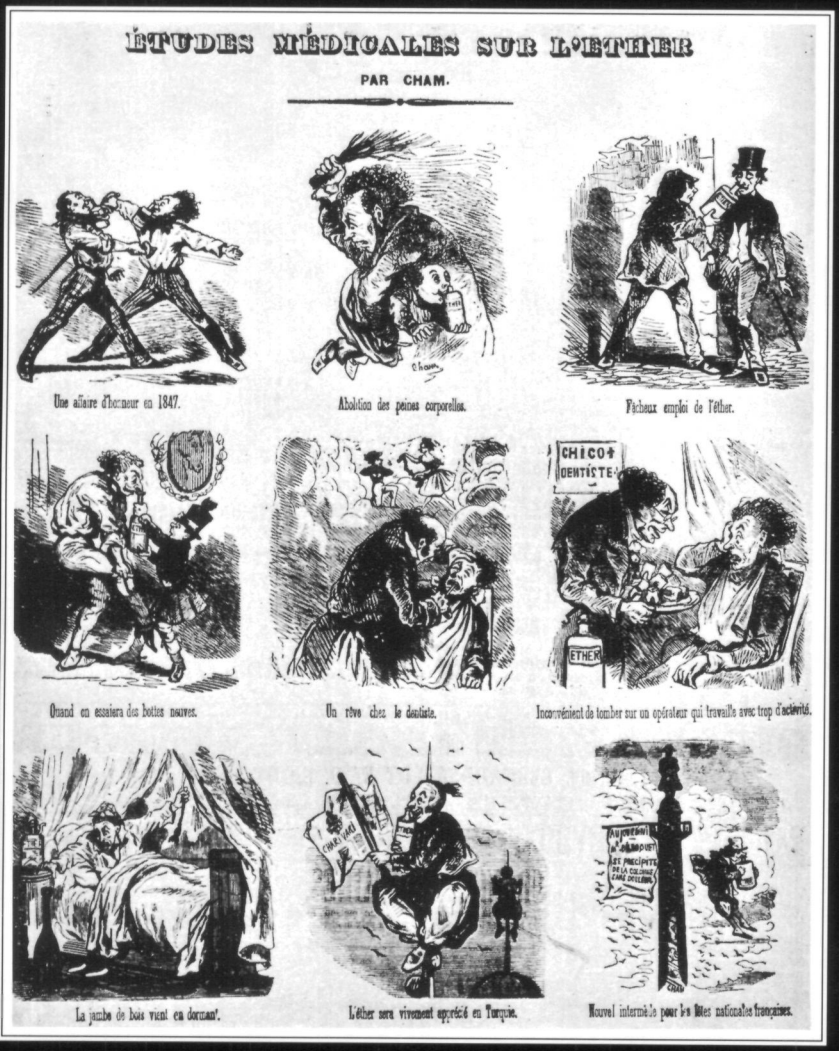
The History of Anesthesiology

Reprint Series: Part Twenty-one

Views of our Specialty



Cham's cartoon from *Charivari*

Illustrations on the use of ether anesthesia by a French cartoonist, Cham, depicting the contemporary lay response to an important medical discovery. (Mayer RL: The reception of ether anesthesia by a French cartoonist. ***J Hist Med*** 1946; 1:611.)

Views of our Specialty
Introduction

The reproduction on the cover of this collection of papers of a cartoon by the French cartoonist Cham (in *Charivari,* a satiric journal) reveals how the public might have interpreted the introduction in 1846 of ether anesthesia. From those early times, at least in America, those who practiced the art were beset by their tarnished image and status, both in the public domain and in the medical hierarchy. Such introspective evaluation has never pervaded the British system where, from the beginning, physicians gave the anesthetics and as medical graduates and clinicians were appreciated by their peers.

In America, anesthesia haltingly gained a foothold but it became essential around the turn of the century for the major clinics and hospitals to employ anesthetizers of permanence and experience, hence the nurse anesthetist. Nevertheless, this development did not dissuade a coterie of physicians from aspiring toward professionalism in anesthesia; men, publications and organizations — as succinctly defined by Ralph M. Waters. In the thirties, this goal began to assume reality but it was not until the 50s and 60s that the specialty approached full potential — Modern Anesthesia. In this collection of reprints, we hear the voices of those within and without the specialty as they expressed their opinions, determination and struggle for recognition.

L. D. Vandam, M.D.

VIEWS OF OUR SPECIALTY

SELECTED PAPERS

1. Goldan SO. Anesthetization as a specialty: its present and future. *American Medicine* 1901:101-104.

2. Haggard HW. The place of the anesthetist in American medicine. *Anesthesiology 1940;* 1:1-12.

3. Waters RM. Pioneering in anesthesiology: why the professional anesthetist. *Postgrad Med 1948;* 4:265-272.

4. Salter WT. The leaven of the profession. *Anesthesiology 1950;* 11:374-376.

5. Lortie DC: The sociologist looks at the profession of anesthesiology. *Curr Res Anesth Analg 1950;* 29:181-188.

6. Dripps RD: Decisions for the specialty. *Bull NY Acad Med 1962;* 38:264-270.

7. Beecher HK: Anesthetist as investigator. *Anesthesiology 1964;* 25:445-453.

[Reprinted from AMERICAN MEDICINE, July, 1901]

ANESTHETIZATION AS A SPECIALTY: ITS PRESENT AND FUTURE.[1]

A CONSIDERATION OF THE SUBJECT BASED UPON AN EXTENSIVE EXPERIENCE IN THE ADMINISTRATION OF ANESTHETICS.

BY

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of New York City.

If the desire, voiced so frequently, for a safe anesthetic, means an agent which would be without danger in unskilled hands, I seriously question whether such an anesthetic ever will be secured; for the production of unconsciousness in itself has, and always will have, an element of danger associated with it. In the search for a safer anesthetic it has very long been overlooked that mortality, immediate and remote, from the old agents, was really due more to the manner in which they were administered, than to the anesthetic itself. These facts which in a general way were known to the surgeon, have been more distinctly brought before the profession by the superior results obtained by skilled administrators who, as a distinct class, exist in this country at the present time, to an exceedingly limited extent.

That such an important specialized branch of medicine should now, after upwards of 50 years since the introduction of anesthetics, be still in its infancy, is, I believe, due to the surgeon.

"Anyone can give an anesthetic" is the cry, as old as anesthetics themselves, and it is hardly surprising that the particular administrator should have considered the subject of no more importance than the surgeon. As often as not the most available man gave the anesthetic, his method usually consisting in pouring ether into an inhaler, covering the patient's face, and proceeding to watch the operation. The surgeon had to divide his attention between the operation and the narcosis and in many instances stop his work entirely, at a considerable loss of time, to avert some threatened accident. When anesthetics were administered to any extent the work simply served as a means for advancement to the

[1] Read before the Medical Association of the Greater City of New York, March 11, 1901.

young practitioner, and was dropped at the first opportunity. As there were no incentives for the more thorough investigation of anesthetics this important branch of medicine, until very recently has been, and considering the country as a whole, is, practically neglected.

The Anesthetist of the Present.—There is a singular idea in the minds of many that a simple gas-apparatus is the only essential for the anesthetist of today. Now while in most cases the preliminary administration of nitrous oxid to ether is a great advantage from many standpoints, of far greater importance is the maintenance of the anesthesia after the gas has been discontinued. The use of gas before ether is not a difficult thing to accomplish, its advantages are many, yet it was more than 20 years after its first employment in England before its use became anything like general here. This advanced method is entirely due to the efforts of the skilled administrator. However, the apparatus can never make the anesthetist, no more than instruments the surgeon, but as special instruments in certain operations enable the surgeon to accomplish results hardly possible without, so a good apparatus judiciously used assists the anesthetist to secure superior results. Any apparatus is worse than useless in unskilled hands, but is often simply one factor of many which the skilled administrator employs to secure the best results, meaning not simply an immediate recovery from the anesthetic, but the narcosis so conducted that a minimum amount of shock results; this is evidenced in my experience by an almost immediate return to consciousness, distressing after-symptoms being the exception rather than the rule, and rapid convalescence. Everyone will admit that a patient operated upon suffers from both surgical and anesthetic shock, both of prime importance, depending upon the nature and the length of time of the operation and the narcosis. Now the anesthesia can be so conducted that a minimum or maximum amount of shock resultant thereto occurs; this shock, added to that incidental to the operation, is quite sufficient in many cases to turn the balance against the patient; again, a minimum of anesthetic shock always secured by the skilled administrator, with the unavoidable surgical shock, will often be sufficient to hold the case this side of a fatal termination, and ultimately lead to a successful operation and subsequent health.

In the proper selection of an anesthetic the skilled administrator recognizes that a great deal depends. Most surgeons select the anesthetic to be used in the case, and usually choose between ether and chloroform. Safety should always be of the first importance yet it is only the trained anesthetist who always gives this subject full consideration. We have simply to review medical literature to note fatalities from ridiculously minor operations, *obviously avoidable* if the proper anesthetic had been selected. No matter what the operation, if the safest anesthetic is adapted to the case, it should be chosen and administered. Now nitrogen monoxid and oxygen is admittedly the safest, although many criticise it upon the score of inadaptability, an objection which is in most instances proven groundless. This is particularly so since more perfect and simple apparatus is being used in its administration. I might digress to say the whole development of the practical use of gas and oxygen for surgical purposes has been due to the efforts of skilled administrators of anesthetics. Many surgeons select the medium without permitting the anesthetist any voice in the matter at all—a decidedly wrong practice. I wish to say, however, this is not the general custom, as a great many leave this matter to the discretion of the anesthetist, but in spite of this many patients do not receive the benefits of the added safety of gas and oxygen for the reason that the surgeon often selects chloroform in the unusual cases; many of these in my experience were particularly well adapted for the gas and oxygen narcosis, but as it is a physical impossibility for the anesthetist to take large supplies of these gases with his usual considerable armamentarium, and as he rarely sees the patient before the time set for the operation, another anesthetic must be substituted. No one who has given the subject thought, will deny that a physical examination of the patient not only immediately before the operation takes place but a day or more prior, would be a satisfaction to the patient; and what is of far more importance, it would enable the anesthetist to discover any peculiarity which if known in advance would enable him to anticipate possible emergencies and so prevent them. More than an examination of the heart and lungs rarely takes place immediately before the narcosis, and a patient is hardly in a condition, neither does the time permit, to ask questions. In fact I have never found it advisable to question patients immediately preceding anesthesia, as this has a tendency to cause fears which

they would not otherwise entertain. I have in more than one instance learned that even in important operations, certain symptoms, to say nothing of organic lesions, were overlooked. A case I distinctly remember illustrates this point well: The patient, an old lady, having exophthalmic goiter, was operated upon for vaginal hysterectomy; after about 30 minutes she developed spasm of the glottis, for the relief of which a catheter was introduced into the larynx and through which I administered chloroform without difficulty; the operation was finished and the patient made an uneventful recovery. Subsequently I learned that she had long been subject to these attacks in which she sometimes remained for long periods. Had I previously known this, I would have introduced the catheter immediately after beginning the narcosis and administered the anesthetic through it from the first, and so prevented the complication from manifesting itself. Consequently I might reiterate that to have the anesthetist see the patient before the time set for the operation is simply to place a factor of great potentiality not only so far as the saving of life is concerned, but for the success of the operation as well. This makes the fourth case in which the use of the catheter has prevented a possibly fatal issue, therefore let me insist that it should always be at hand in event of an emergency.

A word regarding accidents in general: These will occur in the best of hands, no matter how skilfully the anesthetic is administered. It is just in these emergencies that the anesthetizer manifests his skill, he is never at a loss to know just what to do—and does it. It must be remembered that accidents occurring under the influence of anesthetics are not necessarily due to conditions with which the anesthetic has anything directly to do. This is particularly well shown, as every surgeon is aware, in certain operations where the semiprone or prone position is necessary and where it is more or less of an impossibility for the patient to expand the chest; correction of the posture *invariably* corrects the complication.

Methods.—We often hear a great deal about this or that particular method from persons who have used only the method they laud so highly. The trouble with most administrators is that they rarely have used other than the method they favor. Is it not ridiculous to make comparisons upon simply theoretic grounds, particularly when it is contrary to the practical experience of the

world? The skilled anesthetizer is not only practically familiar with all, but he has a multiplicity of methods varied to the needs of each case, always bearing in mind safety first. He is a slave to no particular manner, knowing from experience that it is necessary to change methods and he has not simply theoretic but practical reasons for so doing; if all patients were the same in temperament, type, weight, habit, vitality and many other factors, we might select one particular method, but more depends upon the administrator; for the admittedly safest anesthetic and method might, and experience frequently teaches does, become dangerous in unskilled hands. Secure then a skilled administrator; who has the ability to properly vary the anesthetic and method, and you will have an ideal combination which will prove a considerable factor not only in the immediate recovery from the anesthetic, but in the ultimate success of the operation.

Responsibility.—There can be but one correct way of viewing this subject, and that is the administrator, whether experienced or not, is responsible for the narcosis. This of course refers to private cases. The surgeon of the past assumed, and at the present time largely assumes, all the responsibility for the operation, with everything appertaining thereto, including the anesthesia. That this has been the usage for years past, however, can not be taken as an argument for its correctness; usage sometimes covers a multitude of the gravest abuses, and in this instance it has certainly been a grave abuse. The contention of many will be that the patient makes all his arrangements for the operation with the surgeon, and that this includes the narcosis, but in this connection, so far as the anesthetist is concerned, the surgeon is simply in a sense an agent. He can only secure for the patient a skilled administrator; and he should in justice to the patient, himself, and anesthetist, explain this matter fully. The anesthetist is not an assistant of the surgeon but a distinct and essential entity, of necessity working hand in hand with him, using every means in his power to secure for the patient a featureless recovery. The responsibility of the anesthesia should be fully impressed upon those who administer anesthetics, as hospital internes, nurses, the occasional administrator, etc., who often as not have little or no experience and in the majority of instances consider the matter of the greatest insignificance.

I consider it unjustifiable for nurses to administer

anesthetics, or for anyone to permit them to do so, excepting, of course, in emergencies. This is an abuse which exists in this country to a considerable extent even to this day.

In striking contrast to the importance that many surgeons and the occasional administrators attach to the anesthesia is the manner in which the patients themselves view it. It is well known that in the vast majority of cases where operations are necessary, the fears of the patient are centered almost entirely upon the narcosis; whether the apprehensions are not well founded, in many instances, must be left to the judgment of the individual members of the profession at large. I believe they are, and when we consider the reprehensible manner in which anesthetics are often administered, the surprise is that even immediate fatalities are not more frequent. Were I to require an operation I would have no difficulty in selecting any one of a number of surgeons. The same, however, is not equally true regarding the anesthesia.

The Question of Fees.—One would think this was a question upon which little need be said. The abuse of anesthesia may be said to be largely dependent upon an abuse of this subject. In the old days—and I might say to a very large extent at the present—any fee the surgeon chose to give (usually $5 or $10) in his estimation sufficed, since the mere honor (?) of assisting (?) at the operation was considered by the administrator sufficient recompense; this belief, it is needless to say, was always encouraged by the surgeon. There is but one correct way of deciding this question, and that is the *anesthetist's account should be rendered to the patient direct*, and not to the surgeon. Many surgeons with innate sense of justice recognize this. This plan never failed to answer satisfactorily in every instance in my experience, because it is correct and just to the patient, the surgeon and the anesthetist.

The amount of the anesthetist's fee can only be properly regulated by the circumstances of each patient and proportionately, of course, to the surgeon's fee itself. While this is and should be the rule in the vast majority of cases, there are conceivable contingencies when this rule does not hold good, *i. e.*, where the anesthesia is of far more importance than the operation; in such cases the fee can always be settled satisfactorily by the surgeon acting equitably with the anesthetist by stating the charge he—the surgeon—is to make, and the anesthetist

can then regulate his. Some surgeons, it should be said, contend (incorrectly, however, in my estimation) that the anesthetist's account should be sent to them to be sent with theirs to the patient. Now, if the surgeon was fair, there would be even here no room for exception—that is, if the surgeon informed the anesthetist the charge he (the surgeon) was to make to the patient, the anesthetist's charge could be regulated accordingly. But this the surgeon very rarely does; he must, in some instances, lay himself open to the charge of unfairness, for upon what grounds can any surgeon in a minor operation in a very wealthy patient ask an anesthetist *specifically* to assume (what is always implied, in my estimation) all responsibility for the anesthesia, which, in magnitude, is out of all proportion to the operation, then presume to place a ridiculously small fee upon the anesthetist's services and charge many times as much himself?

In many cases surgeons' fees are from hundreds to thousands of dollars. The anesthetist can only gauge the ability of the patient to pay by his surroundings. This is particularly the case in the private hospitals and sanitariums where many patients can afford more than a minimum charge. To avoid any unpleasantness in these instances it was at first my custom to send the account to the surgeon with a request that if the patient's circumstances permitted, the fee be made accordingly. Incredible as it may seem, no charge was ever made larger than that indicated by me, consequently I found no reason why my account should, to the surgeon, be less in *any case* than it would have been if sent direct to the patient.

The surgeon should divest himself of the idea that he is doing the anesthetist a favor by having him administer the anesthetic, as he is far more important to the patient and the success of the operation; he is simply increasing the probability of the success of the surgeon's work, which depends very largely upon the skill with which the anesthesia has been conducted. This is a service none the less direct to the patient simply because the surgeon secures his services. One unassailable contention is that, however simple or dangerous the operation, no patient refuses the added security of the skilled administrator when explained to them. An argument I have heard is: The patient cannot always afford the skilled anesthetist. If the anesthetist's charges were always the same there might be some truth in this con-

tention. Speaking for myself, in appropriate cases I never refuse my services, even if the patient is unable to pay any fee. If the patient's circumstances are poor, I ask but a minimum fee; but I always base my charge entirely upon the patient's circumstances, and never upon what the surgeon considers my services worth. I trust there is no ambiguity about this. If the surgeon is paid, no argument can be advanced why the anesthetist should not also be paid, and accordingly. The fact that some surgeons receive fees of from hundreds up to, in some instances, thousands of dollars, and expect the anesthetist's account to them to be from $10 to $25 seems incredible; it is nevertheless in my experience true. Needless to say—speaking from a personal standpoint—I have never knowingly tolerated such an attempt, and never will.

Another argument advanced has been that the anesthetist has no right to make a charge to the surgeon above that which has been set for years past, because the surgeon asserts he must himself pay it. I fail to see how anyone can subscribe to such fallacious contentions. In the first place, upon what basis of reasoning must the anesthetist's charge be a fixed one? If the surgeon assumes to limit the anesthetist's charges, there is certainly no reason why the patient cannot do likewise with the surgeon. That the surgeon should pay the anesthetist is no reason why his fee should be smaller than it would have been if the patient paid it directly. An important service has been rendered the patient—which I for one do not look upon lightly; if the surgeon prefers to follow this erroneous method and incorporate the anesthetist's fee in his when making arrangements with the patient, he should ascertain what this charge is to be in advance, which he can always do.

Not infrequently in my experience, through the physician, or some friend or relative of the patient, previously operated upon, my services have been secured for the anesthesia. I have never known any surgeon in such an instance to question my charge in any way. Is there any more reason for his doing so simply because he occupies the position, where in the interest of his patient he acts for them in securing a skilled administrator.

The way to correct an abuse is to expose it—the abuses of anesthesia in the past are slowly being corrected by the realization of the superior results obtained by the skilled administrators of the present. You can not expect that only one phase of the subject can in the in-

terest simply of the surgeon be corrected, and another which involves only right and justice to the anesthetist be ignored—if you do you must not expect that any man will give his best energies to the study of the subject devising means and methods whereby such a vital subject as anesthesia may be placed upon a scientific basis, as near, at least, as it is possible to do with a subject into which so many factors enter. It has been questioned as to whether I would have the courage of my convictions. This paper answers that question. Practising anesthetization as a matter of choice, not necessity, I prefer taking the initiative in correcting abuses, to sacrificing my principles and self-respect. The surgeon is presumably working in the interest of the patient, not the anesthetist; consequently he does him no favor by securing his services for the patient. Whether my contentions are recognized now or later, the day is not far distant when the patient, the one most interested, will himself secure, or expect at the surgeon's hands, a skilled administrator which no one will deny is implied in *every* instance and which the surgeon is morally bound to consider.

A word as to the future of anesthetization, instead of the haphazard methods of administering anesthetics they will be properly taught by those competent to teach, not by any means the surgeon. He is not an anesthetist but a surgeon. To follow his teaching in this subject would certainly be decidedly bad for the patient in many instances. I well remember some years ago a surgeon was instructing his class how to administer chloroform. The patient was upon the table with the regulation Esmarch mask covering his face. From the small brown bottle familiar to all, the surgeon was pouring a stream of chloroform upon the inhaler—the meanwhile, telling his class, the first thing to do was to secure the patient's confidence. He did not, however, say that one cannot administer chloroform and talk at the same time—with such a method it was hardly surprising that the patient stopped breathing. "Now gentlemen," he said "this gives me an opportunity of showing you how to treat emergencies." He did not tell his class how the emergency might have been avoided by a proper administration of the agent. The patient recovered after the saturated mask was removed and the anesthetization was continued by the hospital interne with no untoward features. To continue—as to the future, more thought will be given to the selection and administration of anesthetics, and no

patient's life will be jeopardized by the use of an anesthetic, which might be avoided by the proper selection of another.

The hospital can only lay the foundation for the skilled anesthetist, as it does for the surgeon. Whether anesthetization or surgery will be specially practised will be a matter of choice.

The anesthetist will not be considered a mere satellite of the surgeon, but recognized as one of a distinct class. There will be an incentive to men to give their best energies to the perfection of anesthesia; the old cry for a safer anesthetic will become a thing of the past; anesthetics will not so often be blamed for results not properly due to their use but abuse—then there will be a supply of skilled anesthetists throughout this country sufficient to fill every demand.

THE PLACE OF THE ANESTHETIST IN AMERICAN MEDICINE

HOWARD W. HAGGARD, M.D.

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THE PLACE OF THE ANESTHETIST IN AMERICAN MEDICINE *

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WHAT I have to say here regarding the place of the anesthetist in American medicine is not an encomium either of the men in this field of medicine or of their contributions. I offer no praise of the anesthetist as a scientist or as an humanitarian, nor do I glorify the relief from suffering afforded by his skill and knowledge. If then, I depart, as my negations must signify, from the easy, ingratiating words customarily spoken on occasions of this kind and under a title such as I have chosen, it is with a purpose.

That purpose is not to define the calling of the anesthetist in terms of what has been done and what can be done in the laboratory or at the operating table or at the bedside. It is not the contributions of the anesthetist with which I deal, but instead, the public regard in which these contributions are held. And I shall emphasize the fact that it is this public regard which determines the place of the anesthetist in American medicine.

There are some here among you, perhaps, who feel that your duties as anesthetists are complete when to the individual patient you have given the best anesthesia that modern knowledge affords. Admitting the primary importance of good anesthesia, this view is, nevertheless, to my mind, a limited and a narrow one.

It contributes little to the real advancement of anesthesia. It is not enough that good anesthesia can be given and that it is given to a fortunate few. What is of real importance is that all anesthesia shall be the best that modern knowledge affords. And this desirable end can be reached only when the public recognizes the need and the importance of good anesthesia; and recognizes most of all that the administration of an anesthetic is a major therapeutic operation. It is only with such

* Read at a meeting of the American Society of Anesthetists, Inc., New York World's Fair, New York City, October 12, 1939.

recognition and with such understanding that the anesthetist will receive that public regard and public support which are essential to the fullest development of his calling. And to attain this necessary public recognition, the anesthetist must not only give good anesthesia; he must also shape public opinion.

It is thus a social rather than a medical matter with which I deal. And if, in dealing with it, I skirmish rather than strike to the center, if my views seem philosophical rather than practical, and if I speak in analogy, it is because no one can give direct and simple solutions to social problems. I do not need to call your attention to conditions here and elsewhere to emphasize the fact that our knowledge toward the solution of social problems in any walk of life is meager. You and I cannot solve the social problems of today. But we can recognize some of them and we can try to analyze some of them. And from this analysis there are certain inferences which we may draw at least regarding the social forces which operate in medical progress. Some of these inferences will form the theme of my discussion.

It is obvious beyond question that true progress is achieved in medicine only when two conditions have been fulfilled. The first of these is medical discovery; the medical research which establishes the means by which disease and suffering can be prevented or alleviated. But discovery alone prevents no disease and it alleviates no suffering. Medical discovery without the fulfillment of the second condition is of academic interest only. And this second condition is more of a social than a medical matter. It is application. Application, utilization, in turn, are determined by public regard, public opinion. Such application comes only when public opinion is shaped. The shaping of public opinion is a social matter.

It further has been an obvious fact in medical history, but never more obvious than at the present, that the benefit that could be conferred by any measure of medicine and the extent of the need for it are no direct indications of the regard in which it is held by the public or the extent to which it is accepted and applied. Regard and application come when public view is shaped to an appreciation. No beneficial measure of medicine ever reaches public acceptance and support on the basis alone of laboratory experimentation or clinical investigation. It receives the recognition and support only when the public view is shaped to an appreciation.

And finally, medical regard and public regard go hand in hand. Public opinion is the doctor's opinion. He is a member of the public. Public demand and regard shape the education in our medical schools.

The only common denominator in all these inferences is the shaping of public opinion.

The three inferences are my propositions. Let me now expand and illustrate them. I have in view particularly the situation of anesthesia but my illustrations may take me far afield.

My first proposition is, I repeat: The benefits that could be conferred by any measure of medicine and the extent of the needs for it are no direct indications of the regard in which it is held by the public or the extent to which it is accepted and supported. Regard and application come only when public view is shaped to an appreciation.

More than 300 years ago Paracelsus laid the foundations of chemotherapy. The new branch of therapy obtained public regard through the unfortunate method so characteristic of the efforts of Paracelsus—that of contention. The members of the medical profession and the public as well took sides in violent controversy as the herbalist and mineralist; the followers of Galen and the followers of Paracelsus. The public attention was there but the difficulty lay in the fact that the scientific basis was inadequate. The basis of controversy is too much public opinion and too little fact. Such a situation in time arouses ridicule which forms its own public opinion—such ridicule as that which was once directed at a controversy of this sort with the statement that the patients of the herbalists died of the disease and those of the mineralists of the remedy. As a matter of fact, except for steel in anemia and sulphur for scabies, little benefit to the patient was obtained from the minerals. True, mercury given just short of therapeutic mayhem hastened the disappearance of the secondary manifestations of syphilis, but it had little effect on the tertiary.

And then, three centuries after the time of Paracelsus, Ehrlich introduced salvarsan. This time it was the laboratory and clinical side which was fully developed. This time it was the social side which lagged. Syphilis continued to exist and to exist plentifully in the presence of what was offered against few diseases—a positive method of diagnosis and a specific remedy.

This anomalous situation, in which there was a prevalence of a disease on the one hand, and, on the other, certain means of control, might have continued indefinitely had not, within the last few years, a deliberate drive, with which you are all familiar, been made to break down the barriers. The breakdown was not accomplished by developing better therapeutic methods, or by clinical demonstrations. It was broken down by radio, newspapers, magazines and books and by word of mouth which led to open discussion. It was an effort made in what should be the most cherished privilege of any profession, that of shaping the folkways of our people. We once called it education; we now call it propaganda.

The doctor often looks down upon this shaping of public opinion; he treats it with indifference, with aloofness, and that in spite of the fact that for him, and for the public, it is equally as important as medical discovery. The doctor, I fear, forgets that his calling is a social calling. At times, although he may complain of fees, he seems to disregard the fact that his calling involves not only personal but also broad and fundamental problems of economics—the direct or indirect pur-

chase of his skill at a level comparable with the service he renders. The important feature is the value placed on this service by the public. The value placed by the public is not based on definite and tangible value received; it is determined by the public's opinion of value received. The patient of today too often takes anesthesia for granted as an accepted accessory to surgical operations for which he must pay as he does for the rent of the operating room. In contrast I ask you what would a patient, of say a hundred years ago, faced with an inevitable surgical operation, have paid for the certainty of painlessness? Is it actually any less important to the patient of today who accepts his anesthesia as a commonplace? The often repeated statement that it isn't lack of appreciation but of economic necessity that leaves the doctor's bill unpaid is a sophistry. No one yet has talked of subsidizing the automobile manufacturers because the public appreciates but cannot pay for automobiles. The fact of the matter is that the quite opposite attitude toward the medical fee is a cultivated one—cultivated now to a point when our citizens are beginning to think that medical service for everyone poor and rich alike is to be regarded as a civic contribution like the paved roads. The city pays for the roads but the citizen still pays for his own automobile. It is all, gentlemen, a matter of cultivated public opinion; the establishment of value by the public. And in these matters the modern physician has not influenced public opinion but instead has been influenced by public opinion. He has assumed something of the self-protective attitude of the cloistered research worker, of the austere institutional clinician. He has deliberately assisted the public in cultivating this regard of him. And it is to his detriment and I think to the detriment of public interest.

Public opinion, for good or for bad, is shaped by propaganda. People use one toothpaste, or another, not wholly because of the proven merits of the product, but because of propaganda. Have you ever stopped to think why the public, on the one hand, learns so quickly of any discovery in dietetics, and, on the other hand, so slowly of some medical measure, say the striking benefits of modern scientific anesthesia? The food discoveries are popularized by food manufacturers for commercial interests. Commercial interests know the value of good propaganda. Among them it does not have this euphonism; it is known as advertising. Discover a new vitamin today and tomorrow it will be in beer and bread and the day after the technical terminology of the nutritionist will roll glibly off the tongues of 100,000,000 people. The same 100,000,000 people still regard chloroform as the major anesthetic agent in use and look upon the administration of an anesthetic as something requiring only slightly more skill and professional knowledge than the giving of a dose of castor oil. The members of the medical profession are inclined to believe—at least so their actions would indicate—that the world will pause and eagerly, seriously and intelligently weigh and ponder the best in therapy and will then in sol-

emn decision accept and use it. There is no greater fallacy. The public does not ponder and weigh; in medical matters it has not the knowledge to do so—only the emotions. It takes its opinions fully formed and accepts those which are forced upon its attention. This direction of the public in the shaping of folkways is education, propaganda, advertising—take whichever term suits your taste. Each can have dignity; and each can be a public service.

Before my digression on publicity I had in a few sentences recapitulated the progress made in one branch of chemotherapy to essential completion—from discovery to application. Let me outline now some steps in the progress of anesthesia.

First there was the great discovery of principles. Here are the stories that are familiar to you and even becoming familiar to the public. They are those of nitrous oxide and ether and chloroform—Davy, Long, Morton, Wells and Simpson. The sum total of the propaganda value of these stories is that anesthesia is available; that there are drugs which give a blessed relief from pain. The sum total of public opinion formed is that it was unpleasant to have an operation before the days of anesthesia. This was very useful propaganda 90 years ago when the principle of anesthesia was under criticism. Today it is about as useful as is propaganda in favor of the principle of utilizing medicaments or surgery or having hospitals or trained nurses. Propaganda which deals only with principles now accepted, obscures the one feature of anesthesia which is of importance to the public today—that is the administration of anesthesia.

The second era in the progress of anesthesia was the search for new anesthetics. This was led, as you know, by Simpson with the discovery of chloroform. It is true that Simpson did a yeoman's service in shaping public opinion in his forceful pamphlets justifying the use of the principle of anesthesia. But chloroform was a long time ago. Since then we have seen the new anesthetics multiply in number and in professional usefulness. But these things are wholly the technical equipment of the anesthetist. They permit him to give better anesthesia but they mean little in creating public opinion. It is not the anesthetic agent which should be held up for public interest, but the administration of the anesthetic.

We have lived through the period of apparatus. We have seen the towel on a wire mask give way to a complicated respiratory apparatus with delicate controls. But again this means little to the public except that in the increasing number of moving pictures showing surgical operations, it is evident that the patient is still alive when the rubber bag fills and empties rhythmically and the valves jingle. In such pictures which express public views and public regard the anesthetist is a handsome nurse, or, lacking this appeal, he is obscured beyond the frame of the picture so that the surgeon may have the center of the stage.

And gentlemen, it was not the invention of a new antiseptic, of a new scalpel, or a new operating table that gave the surgeon—I speak collectively—the prestige and pre-eminence which he enjoys in public regard. This prestige gives surgery a prominent position in the curriculum of the medical school. It draws many of the better students into this field.

Today—to my mind at least—where the anesthetist, and again I speak collectively, is weakest, is in this very social aspect; this matter of prestige. The analysis of prestige and its importance brings me to the last of the propositions which I postulated: Medical regard and public regard go hand in hand. Public opinion is the doctor's opinion. He is a member of the public. Public demand and regard shape the education in our medical schools. And I may add that the public regard in which a branch of medicine is held is no direct measure of the benefit derived from that branch of medicine. It is a measure of the shaping of public opinion.

In broadest terms what I am saying is that throughout the ages the respect in which the doctor was held, the veneration bestowed upon his calling, and the support given to him have had absolutely nothing to do with the benefits the doctor and his calling have conferred upon the public. The regard given him is a cultivated regard; it is a fortunate coincidence when he deserves this regard.

Let me support my point with generalities. Look back, if you will, at the medicine man of uncivilized people; from our point of view all that he possessed was a bag of tricks in psychotherapy, and a few empirical methods of drug therapy, and yet he was held by his people in a veneration that amounted to actual awe. He was the great leader of his people.

Look next at the physician of the late Middle Ages and the Renaissance. He had far more to offer than the savage, but nevertheless he was regarded with no veneration. He was a menial. The surgeon was a barber.

And then look at the physician of the late 18th century, particularly in this country. That was a period in which men's minds were turned to serious matters. Devotion to principle was characteristic of the day. Public-minded, socially-minded men devoted their services to the needs of their fellow men with an almost religious enthusiasm; they were in medicine and they were in public affairs. They followed medicine as a duty of service to their fellow men; they signed the Declaration of Independence. They may—and often did—commit therapeutic outrages on their patients. You will recall Rush's famous 10 and 10; 10 grains of calomel and 10 grains of jalap at a single dose, often with copious bleeding. But he and his brethren were regarded with the highest respect. Their position in the public mind was far higher than that of the physician of today, in spite of the fact that what they had to offer as science was negligible.

You remember that famous remark of Dr. Benjamin Rush when he expressed his regard of science. He said "Medicine is my wife and science my mistress." You may remember, too, the waspish comment a half century later of Oliver Wendell Holmes when he said: "Medicine may have been his wife and science his mistress, but this breach of the seventh commandment cannot be shown to have been of any advantage to the legitimate recipient of his affections."

I bring in this anecdote because it shows more clearly than any words of mine the tendencies of the times. Holmes, present on that day when anesthesia was first publicly demonstrated, came in the era when science was beginning to dominate medicine—when the whole problem of the ills of mankind was to be solved by science and science alone. The laboratory and the clinic rather than the public place were to become—and then did become—the retreats of medicine. The door closed on the doctor. He was engaged, it is true, in a fundamental feature of his profession—the accumulation of knowledge. But it was to the exclusion of an equally fundamental feature—the shaping of public opinion to the full application of that knowledge.

In consequence of his sequestration a mode of thought was created. It was one which put the premium on medical discovery and not on medical application. In the last hundred years, with the introduction of the exact sciences into medicine, medical research has yielded some of the most beneficial knowledge that the human race has ever acquired. Enthusiasm has grown high and the mode of thought crystallized. The beginning and the end of medicine seemed to be research; the finding of new and better ways. And that, unfortunately, in the disregard of the fact that discovery without application is only of academic interest. It was a miserly method; the accumulation of valuables without putting them into circulation. The social side, the equally dignified propaganda side of medicine, was largely ignored, or, if not ignored, handled so badly or with such indifference as to fail in its purpose. It was treated with contempt as below the dignity of the doctor.

Now I speak feelingly on this subject and for a personal reason. I am, by sheer chance, a research worker; a laboratory man. But ten years ago I held much the same idea that I hold today regarding the need of propaganda although my views have changed considerably on how it should be done. At that time I was offered radio facilities to talk on such subjects. To the possible disadvantage of my professional career, I rather unwisely accepted.

For a little over a year I continued to talk with considerable criticism from some of my scientific confreres. The criticism did not come because of the amateurishness of my talks—and they were amateurish—but because such work was not consistent with a scientific career. So pressing was the criticism that I felt it then advisable to stop. That was ten years ago. In the intervening years conditions have changed. Medical radio propaganda of a similar sort—mostly rather bad in exe-

cution and misdirected I fear—has now become reasonably respectable. Time on the radio is eagerly sought by many medical societies. This year, to my amusement, the talks I gave with only a meager knowledge of the principles of propaganda ten years ago are now being repeated nearly verbatim by six different medical groups which have been given radio time. The certain conclusion that one must draw is that, while the principle of propaganda has been given some respectability, the method of carrying it out has not correspondingly improved.

In these rather personal digressions I have wandered from the point I was trying to make that public opinion is shaped by social endeavor and not by laboratory and clinical discovery. I have spoken in generalities. Let me next trace out along a somewhat different line a specific example of the development of prestige and the importance of prestige to the advancement of any branch of medicine. I turn to the surgeon. Incidentally I shall speak only of the advantages of prestige and deal with none of the disadvantages, the most obvious of which is the scramble of the mediocre toward the specialty which at the moment enjoys prestige.

As you are all aware, the surgeon did not always have prestige with the public or even the reasonable respect of his medical associates. In this regard there is a most pertinent and illuminating line in that ancient ritual which we call the Oath of Hippocrates but which in reality was the more ancient oath of the medical priests in the Temples of Aesculapius. It says, in effect: We, as respectable physicians, swear not to cut for the stone but to leave this to men who do such things. This stricture was not directed at the urologist, but at the surgeon. The surgeons were the men beyond the pale of professional respectability who did such things. Such was the attitude toward the specialist in surgery in the classical period of medicine. It was not one of great prestige. And it sank distinctly lower during the subsequent Arabic period of medical supremacy. Surgery was menial work; the professional standing of the surgeon was something comparable to that of the hospital orderly of today.

This regard of the surgeon carried over into Europe. No clearer indication of the prestige, of the recognition, or the reverse, of the importance of any field of medicine by the public, is to be found than in the curriculum of the medical school. In the early great medical schools of Europe no surgery whatever was taught. You will remember that Ambroise Paré, the 16th century Father of French surgery, was a barber. Only royal insistence obtained for him a grudging recognition by the medical men of the period. You may have read his Surgery and you may have read one of the standard medical textbooks of that day. If you have, you will see that Paré with his surgery had far more to offer than the internist with his comparatively greater prestige. All the physician had, as contrasted with the surgeon, was a more scholarly social distinction in the eyes of the public. Yet this public opinion was

sufficient to literally abolish intelligent surgery. By the time of Louis XIV, Paré's surgical knowledge had actually been so far forgotten that when the king developed a fistula in ano none of his attending medical men knew how to perform the necessary operation. It required six months study and preparation in a veritable medico-surgical comedy before the operation was performed on the royal posterior. This incident brought royal favor to surgery. Royal favor brought public regard with a revival of surgery. Of such things, gentlemen, is prestige created.

And I may add, parenthetically, that this was not the only specialty of medicine which profited by royal example. Obstetrics made its first stride toward social acceptance when Louis XIV had a male midwife for the confinement of Lovalliere. You all recall the public opinion created in favor of anesthesia by Queen Victoria's acceptance of chloroform at the birth of Leopold.

A sounder but no more effective prestige than that of royal favor was given to surgery by John Hunter when he introduced surgical pathology. This step made the surgeon something more than a technician who clipped off legs or arms and tied up aneurisms. It brought in surgical diagnosis. Surgical diagnosis required something more than manual dexterity. It required intelligence and education. A surgeon of the times, which was only about 150 years ago, said that John Hunter had made the surgeons gentlemen. This surgeon, in his statement, did not mean that the men of his calling had gained prestige with the whole public, but only with that part of it represented by the physicians. It meant that after the long struggle the surgeon might stand on a level with the physician and that the curriculum of the medical school would, in consequence, include a fair proportion of surgery. The public prestige of surgery followed. Inseparable to its development were the discovery of anesthesia, antisepsis and asepsis, the founding of trained nursing and the rise of the modern hospital. Anesthesia and antisepsis were taken as adjuncts to surgery; trained nursing originated and grew as surgical nursing; and the modern hospital was built to house surgery. The public saw these things, the public recognized the spectacular success of surgery; and surgery became, in public regard, the prodigy of medicine. Public prestige meant large fees; large fees, plus prestige, meant a flood of students seeking surgical training; this demand further influenced the curriculum of the schools. And as a final advantage, surgery was personal. As a branch of medicine it has done far less toward modern health and longevity than has sanitation, but sanitation lacks prestige because it is impersonal. From the World War there came a score of books of surgical reminiscence for public consumption. There was not more than one that I know of on sanitary reminiscences. And yet the benefits conferred by sanitation were profoundly greater than those of modern surgery.

As I understand it, the sound, enduring establishment of any specialty of medicine is predicated upon three major points:

1. It must be an intellectual as well as a manual occupation.
2. It must receive respect and prestige from the other members of the medical profession. This respect may come primarily from the doctor as it did in surgery, or it may follow public opinion.
3. It must have public comprehension and must receive public respect and prestige. In short, it must appeal to the public.

Most sketchily I have traced out these steps in surgery. Let me apply them in turn to anesthesia. Anesthesia is new and anesthesia got off to a bad start from its very beginning. There was for years in anesthesia no intellectual or scholarly basis; it was a technical procedure carried out by rule of thumb by men or women who had no special knowledge of the respiratory and circulatory physiology and of the pharmacology that today are the primary requirements of the professional anesthetist. Anesthesia was the giving of a dose of medicine. The dose could be administered by the nurse or interne and, in an emergency, by a layman. A good many patients survived this sort of anesthesia. For that matter, a good many patients survived surgery before the days of Lister. Moreover, anesthesia was rarely, if ever, administered without accompanying surgical procedures and those were the days of rapid traumatic surgery. It was difficult to separate the risk of one from the risk of the other. Surgery was recognized and accepted as a hazard. But less well recognized was the fact that bad anesthesia often added immeasurably to the hazard of surgery—not the risk on the operating table of death from anesthesia, but that of subsequent failure hours or days after the operation was completed. In the maze of variables the part played by bad anesthesia was obscured.

I speak feelingly of bad anesthesia of the not very remote past—and there is still much—for I was once, for a short time, an anesthetist and a very bad anesthetist. During my internship I was trained by a nurse. I was given a cone, a can of ether and a few empirical tricks. The memory of those days had a salutory effect on me. In later years when it came time for me to undergo an operation—a tonsillectomy—my first thought was to obtain the services of the best anesthetist I could find. The second, and very secondary, was to find a throat specialist. Any good operator—and there were dozens at hand—could do a safe and competent tonsillectomy. But anesthesia, possibly because of my early experience, possibly because I was a respiratory physiologist, was a serious matter. It was a major therapeutic procedure without regard for the significance or insignificance of the operation. That is a point that the public does not appreciate nor, for that matter, some members of the medical profession.

If the members of the medical profession at large held such convictions, then the teaching of the principles of anesthesia would not, in some otherwise good schools, be crowded into physiology and pharma-

cology and its clinical aspects dismissed with a few demonstrations. It would be taught, as it should be taught, and I hope soon will be taught in every school, so that every medical student would leave the school with a beneficial and practical knowledge of respiratory and circulatory physiology which most do not get; and with an appreciation of the vast fund of knowledge and of the judgment that the good anesthetist must possess. If he did obtain these things which seem so essential a feature of a medical education he would carry with him a high regard for the specialty of anesthesia. If the members of the general public shared such views regarding anesthesia—and they are perfectly willing to share them if they are told of them—the anesthetist would come into his rightful position.

Thus, gentlemen, it seems to me that the future position of the anesthetist in American medicine is largely a matter of social change. The anesthetist will not establish his position by laboratory and clinical research alone, or by the development of new anesthetics and new apparatus. He will establish it only when he deals with the important but often neglected social feature. Even in spite of this neglect by most anesthetists the fact remains that the anesthetists have, during the last decade, made more progress toward establishing their specialty than has any other group in the profession. So far the progress has been mainly from within. It has been organization, the founding of journals and sections and the insistence on better teaching of anesthesia. And I do not need to tell you here that for this progress you owe a great debt to one of the most socially-minded and certainly one of the bravest men I have ever met—Dr. F. H. McMechan.

And now, in conclusion of this rather discursive and rambling talk, I am going to assume that you agree, at least in part, with my views. And in so assuming, I am going to presume so far as to offer some practical suggestions.

The first of these is that propaganda does not mean of necessity great radio programs, magazine articles and books. They are vastly helpful. But the first step is an earnest conviction on the part of the anesthetist of the importance of his calling and with this conviction an enthusiasm to tell of it by word of mouth to those with whom he comes in contact. Word of mouth may be slow, but it is the soundest propaganda there is. If the efforts toward shaping ideas go on further to public talks and magazine articles, then do not fall into the common fault of dramatizing discovery. Dramatization is emotional and sound social points cannot be put over in a setting of emotions, only conflict and fear. There is no need of arousing interest; the public already has an avid interest in all medical matters. Discovery alone so often emphasized in medical propaganda is not the feature to bring pointedly before the public. Discovery is medical research; it belongs to the doctor. The public plays no part in it except possibly to provide funds. The point to emphasize is application. What good does it do anyone to

announce over the radio, and in the papers, that a new anesthetic has been discovered? The announcement provides only table talk for the members of the public. It leaves no impression of the importance, the skill, the knowledge, of the man who must administer the anesthetic.

Today the public, by and large, believes that the important decision in anesthesia is what anesthetic they will be given, or possibly what method will be used. When, by propaganda, you have changed this view to one in which the important decision is what man shall give the anesthetic, then the problem of the place of the anesthetist in American medicine will be solved.

Pioneering in Anesthesiology

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On a cold, windy day in the winter of 1912-13, a medical practitioner in a small city in our Missouri River Valley turned over to me his office, whatever I could retain of his practice, and his bull terrier. He was bound for Vienna, postgraduate study, and, I suspect, specialization in the future. The office was spacious and "well located" over a drug store. The practice which came to me, largely referred by the pharmacists downstairs, most often proved to be drug addicts seeking relief in those days before the Harrison antinarcotic law. The dog, a very unsatisfactory companion for a bachelor, would not eat in the presence of human observers and caused me much inconvenience. I collected $144 in fees the first month without accepting the largest roll of bills I had ever seen up to that time; it was offered by an addict if I would inject a syringeful of cocaine solution into his vein.

One of my duties in conducting the practice was occasionally to administer somnoform (a then popular mixture of ethyl and methyl chloride and ethyl bromide) to the patients of a neighboring dentist. I was permitted to join the informal and unorganized staff of my predecessor's hospital. A surgeon there possessed an apparatus for the administration of nitrous oxide, but no one, except the advertising "painless" dentists, knew how to use this agent. I volunteered, and thus the foundation for my career of specialization was laid.

In general, the line drawn between specialists and general practitioners was at that time neither very straight nor very distinct. For instance, I am sure that 75 per cent of the members of the county medical society attempted, at least occasionally, to perform major surgical operations. I was not without guilt myself in those days. In a then recognized hospital, I once anesthetized a woman while a man removed her uterus without benefit of ligature or suture. Clamps were applied to the vessels *after* the bleeding had become "less active" and the wound was closed about the clamps. Believe it or not, she lived long enough to regain consciousness. In the good old days a suction tip in the anesthetist's hand often supplemented the skill of the surgeon's dissection of numerous pairs of tonsils.

The requirements for specialization in many midwestern hospitals consisted of the possession of sufficient audacity to attempt a procedure and persuasive power adequate to gain the consent of the patient or his family.

With native intelligence and periodic visits to centers of medical learning in this country and abroad, a creditable specialist often eventually resulted. Technics were not so intricate nor was the breadth of knowledge so extensive as at present. Frequently a "half-baked" specialist designated him-

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self as paying "special attention to" this or that. A practitioner especially interested in gynecology for instance, had printed on the door of his office and on his professional cards and stationery, "John Doe, M.D., Special Attention to Diseases of Women." The first formal recognition of limitation in my own practice was upon professional cards carrying the notation "Practice Limited to Obstetrics and Anesthesia." This was solely because I liked to do such work and had no thought of the impossible conflicts in appointment that were bound to occur.

After three years of mixed experience and a month's visit with an eastern anesthetist, my practice in the small midwestern city became "limited to anesthesia." I was a specialist. Many a fellow practitioner in the Mississippi Valley and its tributaries became a specialist in similar fashion in the years before the first World War. To be sure, residencies in some of the specialties were available in hospitals associated with the better medical schools. Occasionally a man studied a specialty for several years in European clinics. On their return these men usually settled in the large centers on the seaboard. Some became specialists by associating themselves with an older preceptor in the specialty. In the main, however, specialists as I saw them in the midwest originated as I have described.

Generally, incomes depended more upon the boldness of the man and his economic acumen than upon his professional proficiency. Then, even more than now, the color of a man's necktie, the length of his waistline, his glibness of tongue, or his cheery manner had much to do with his success. I once had the unpleasant duty of anesthetizing a woman for the removal of her kidney by a "surgeon" who had tied off the ureter at a previous simple hysterectomy. When I returned the patient to her room, the husband detained me for some time with a recitation of the virtues and skill of the operator.

From what I have said, it should be obvious that financial success and even professional recognition in a specialty could be gained without a great outlay of time and study. It was quite another matter regarding one's own self-respect and personal satisfaction. Within a few months of the beginning of my special interest it became evident to me that (1) interest in anesthesia was superficial when it existed at all in this country; (2) opportunities for training were scarce; and (3) such contributions as were being made came largely from those whose primary interest was surgical or that of the laboratory. Real specialists in anesthesia were rare indeed.

In certain centers a very few physicians had interested themselves in the practical and technical aspects of the subject. I found that the source of this interest was Great Britain and that the first scientific specialist in anesthesia (I had almost said the only one) began his practice and his investigations almost with the first public demonstration of surgical anesthesia.

It was on October 16, 1846, that Morton first administered ether at Massachusetts General Hospital in Boston. A month later, John Snow began the study and the administration of ether.[1] Dating from January 28, 1847, he reported that "the ether produced the desired effect in every operation performed in St. George's Hospital." Snow's biographer says, "What had been a mere accidental discovery, I had almost said a lucky adventure, was turned by the touch of the master [Snow] into a veritable science." Although Snow died eleven years later, his influence remained. His scientific study and application explains much of our present knowledge and skill at the end of the first century in the use of anesthesia. The respect in which Snow was held by the profession in Great Britain influenced high-caliber men throughout the British Empire to follow in his footsteps. The few men such as Bennett, Gwathmey, and others who specialized in anesthesia in this country received their inspiration not from New England but from Snow and his followers in Great Britain. To this day, in the British Empire, the administration of anesthetic agents has never been entrusted to those who do not have a medical degree.

I have written elsewhere of the influence of publications and organizations upon the development of this specialty during the present century.[2] Others will record the influence of the recent war. My own effort has been along lines of undergraduate and graduate teaching and investigation; in other words the contribution of the medical school. After ten years of private practice "limited to anesthesia," two things seemed obvious to me. First, improve-

ments in our knowledge of the subject, the whys and hows of both the science and the art, depended upon close cooperation of those who administered drugs in the operating room with those who worked in the laboratories. Only in the medical school can such cooperation be established. Second, so long as the majority of physicians had little or no understanding of the dangers, the importance, and the possible contributions to the welfare of patients which anesthesiology can offer, no improvement or recognition could be expected. Again the medical school was the answer. Only when every medical college is teaching those whom it graduates the real foundations upon which sane administration of narcotic drugs must be based, can we expect the profession to appreciate and demand legitimate service for its patients.

In early days the deplorable belief was common, and still lingers in the minds of some of the profession, that the best in anesthesia lay in the "choice of agent," the selection of a particular drug with some occult fitness for administration in a given case. Little consideration was given to the all-important fact that all known anesthetic drugs and methods of using them often produce dangerous side effects. We were long in recognizing that it is the anticipation and recognition of these undesirable physiologic disturbances accompanying anesthesia and their management and control which constitute wise and safe anesthesia.

In 1927, I was glad to accept a place on the medical faculty at Wisconsin. Objectives of that position from the beginning have been fourfold. In order of their importance they still remain: (1) to provide the best possible service to patients of the institution; (2) to teach what is known of the principles of anesthesiology to all candidates for the medical degree; (3) to help long-term graduate students not only to gain a fundamental knowledge of the subject and to master the art of administration, but also to learn as much as possible of effective methods of teaching; and (4) to accompany these efforts with the encouragement of as much cooperative investigation as is consistent with achieving the first three objectives.

Some of the details of our attempts to carry out these objectives have been published in previous papers.[3, 4, 5, 6] It will be sufficient to say here that we believe our undergraduates have acquired only what is essential by a didactic period once a week during the second half of their third year (junior) and a service of two weeks in the operating room during their senior year. This we feel gives only the minimum of information and experience in anesthesiology necessary for any well-informed physician. If anesthesiology as a specialty is contemplated, a residency of at least three years' duration seems to be advisable. To review our experiences and personal conclusions regarding these residencies at Wisconsin after twenty years may be of interest to others. Some of the conclusions apply to the specialty of anesthesiology only. Others seem to me of general application to graduate instruction in all the specialties.

Possibly by accident, and certainly for selfish reasons at first, resident graduate students in the specialty were chosen who had had some experience in anesthesia as a special interest during a period of general practice. Compared with individuals who come right to specialization from a rotating internship, such residents seemed to have definite advantages. It has been my practice, almost without exception, to urge, if not require, that every applicant for an appointment on our service finish a period of two or three years in general practice before he makes a final decision as to what specialty he desires to enter.

After observing individuals for twenty years, both during their training period and following it, I feel quite sure that an interval in general practice before specialization is highly desirable. I believe that the younger doctor who follows the plan of internship, general practice, final decision as to his specialty, and then a long-term residency will be more successful and more satisfied ten years after graduation than would the same individual if he went into a specialty directly following his internship. This statement, I realize, demands some defense.

From the young man's standpoint it may be argued that a period of general practice before specialization delays the beginning of one's real life work until the individual is too old for real enthusiasm. Economic security may be delayed, and the early establishment of a family and a permanent

home of one's own may be impossible. However, as I look back upon those who have been associated with me in the study of anesthesiology in the long past, these two objections seem to be overbalanced by numerous advantages. At least some of these men who became specialists married, had families, and yet were economically stable and happy.

THE hospital staff and management may argue that the resident with previous experience in general practice is intractable, less cooperative, less studious, and more demanding. Some of these objections depend upon the point of view. If, as a primary function, the hospital expects its residents in the specialties to care for its patients, and to do the work of the hospital and the visiting staff, then the younger and less experienced in life they are, the better. For instance, I know of hospitals that have "modernized" their service in my own specialty by replacing former technicians in anesthesia—the so-called "anesthetic nurses" who got a salary of $150 or more a month—with "residents" in anesthesia, young doctors at 25 dollars a month. These "residents" have been allowed to anesthetize patients, private and others, without proper supervision or instruction while the hospital budget is balanced by the fees which it collects for their services.

If, as I believe, residencies or fellowships in the specialties are maintained primarily for the purpose of creating capable specialists who will contribute the maximum in efficient service to the public in the future, it is the responsibility of the hospital to provide time, opportunity, and instructors necessary to prepare them. An immature youngster just finishing his internship may be happy with the opportunity to care for patients independently, to operate upon them, or to anesthetize them, and to permit such experience to be called "training for a specialty." The man with experience in general practice does not accept such conditions as "graduate training for a specialty." We, as staff members and hospital administrators, must guard against having opinions or supporting practices which contribute to the convenience of the visiting staff and the economic security of the hospital at the expense of the quality of special training offered. I am suggesting that the maturity of the man who begins to specialize after a brief experience in general practice will prevent us—teachers, visiting staff, and hospital administrators—from exploiting, however unconsciously, the graduate student.

But, you say, common honesty and understanding on our part will prevent exploitation of the graduate student. Agreed. What then are the real advantages of the plan I am proposing? They extend in two directions—to the community and to the young doctor. One of our unsolved problems in recent years has been the deficiency of available family practitioners to serve our smaller communities. If every medical graduate, on finishing his internship, were to undertake a short period of general practice, this shortage would not exist. A few months or years of such experience gives the young doctor an opportunity to learn how to collect and spend money, how to conduct himself in his relations with the community in which he lives, with patients and their families, and with other physicians. It is so easy to acquire a critical and unsympathetic attitude in a specialty. It is less easy when one has lived "on the other side of the fence." But more especially the young doctor during general experience will see all sides of the practice of medicine; he will refer cases to specialists; he will learn that no patient is the problem of a single specialty. While making these observations, he will be in a position to decide just what specialty he will really enjoy and where his inclinations and skills will fit.

What about the community when he leaves to begin his special residency or his fellowship? Once the custom becomes established, will not a heritance develop much as it operates now regarding internships? Certain schools establish the custom of sending a man to this hospital, another to that, each year. As long as the hospital is satisfied, the habit continues. Sometimes it is a fraternity or some other small group which determines what hospital a particular senior will choose for his internship. Would not the same habit develop in determining where he would enter general practice the next year? The office, equipment, even the motor car and living quarters, might be handed down in a similar manner. If, as I am sure would happen, an occasional young doctor decided that he likes general practice and did not return for training in a specialty, I believe both the community and the pro-

fession would benefit by the doctor's decision.

To implement such a plan as I am advocating, a slight change is necessary in customs among administrators. Interns have said to me, "I like the idea of having experience in general practice before I decide what specialty I shall enter. But I get the impression that it will be next to impossible for me to secure a desirable appointment in a first-class department unless I arrange for it while I am an intern." Obviously, if the intern waits to avail himself of experience and maturity before choosing his life work, he must not be penalized for it. If more mature individuals are appointed, it is my firm conviction that the hospital superintendent and the director of training in any specialty will observe benefit not only to the graduate student but also to the service.

Even when a person has the advantage of a period of general practice during which he decides upon a specialty, he may be mistaken regarding his preference. Actual experience may prove that his aptitudes lie elsewhere. Both the candidate and our department always look upon the first six months of a resident's service as a trial period. If either side decides that a mistake has been made, we try to rectify it as soon as possible. Although these methods of deliberation in planning one's future may seem like waste of time, they make for satisfaction and success in later life. Everyone is not intrinsically equipped to be a surgeon, an obstetrician, an internist, or an anesthetist. May it not be advantageous to spend a reasonable time in deliberation and experimentation? Certainly there should be no disgrace attached to changing one's mind about the choice of his future life work. If the choice has been right, life is a joy forever after. Uncongenial work is drudgery.

What does the evidence show in the later experience of our own men who have gone out as specialists in anesthesiology? I am quite willing to admit that the number has been altogether too small to have the slightest statistical significance. We have had with us residents of three categories: (1) those who came to the specialty from their internships; (2) those who have had an interval of two or three years in general practice; and (3) a few who have come to us late in life, sometimes after part-time specialization for some years. What can we say of their comparative accomplishments?

Those in the first group acquire knowledge and technical facility as readily as the others. On the other hand, as a group while in residency they show less good judgment, less independence of thought, and less self-reliance. They are more, rather than less, likely to give evidence of brashness or foolhardy conduct. After leaving us, when "out on their own," the first group have had more difficulty in building a place for themselves in the world. Their relations with hospital staff or medical school faculty, with hospital administrators, and with the community at large, have been more difficult at first and satisfactory adjustments have been made much more slowly.

The second group, who have returned after an experience of two or three years in general practice, have, in our experience, shown little or no tendency to resist the necessary routine of a department, record-keeping, cooperation, and the like. They have adjusted to institutional life without difficulty. As a group, they offer more original ideas, good and bad, which not only prove a healthy stimulus to discussion in the department and to investigative effort, but also at times result in change of conviction in the department. The advantage to us and to our institution deriving from this second group over the first, though noticeable, may not have been great. The advantages to the resident himself, however, both during his training and in later life, seem to us considerable. He comes to us after a mature choice of what he wants to do. He works harder and grasps his opportunities with more vigor. Possibly the fact that he is older and more mature when he begins to practice "on his own" explains some of his advantage. However, I do not believe that age and maturity are the only factors. The broad viewpoint acquired as a general practitioner remains with him as a specialist. Experience in economic and social relations does not have to be acquired at a time when he is trying to establish himself as a specialist.

Finally, what of those in the third category who have been out in the world for a good many years either as part-time specialists or as general practitioners? Some of these are merely men who,

through failing health, deficient professional background, or desire for change, wish to specialize. These must be discouraged at once. An old dog doesn't learn new tricks very easily. As a rule, those in the third class do not fit into a residency program nor do they benefit themselves thereby. We have met a few exceptions to the rule, but these are rare indeed.

Personal acquaintance with candidates through long correspondence and at least one protracted personal interview is necessary if the director of a training program is to fulfill all his obligations. These extend not only to the applicant but to the applicant's prospective fellow students, to the specialty and last, but most important of all, to the medical profession as a whole and the service it will render to the public. If we cannot help young physicians to become specialists who will be a credit to our profession, if we do not put them in a position to perform a useful service in years to come, our efforts had better not be devoted to the "training of specialists."

SUMMARY

Specialization in medical practice has developed as knowledge and skills have extended with the years. Methods of preparation of specialists have varied widely. I have recited some personal experiences and observations both as student and as teacher. The very informal customs I have described as being characteristic of some parts of our midwest at the time I began practice in 1913 had certain advantages. Independence, self-reliance, and originality were developed; or at least these qualities, when naturally present, were not diminished. Sometimes, however, the freedom allowed led to boldness, rashness, and foolhardy practice, resulting, in certain cases, in disaster and death, if not murder. Certainly it was not the ideal manner of preparation. We have speculated as to how the advantages of the informal, individualistic method of learning to be a specialist can be combined with the advantages of the formal training that is customary at the present time.

I think we may conclude that familiarity with physiologic functions and the manner in which these are affected by therapeutic procedure is the essential background of specialization. Added to such familiarity, technical skills in diagnosis and treatment are not enough to produce a real specialist. He must also have a rational, well-rounded attitude toward the general problems involved in the practice of medicine and the care of the sick. If our training of specialists sacrifices one of these three factors, either scientific background, special skills, or a rational, well-rounded attitude, it is not very successful.

Having tried to select those candidates for special training in anesthesiology who have conducted a general practice after internship and having watched a fairly large number of these later as specialists, in comparison with others who began to specialize directly after internship, I cannot avoid certain definite impressions.

1. The former general practitioners are happier and are better satisfied with their specialty.

2. They are more successful and more convincing professionally as specialists.

3. They more easily and completely command the respect and the economic recognition of fellow physicians, hospital administrators, and the public.

It is my belief that a young person will act for his own and the communities' best interest if he delays decision as to specialization and his choice of a specialty until he has passed through at least a short period in the general practice of medicine or its equivalent.

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EDITORIAL

THE LEAVEN OF THE PROFESSION

ANESTHESIOLOGY, one of the youngest among the medical specialties, is gaining more and more at the professional level. Many thousands of hospitals throughout the United States are in need of adequately trained men in this branch of Applied Pharmacology, but only a few hundred certified anesthesiologists exist at the moment. In Madison, Philadelphia, Rochester, Montreal and Hartford—to mention but a few outstanding localities—elaborate curricula for the training of internes and residents in the speciality have been established. Great emphasis is being laid upon the skilled *services* which specialized personnel can render both in surgical and in medical care. The "know how" requisite to intricate procedures like regional block, artifically controlled respiration and spinal anesthesia demands prolonged and sometimes tedious training. Moreover, the pharmacological agents involved are frequently used under conditions in which the therapeutic index is only two to one, based on the average lethal dose. To render successful *service* under such circumstances is proof enough that specialized training is of the essence.

At this juncture, however, those who have the future of Anesthesiology close at heart will realize that no professional specialty can maintain itself on the basis of *service* alone. In the case of Surgery, for example, Harvey Cushing—one of the most skilled technicians of his day—once intimated that it might be well if amputation of the fingers were a requirement for an appointment to the Chair of Surgery in every progressive university. This remark annoyed quite a few of the contemporary super-technicians whom Cushing counted among his colleagues! Nevertheless, his remark contained a very important germ of truth; namely, that professions do not live by *service* alone, but rather by the words of wisdom which issue out of the mouths of those few demigods who in every generation lead and inspire the multitude of their professional associates.

It is true for Anesthesology as for any other profession that *service* must be leavened with progressive thought. Every profession has its corps of hewers of wood and drawers of water. It must also have its sprinkling of investigators to guide and lead it on its path forward. Without vision, the profession dies. At the present moment the progress of Anesthesia is limited almost exclusively by a lack of knowledge of the basic action of drugs as applied to human organisms which are abnormal. Greater strides must be made in elucidating the pathological pharmacology of such drugs as curare. The relative impor-

tance of analgesia as contrasted with relaxation must be reviewed on the basis of careful physiological measurement made *at the bedside* with modern mothods. Who is to do such essential studies of Applied Pharmacology?

Obviously, a considerable knowledge of pathological human physiology is involved. In this day and age there is a tendency for the routine anesthetist to "pass the buck" to the professor of physiology or the professor of pharmacology, in the vain hope that the answers can be learned from mice or monkeys. The respective professors named are usually only too eager to cooperate and interested in fostering the development of applied studies on man. They realize all too well, however, that such studies must be made by an applied pharmacologist, appointed by the Department of Anesthesiology. Such a man should be familiar with the everyday problems of the practicing Anesthesiologist. He should have basic training in the fundamental departments mentioned. He would do well perhaps to commence his work with experiments on animals performed under the aegis of the preclinical departments. Ultimately, however, the problem must be taken into the clinic and the definitive answers resolved there.

To this end, there must be trained a group of so-called "academic Anesthesiologists." These individuals must have the special training and sufficient leisure to advance the basic concepts of applied science. In their earlier years they must be supported by adequate fellowships. In their mature years they must receive adequate recognition in the form of staff appointments and university affiliation. They must not be run ragged with routine assignments, but must be protected from the irate surgeon who demands *service now* in the name of all humanity and the Trustees. At the present time the fellowships and funds available for this purpose are pitifully meager.

Part of the fault for this lack of opportunity lies in the diffidence of the routine Anesthesiologist. The conscientious and overworked anesthetist, while rendering invaluable service to the community, fails to appreciate that his ultimate professional status cannot be guaranteed by *service* alone. Without vision and research, the professions die. It behooves every practicing member of the profession to exert his influence both in his local medical group and in his society of specialists to see to it that opportunities exist for progress.

It must be appreciated that the future representatives of Anesthesiology, as in all professions, should be hand-picked, not merely for manual dexterity but also for general background and cerebration. This is particularly true of Anesthesiology, where there is danger of overemphasizing technics and gadgets. Too few Anesthesiologists appreciate the occasional invigorating whiffs of classical learning borne down to the States on the wings of the North Wind from Montreal. Their delicate savor and piquancy is not appreciated by a nose obtunded with the fumes of ether. If Anesthesiology is to hold its head high

among other specialties, its leaders must include men educated in the broadest sense. Boundary lines of political significance must not hinder the free flow of knowledge. Interchange of information among specialties must be fostered if patients are to receive the best care that the medical profession has to offer. Cooperative effort among the members of our respective specialties in research will make possible improvements in care over that which we have to offer today. The principles discussed above apply in amplifying the efficiency of our service to patients, which is the keynote of all our activities.

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The Sociologist Looks at the Profession of Anesthesiology.*

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THIS PAPER is a brief summary of research findings, based on a study which inquired into problems faced by members of the new medical specialty of anesthesiology. To most of you, of course, anesthesiology is not "new." I refer to comparatively recent recognition of anesthesiology as a full-blown medical specialty.

No doubt many of you are asking, "Just what does a sociologist want with a study of our specialty?" I shall try to answer this most legitimate question immediately. The first point, however, is that the sociologist's interest in such questions is scientific and nonevaluative. "How does it work?" "Why does it work the way it does?" These are the kind of questions he raises in studying social life. In medical language, you might say that the sociologist is nontherapeutic. His activity is more like that of the anatomist and physiologist than that of the practitioner of the healing arts. He must guard continually against taking partisan positions on subjects which he examines. For without objectivity, he cannot claim the status of social scientist.

But why, specifically, should any sociologist undertake a study of anesthesiology as a profession? Social scientists have shown an increasing interest in human relations found in work situations. Many and various occupations are being studied as social organizations of sufficient importance to merit analysis and interpretation. Medicine, along with other dignified professions, has undergone such study. In regard to anesthesiology, certain special questions have arisen. The chief query is: "What are the problems met by those working in a new profession—a profession not yet completely established in its work world?" Because of ever-increasing number of occupations today, such a question has general relevance to social science. Anesthesiology was chosen, therefore, as an example of specialization and its social effects.

As scientists, you have an interest in methods used by those reporting to you. The frame of reference used is conventional to modern sociology. The main technique used is somewhat familiar to a good number of you; for it was by interviewing many anesthesiologists, working in various places and under various conditions, that most important data were obtained. Interviews with others involved in the

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provision of anesthesia brought the total amount to over one hundred interviews. Observation in hospitals and operating rooms, attendance at several medical gatherings, and perusal of the relevant literature and documents were also undertaken. The statistical method was not employed extensively, a passing methodological decision. This is an opportune time to extend my sincerest thanks for your wholehearted cooperation. It is flattering to be asked to make this presentation to those whose familiarity with the questions lies at the basis of the study. The analysis made, however, I must accept as my responsibility.

There are a few concepts that should be clarified at the outset. These are the central concepts of (1) status, (2) role and (3) social structure. The first term, status, refers to that particular set of rights and duties that belongs to a certain position in an established social group, as, for example, the position of anesthesiologist in the hospital. Such statuses are ranked, with varying degrees of prestige, authority, and income being ascribed to each. The concept role refers to the pattern of behavior that coincides with a given status. In other words, a person's role depends upon his status within a web of human relationships. It is obvious that these two concepts are closely related. One refers to position within a group, while the other to the behavior attendant upon that position.

Forgive me another abstraction, if you will. In examining any occupational role, or job, the sociologist examines it in relation to others within the same system. In the hospital, for example, there are numerous statuses and roles, from that of trustee, to staff physician, to orderly. These persons act toward one another largely in terms of the positions that they occupy within the institution. Research reveals that there is certain stability to these relationships. They are, in our vernacular, "structured." Thus we refer to the total picture, the composite of these relationships, as a "social structure."

What, you ask, is the relevance of these concepts? It is simply this. Problems encountered by anesthesiologists result, in large part, from ambiguity of their status in the medical community. In a social structure that functions smoothly, one can usually identify proper rights and duties, technical functions and economic rewards that fit a certain status. There is a certain definition of what is proper for a person occupying given status. This definition depends upon a certain degree of consensus among those involved. It includes stipulations extending from beliefs as to worth of the work, to the type of person that should fill the status.

I referred to "ambiguity of the anesthesiologist's status." This ambiguity results from the fact that there is no clear-cut "definition of the job" in regard to anesthesia. In many places in America, the work is defined as "nurse's work." Patients, hospital personnel and physicians expect this function to be executed by a nurse. One hears numerous explanations on why anesthesia should be provided by a woman with nursing training. We need not go into the history of this development in order to realize its importance. For this definition of anes-

thesia militates against what anesthesiologists, following the late Dr. Frank McMechan, term "Professional Anesthesia." This is a definition that differs greatly from that of anesthesia as "nurse's work." And it appears that it is gaining ground in this country. Due to recency of specialized anesthesiology, however, this conception of the anesthetist as a fully-trained, recognized medical specialist, has not yet permeated the entire medical system. Another definition of the job, that of anesthesia done by part-time physician anesthetists, is also important. Time does not allow consideration of this type of anesthesia practice.

What is the difference between the two definitions, anesthesia as "nurse's work" and Professional Anesthesia? Let us compare the two.

Where anesthesia is done by nurses we find a definition of the job as low status and subordinate. It is low status when compared, not with work of other nurses, but with that of physicians and surgeons. In four key relationships, those of nurse anesthetist to surgeon, patient, hospital and economic organization, one finds that the anesthetist is subordinated. Nurse anesthesia, according to legal counsel of the American Association of Nurse Anesthetists, means that the surgeon has ultimate responsibility for safety of the patient. The surgeon can, and does, claim the right to make crucial decisions in regard to anesthesia. There is, to all appearances, little strength in relationship between nurse anesthetist and patient. Her position in hospital structure does not differ, to any appreciable extent, from that of other nurses. Although she may have more prestige, the nurse anesthetist does not usually have much voice in hospital policy. She is, in the vast majority of cases, a salaried employee of the hospital.

How does this compare with the conception of Professional Anesthesia? Although there is no complete agreement among anesthesiologists on this score, one does find a picture emerging that we may title "the anesthesiologist who has arrived." This anesthesiologist, found under certain conditions, stands as a consultant to other doctors caring for the operative patient. This consultant relationship is one where the anesthesiologist, by virtue of special training, skills and experience, is free to make crucial decisions in his function as anesthetist. He is full colleague within the profession of medicine. Anesthesiologists express strongly their convictions in regard to what they consider their rights in this matter. They desire independence from interference in their work. The anesthesiologist who has arrived has a wider range of activity than is usually found in other anesthesia arrangements. The majority of anesthesiologists interviewed were more than willing to accept medical responsibilities previously assumed by what they consider to be overly-harassed and occupied surgeons, as well as other medical functions for which their training supplies special qualifications. Few anesthesiologists interviewed, despite some publicity to the contrary aspire to overall control of the operating room. There is general acceptance of the surgeon's position as captain of the team. The emphasis rests, rather, upon desirability of teamwork among specialists working together, each with his own clearly defined responsibilities and authority.

The definition of anesthesia advanced by members of the specialty also differs from nurse anesthesia in other respects. A more direct, personal relationship with the patient is part of it. A preference for fee payment, as more lucrative and indicative of greater prestige, is usually expressed. The status of the anesthesiologist in Professional Anesthesia is not that of an employee; it is that of a medical specialist having a significant voice in his department and the hospital generally. In short, the definition of anesthesia advanced by anesthesiologists is that of the specialist among equals.

One need not underline, for any group of anesthesiologists, the many ways in which the "nurse's work" definition acts as a brake upon their aspirations for full recognition. For the number of anesthesiologists who have arrived is as yet limited. The heritage of low status, limited authority within anesthesia proper, salary payment, and general professional subordination are too well known to those practising in this area. One finds that some anesthesiologists become acutely sensitive about these questions. Could a layman offer a word of consolation? The problems faced by anesthesiologists, as newly-arrived on the medical scene, are not too different from those found in other pioneering professions. It takes some time before any field of endeavor becomes recognized as worthy of respect and its corresponding status. Those of you who wonder just what a sociologist is can see that the problem is not limited to anesthesiologists!

There is one problem, which we might call "functional dilemma," that is a recurrent theme in the data. I refer to difficult decisions that must be made by those anesthesiologists whose medical opinions are not automatically accepted by those outside the specialty, in particular, surgeons and obstetricians. Such matters as the selection of premedication and anesthetic agent are not easily made when the anesthesiologist is confronted by the strong, verbalized preferences of others. Although the dilemma is not always as clear-cut as that between serving God and Mammon, it is a problem causing considerable dissatisfaction to anesthesiologists. Furthermore, it cannot but retard experimental enterprise of these doctors and so limit development of new techniques and advances. It is an indication that in many American hospitals served by physician anesthetists, anesthesia still carries something of the "nurse's work" definition.

Upon what does this definition continue to rest? What are the resistances to physician anesthesia? I do not intend to suggest that customs surrounding nurse anesthesia are so tough in themselves that they cannot be changed. There appear to be certain conditions surrounding the position of anesthesiologist that are retarding development of a higher status for him. We can get at these conditions by comparing the position of the anesthesiologist who has arrived with that of the not completely recognized, or "employee anesthesiologist." This term is not meant to refer primarily to economic considerations, but to a certain status polar to that of the fully recognized specialist.

Not all anesthesiologists, by any means, share a similar status and role. Anesthesiologists, aware of these differences, are prone to make

the distinctions almost entirely on the basis of economic arrangements underlying various practices. Important differences do exist, in most cases, between salaried and fee arrangements. These economic arrangements, however, are but part of the story. They are but symptoms, if you wish, of decidedly different statuses within the medical world. And, like symptoms, they do not always and everywhere point to the same things. Let us, however, in the manner of a medical textbook, make things simpler by setting up two distinct types that we can use for purposes of analysis. Although we lose some accuracy and detail by using such types, it becomes possible to place actual cases on the scale that runs between the two extremes. The two extremes here are represented by the anesthesiologist who has arrived on one end, and the employee anesthesiologist on the other.

The employee anesthesiologist working in a large urban hospital faces difficulties in achieving the status of a fully recognized specialist. Unlike most of his medical colleagues, he is usually paid a salary and is able to work in one hospital only. It is among this group of anesthesiologists that we find greatest awareness of subordination and lack of professional independence. Complaints of interference from nonspecialists are frequent, not only in the operating room proper, but in the hospital generally. Such anesthesiologists are accused of ulterior motives when they seek to have contact with patients upon whom they work. Hampered from such relations with patients, they are aware that there is little likelihood of these patients realizing the part that they, as persons and as representatives of the specialty, play in the course of the operation. Denied more than case-record knowledge of the patient, they are ill-equipped to challenge decisions of others with more complete knowledge of the case.

There is no suggestion here that continual conflict is the rule. Compromises, necessary wherever two or three are gathered together, are made. The anesthesiologists interviewed, however, spoke often of the limited range open to them. On constant guard against the possibility of bad relations with others, they must rely upon copious supplies of tact. In fact, the research done suggests that one of the main functions of the department head becomes that of the busy diplomat, working out problems met by his staff in the course of their daily work. No anesthesiologist need be reminded that the operating room, by virtue of the vital services rendered patients there, can easily become filled with tension. Tempers flare; nerves are made bare. It appears, however, that a considerable proportion of the tension generated finds its rest upon the head of the anesthesiologist.

I shall not continue to deal with events familiar to many of you. I should like to add hastily that if the picture drawn here is too heavily black, that this is somewhat inevitable when we concentrate upon problems. Furthermore, there is the opposite set of conditions found where the anesthesiologist who has arrived holds sway. Let us examine the contrast supplied where these specialists do their work.

The anesthesiologist who has arrived stands in different relationship to many persons. He sees patients both before and after opera-

tion, and is known to them. He is relatively free to initiate the type of anesthesia that he considers indicated. Thus he is able to beat new paths in anesthesia practice that are often untrammeled by the employee anesthesiologist. His requests for assistance from nurses and other hospital personnel do not fall upon deaf ears. He may be called in consultation on problems that in other hospitals would be considered far removed from the jurisdiction of an anesthesiologist. In general, his position is that of full colleague to other physicians and surgeons on the staff.

In analyzing basic difference between these positions, it is necessary to examine some general conditions surrounding the practice of anesthesia. One is the relationship between anesthesiologists and hospital administrations. There is no doubt that economic problems of hospitals are of importance here. In the historical development of anesthesia service in this country, anesthesia has become embedded in hospital organization as a hospital service. Thus the claims of anesthesiologists to arrangements similar to other staff physicians are in contradiction to the economic interest of hospitals, or are so construed by hospital authorities. Why is it so difficult for anesthesiologists to set new patterns in these relationships?

The economic is part of the larger whole that is the hospital social structure. H. Smith, in his researches into hospital organization, has delineated two types of control, or authority, found in hospitals generally. The first, and usually most explicity stated, is that line of authority we call the administrative. It emanates from the board of management and is channeled down the usual hierarchy found in established organizations. The other authority is that which is vested in the professional staff of the hospital—its locus being in the executive committee of the medical staff. These two systems of authority are not always in complete accord—the hospital means different things to each group. Action, when it is taken, results from joint activity of these two centers of power, the board and the executive committee. Certain medical departments, however, fall between these two groups. Partly in each, subject to the control of each, they are without strong representation in the decision-making areas of either.

The anesthesiologist's lack of representation in both centers of power derives from his peculiar function. His position vis-a-vis the hospital is limited by the fact that unlike other specialists, he does not bring in patients whose role in the hospital is more important than generally recognized. On the other hand, he is also dependent, again by the nature of his work, upon referrals from other doctors. In the referral system he stands at the receiving end, and thus lacks the leverage held by other specialists who have patients to refer. The anesthesiologist's position is complicated by the fact that other doctors look upon these matters in moral terms. They feel that the anesthesiologist, irrespective of his unique function, is not living up to the obligations inherent in the system. One might note in passing that extension of 100 per cent limitation to anesthesia practice will certainly not solve this problem.

There are many questions here of which limited space does not allow consideration. The question of the anesthesiologist and the community, for example, is closely related to his relations with patients. But, you ask, how have certain changes taken place in this system? Are there not, as you term them, anesthesiologists who have arrived? Certainly. However, what we find is that those anesthesiologists who have achieved full recognition, have done it within the context described above. The private practitioner anesthetist, or "lone wolf" as he is sometimes called, has succeeded in establishing relations with surgeons and others having patients needing anesthesia service. Those encountered in this study, however, had not ventured forth without basic security supplied by a hospital or university appointment. The lone wolf anesthesiologist, once established, has a certain degree of choice in regard to the conditions under which he will work. The anesthesia groups, or extended partnership arrangements, are apparently increasing in popularity and frequency among anesthesiologists. From the small amount of information assembled on this type of practice, it appears that they constitute a sharing, among several specialists, of certain social assets in the social structure of hospital and profession. Other paths have led to full recognition for anesthesiologists. Some specialists have become established through hospital administration or university and professional activities. Others have achieved prominence in the profession generally, and the hospital in particular, by gradual extension of their services. This extension has resulted in their services, and consequently the anesthesiologists involved, becoming indispensable.

What of the profession generally? Are noticeable changes taking place in the overall status of physician specialist anesthesia? It is difficult to measure these changes when one has not observed them over a considerable span of time. There are, however, obvious signs of a pervasive change in the status of anesthesiology. These are known to you, establishment of university courses, increase in residencies, formal certification procedures, support from the American Medical Association; all these are some indication of the change taking place. And we must not forget one of the chief allies of physician anesthesia, the ever-widening area of knowledge and practice within the field. For as anesthesia develops its peculiar knowledge and skills, as for example in such recent advances as nerve-blocks, the role of the anesthesiologist becomes increasingly distinct. For specialization is more than specialization of activity; it is specialization of knowledge as well. As the store of knowledge increases, necessity for specialization cannot but become more apparent.

There are other questions of great importance that cannot be dealt with here. I should like to mention briefly the problem of recruitment. It is here that the specialty faces a vicious circle—the difficulty of attracting high caliber men to a field not as yet fully established. The "nurse's work" definition reduces prestige in the field, and young men, at least in the sociologist's view, are quite as interested in prestige as in other forms of social reward. The specialty must, if it is

to escape such onus as is represented in terming it a second-choice occupation, find some solution to its problems in attracting persons whom it most desires. This problem, related as it is to all the others mentioned, must be dealt with along with them if the specialty is to achieve its goals.

I have already, in the last few sentences, departed from my role as a social scientist by implying that certain types of action are to be desired by anesthesiologists. Such recommendations cannot arise out of a scientific analysis; they are but opinions and as such, involve the use of certain nonobjective values. I should like, however, to add one more word on this order. There is one gap in attempts of anesthesiologists to achieve full recognition. Despite great activity of the specialty's professional organizations, there are important areas where the specialty itself shows no clear-cut consensus as to what it wants. There are voids in the specialty's policy, and one encounters anesthesiologists who are unaware of the widespread nature of their problems; many think of them as purely unique to themselves. The consensus that must underly any effective policy can only arise through continued communication among all those involved. Could I suggest, that if the specialty desires to change its status, it continue to establish among its members more definite goals for the specialty, and more definite means whereby these can be accomplished?

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DECISIONS FOR A SPECIALTY*

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GROWTH of the specialty of anesthesia has been almost explosive during the past two decades, in this and other countries. National and international organizations have flowered, including the American Society of Anesthesiologists, the American Board of Anesthesiology, the Association of University Anesthetists, the World Congress of Anaesthesiologists. The National Research Council has a Committee on Anesthesia. The United States Public Health Service has provided funds for research training in anesthesia. Departments of anesthesia have arisen in the majority of schools of medicine. There is a large number of journals devoted exclusively to the specialty. Textbooks on the subject abound. Research of a basic and clinical nature has burgeoned. Finally, from the 1961 Congress, a directive of great interest has been sent to the public Health Service as follows:

> "Anesthesiology has been one of the most neglected of all medical fields as far as research and training are concerned. In 1957-58, there were 10 million operations including 4 million obstetrical deliveries —one person in every 15 of the population was anesthetized for a surgical operation. Yet, despite the large number of people subjected to anesthesia, there is a critical shortage of personnel to administer anesthetics, to teach the science of anesthesia and to conduct research in this field. The committee therefore directs that the Division give special attention to the training of research anesthesiologists and to the support of scientific research project and program grants in anesthesiology."

This is gratifying and encouraging, but what of the future? Past growth is no guarantee of continued growth. A few medical specialties are in danger of disappearing altogether. Others see their fields swal-

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lowed up by groups with vision broader than their own. Anesthesia can and must avoid these fates. I propose this evening to analyze a few of the problems facing the specialty today and to suggest some solutions on which to build a more worthwhile future for all of us.

I shall consider briefly five problems.

The service load. The number of patients to be anesthetized is increasing. The population is larger, individuals live longer, and economic pressures are keeping fewer and fewer people out of hospitals. The volume of work can overwhelm those responsible for it. Two consequences are worrisome. The patient becomes a case, a statistic, no longer an individual. And, if training is being attempted in the institution, the work load prohibits adequate teaching and discussion, denies time for reflection, reading and study. While recognizing freely that clinical experience is essential to the development of an anesthetist, I find an equal need to analyze and synthesize this experience. This demands a certain amount of leisure, plus time for conferences, lectures, and library work. The concept of the trainee as cheap labor, as a useful pair of hands, must be forgotten. If one accepts trainees, one has an obligation to fulfill. This obligation cannot be met under the burden of an excessive clinical load.

There are not now enough physician-specialists to administer all of the anesthetics in this country. It is unlikely that there ever will be. Who then will be available, how will they be trained, how supervised and controlled?

The terms "nurse-anesthetist" and "nurse-technician" arouse strong emotional reactions in some quarters. Perhaps it is well to recognize this and to try to solve the problem of additional personnel in another way. I propose that the American Society of Anesthesiologists urge other anesthesia organizations in this country to come under its supervision as auxiliaries. This is not a surrender of principle, it is recognition of an obligation overdue. We shall give up little, the patient should gain much in this cooperative approach to the personnel problem. Cooperation requires maturity which we now have. As John Stuart Mill said 125 years ago, "There is not a more accurate test of the progress of civilization than the progress of the power of cooperation."

I further propose that technicians be trained in two-year college programs, leading not to a baccalaureate but to an Associate degree. The latter has been successful in other health fields and a number of colleges

are interested in adding this type of educational endeavor. Scholarship support may have to be provided. A one-year "internship," or supervised clinical experience, would be required for certification. Again, we shall be recognizing a public health responsibility, and the patient will benefit from the availability of better trained, paramedical personnel.

The role of the anesthetist outside of the operating room. There is always satisfaction in being able to do something better than someone else. There are, however, pitfalls in attempting too readily to demonstrate one's proficiency. I have been guilty of referring to our specialty as representing internal medicine for surgical services. Others have referred to themselves as physicans to physicians. These roles may be all right. It is unwise, however, to become technicians to physicians. We are today answering calls to "stand by," lest untoward reactions to drugs occur during diagnostic radiologic studies, to guarantee inhalational therapy for a hospital, to regulate respirators. My concern is illustrated by a request for an anesthesiologist to administer potassium intravenously to a patient believed to be suffering from digitalis poisoning. In this instance, the thinking has been done, we are merely to be handmaiden or technician.

In an unnecessary search for prestige—for anesthesiology can stand alone—one must not confuse a technical for an intellectual challenge. We must be steeped in knowledge of medicine. We must use this knowledge in the evaluation and treatment of patients. We must not, however, lose identity in doing others' bidding.

Continuing education—a problem for student and educator. The giant strides made in the scientific and clinical aspects of medicine require physicians to continue their education until they cease to practice. A pattern has evolved over the years and includes subscription to journals, attendance at meetings, enrollment in post-graduate courses and, more recently, attention to radio and television programs and tape recordings. Is this the most effective way of keeping informed?

The medical literature leaves much to be desired. As Louis Benezet, President of Colorado University, points out, "The layer of scholarly publications is spreading over the landscape of higher education like a new Glacial Age." It is monumental. It is often unclear, imprecise, incomplete and uncritical. Recognizing this, Alan Gregg wryly observed, "Even after passing editorial filters, the virus of wretched writing can inflame, insult and exhaust a clear-minded man." Both authors and

editors must assume a greater responsibility. Authors must learn to write clearly, accurately and briefly. One of the finest aids in this is a little book called "The Elements of Style", written initially by Strunk and rescued from oblivion by E. B. White. Editors must be ruthless. Strict birth control should be practiced with regard to new journals, with strict suppression of certain old ones. The notion that every speech made should be published is unsound. Scotland's famed physiologist, Sir Robert Hutchinson, decrying the publication of a memorial lecture he had given, noted that there are "surely better ways of remembering the dead than by boring the living."

Until the medical literature can be improved from within, the reader must exercise great discrimination. This requires hard work and is not easily learned.

There are also far too many meetings. Surrounded by bulletin board notices, placards and announcements, the harried practitioner feels guilty about missing a session, yet all too often, when he drives himself to attend, he is bored by the poor quality of the program. This applies to stated medical meetings and to postgraduate courses. I am impressed with the intensity of interest on the part of today's physicians. They seem sparked by what Gregg has termed the "nuclear energy of feeling incomplete". They deserve better treatment.

There is, likewise, a problem for speakers who are badgered into accepting invitations as much as two years in advance. What excuse can they give, they think? The ability to say no is needed. It is an evident waste of time for one who does not wish to be present to address an audience that wishes it, too, were somewhere else. Surely this trend can be reversed. Then, with something to communicate on the part of the speaker, an attentive audience can easily be gathered for a mutually rewarding experience.

Research in anesthesia. Predicting the future is dangerous and not fruitful, as a rule. One can with confidence, however, predict that from the scholars in anesthesia will come the break-throughs which will advance the specialty. Men of intelligence, perception and dedication must therefore be recruited in increasing numbers. They must receive careful training, not so much in research techniques as in adherence to the scientific approach to problems, i.e., an open-minded objective search for knowledge. A scientist, it has been said, sets up a hypothesis and then tries to destroy it, whereas an unscientific worker sets up a

hypothesis and tries to keep it up. Unscientific attitudes, as Donald Mainland emphasized, may be hidden from the research worker himself. "Even if we start out with an open mind our ideas and results soon become our children. We defend them against criticism, and are likely to be blind to their deformities."

We need to pursue to greater depth also. Most of the studies in medicine are pilot studies, not recognized as such by the investigators, who report the results and go on to something else.

The greater sophistication and complexity of many of today's investigations discourage some from trying to advance knowledge. Success comes not from complexity of design or execution, but through thoughtfulness, and imagination.

I believe that we are on the threshold of exciting advances in anesthesia. Instead of altering nervous tissue function by drugs, it seems likely that other methods may be used. The application of electrical currents to the head directly is being re-investigated. In Russia, an offshoot of this has been the production of so profound a sleep, through electronic impulses applied to the temples, that only one or two hours of sleep is allegedly required per day. There is the distinct possibility that conduction in peripheral nerves can be interrupted electrically via electrodes wrapped around an extremity. It has also been observed that behavior can be influenced by radio waves—this may open new vistas in the control of pain and consciousness.

Research in anesthesia has been productive in the past. With increasing financial support, improved facilities and, most important of all, with well-trained scientists on the march, the future looks bright.

We must be dedicated, in the words of Jacques Barzun, ". . . to Intellect—not in the sense of pedantry, or verbalism, or highbrow superiority, but in the sense of the Mind, free and restless in its desire to express, comprehend and use reality".

Scholars have rare opportunities today. They also bear a heavy obligation, for as St. Luke wrote, "To whomsoever much is given, of him shall much be required."

The patient and the anesthetist. Last October's *Harper's Magazine* contained a series of articles titled "The Crisis in American Medicine." In their introduction the editors stated two apparently contradictory beliefs; one, that American medicine was the best in the world, and two, that many people were bitterly dissatisfied with the care they were

getting. One writer in the series, the President of the Arizona Medical Association, admitted that medical practice had changed from an intensely personal service to the objective and highly intellectualized approach demanded by the sophistication of modern biological theory. In a stirring appeal to his colleagues he outlined three measures to be avoided.

"We must not", he said, "with pious tongue in fat cheek, cry nostalgically for the old days and pretend that we are still nineteenth-century leeches and should be adulated as such. We cannot restore the day of the country practitioner, beloved counselor to the whole rural family. To be sure, the night watch remains in the exchange transfusion, the vigil after cardiac surgery, the use of the artificial kidney, the adjustment of a brittle diabetic, the quieting of an acutely disturbed depressive. However, for the youngster with pneumonia, antibiotics have replaced the doctor's sleepless hours. An injection of 400,000 units of penicillin in the buttock not only stings, but understandably does not engender the same sense of gratitude.

"The second negative caution is against faith in salvation by publicity through the ministrations of the mahatmas of Madison Avenue. The craft of public relations may not be outright deception, but it is certainly always guilty of the strategic ruse of omission, in the selection of facts favorable to the cause. This is at best a not very innocent game; it has no place in the serious concerns of health and illness.

"Thirdly, I would have us eradicate from our official program the strident demand for the economic rights of doctors. The people have read too long our defensive special pleadings; they have become derisively aware that the most widely read medical magazine in America is said to be *Medical Economics*."

Harsh words, but worthy of serious thought.

The surgical patient needs help in conquering his fear. He needs a companion in his weakness and reassurance against uneasy suspicions. The sick person is much more than an intellectual problem, Gregg admonishes us.

The modern hospital needs physicians who bring with them the spirit of kindness, patience and forebearance to overcome its atmosphere of impersonality. The need is particularly great among those facing the uncertainty of operation. The anesthetist's role is obvious. His contribution as an understanding physician can be enormous.

The increase in law-suits against physicians is attributable, in no small measure, to a failure on the part of those being sued to establish close, personal relationships with patients and families of patients. A sick individual deserves sympathy and understanding. He deserves courtesy and tact. He deserves kindness. This requires time. Rounds made in great haste, office visits run through rapidly, and consultations conducted in an impersonal fashion do not foster a devotion to and respect for a physician. Nor should they. The medical care provided may be of the highest quality, but an essential ingredient is lacking—humanity. The finest practice of medicine includes science and art. Each is incomplete without the other.

A return to idealism is overdue. Medicine rests on a moral base. Lindsay Beaton warns that medicine cannot escape this moral base, for it rests on the only biologically unassailable purpose, the preservation of members of the species: It is this origin that makes caring for the sick an act of love. If treatment is not rendered in that frame of reference, it is not good treatment.

In 1961 it is time for the physician to renew that stern promise of the Hippocratic Oath: "Into whatever houses I enter I will go into them for the benefit alone of the sick. In purity and holiness I will pass my life and practice my Art."

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Anesthetist as Investigator

Henry K. Beecher, M.D.

"The problem of the general nature of anesthesia is in fact inseparable from the wider problems of the nature and conditions of irritability in general." —R. S. Lillie, 1916.

The Field

IN being asked to contribute a paper to this Anniversary Volume I take it for granted that you want to hear my own views on the subject, not a rehash of others' views and comments. I assume that is the reason for the invitation. To proceed with the subject I shall sometimes need to refer to work done in our laboratory. I should expect any experienced anesthetist investigator to refer to his own work to illustrate his points, since he knows it best. These illustrations could doubtless be as various as there are individuals undertaking a similar task. I shall refer to our own work from time to time without further apology; for just as truly as original research is an intensely personal matter so also must be any useful discussion of it.

* * *

I sometimes get the impression that the anesthesia world, when research is considered, is inhabited by extremists: On the one hand there are those whose bland assumption seems to be that everybody should "do research." "You just get a gimmick and exploit it" and renown follows as a matter of course, of course. Such overlook the harsh fact that,

> Productive scholarship is the shyest of all flowers. It cometh not with observation, may not bloom even under the most careful nurture. American universities must do their utmost to cultivate it; by planting the best seed, letting the sun shine upon it, and taking care that in our land of rank growth it is not choked by the thorns of administrative routine.

Received from the Anesthesia Laboratory of the Harvard Medical School at the Massachusetts General Hospital, Boston. Dr. Beecher is Dorr Professor of Research in Anesthesia, Harvard Medical School.

as President Lowell [1] said in his Harvard inaugural address 55 years ago. On the opposite hand, there are those who say the anesthetist belongs in the operating room; he has no business "fooling around with research. Too many useless papers are written anyhow." Such a one would relegate the specialty of anesthesia to a technician's job, with no more likelihood of survival than a tree without its cambium layer of growth. There is a temperate, middle course; I should like to examine it here.

The Anesthetist's Opportunity

The anesthetist has an extraordinary opportunity to study the effects of certain drugs and procedures in man. This paper will therefore be devoted to a discussion of the opportunities and problems the anesthetist will encounter. He must, of course, go into the animal laboratory from time to time to test certain agents or procedures, but animals are primarily in the domain of the "basic" pharmacologist or physiologist. There is no need for the anesthetist to compete disadvantageously in their realm. The anesthetist can take advantage of his remarkable possibilities—in the main denied to the "basic" scientists—for studying human physiology and human pharmacology. This privilege brings with it heavy responsibilities, heavy ethical problems. I should like to say something about these a little later on.

The anesthetist who expects or hopes to lead must first become an expert technician, and many do; but the *maintenance* of technical proficiency is, surprisingly, not so common among "chiefs." It should go without saying, but unfortunately it needs to be said, the acquisition and *maintenance* of one's technical prowess is the basis on which the anesthetist-investigator builds. A good many, and sometimes the ablest are included here, find anesthesia investigation more interesting, more exciting, than the routine of clinical work,

which they then let slip until they gradually become technically incompetent. Such a one had better have been a biochemist or a physiologist or a pharmacologist. He is no longer an able clinician and he is unlikely to be a top-flight scientist since so many of his formative years must necessarily have been spent in the clinic. There is, happily, a middle ground where anesthesia techniques can be maintained with a regular clinical schedule (not only supervising, but *doing*), yet with adequate time for sound investigation. This is the goal for the anesthetist-investigator to aim at. The academic world has room for the expert clinician-teacher and also room for the expert clinician-investigator. These two working together are essential for the growth and development of the specialty.

Human Pharmacology and the Anesthetist

In the last two decades, and especially in the last year, the elements of a new specialty have been emerging, "human pharmacology," unfortunately called "clinical pharmacology." Those responsible for the development of this field are nearly unanimous in their discontent with its present label; but no one seems to know what to do about it. "Clinical pharmacology," so it is said, is too firmly established as a name to permit change. (This seems to me doubtful.) The trouble with this name is that it connotes downstream, applied science, a preoccupation with technical matters, with dull drug testing. The truth is, this area offers an opportunity, using drugs as tools, for the most fundamental probes of basic mechanism in man. There is a need for travel along these little-explored byways, a ready-at-hand opportunity for the prepared anesthetist.

A moment ago I mentioned the impetus given to this field in the past year. By this I meant the consequence of the new regulations of the Federal Food and Drug Administration. It must be admitted that at the present time these regulations have had a chaotic effect on study of new drugs in this country. Their net effect seems to be at present crippling rather than reinforcing; but I cannot escape the view that the attention these regulations have directed to the field of drug studies will, in the end, with sensible modifications, be good, and the very thing to crystalize the formation of this new discipline, clinical pharmacology. The opportunities here, offered to the anesthetist with his ready access to human subjects, exceed by far those given the orthodox pharmacologist whose work in the main is limited to animal studies.

Disease and the Advancement of Basic Science

It may be useful to consider in some detail just why the anesthetist has such a great opportunity here. There is little point in debating whether there are such things as both basic and applied science. One can, as some have done, take the view that there is merely good and bad science. But there *is* such a thing as interest in the discovery and establishment of the new scientific concepts. And then there is the application of such concepts—applied science—whether it occurs in a laboratory of biochemistry or on a hospital ward.

One can borrow a figure from the physicists and think of man in one sense as a closed system, a black box, as I have mentioned elsewhere.[2] The characteristics of the normal body are studied and then, just as the physicist after studying his black box puts a perturbation on it, disease or drugs affecting the human body provide a stress and their effects are there for study. Nature presents bolder experiments than one would ever dare perform. We can take advantage of these in studying the basic mechanisms involved in the effects on disease produced by drugs.

One of the clearest examples of the advancement of physiology from study of disease is in the field of endocrines. Development of basic physiology in this area has stemmed almost entirely from clues presented first by diseased endocrine glands. Discovery of vitamins and their biochemistry have depended on deficiency diseases. The origins of the sciences of microbiology and pathology need no comment in their obvious relationship to the present thesis.

This thesis need not rest alone on such objective matters: It has now been found possible and rewarding to make a quantitative approach to subjective phenomena. If the

so-called behavioral sciences are ever to be put on a really sound basis a quantitative approach is essential. Technical measurement of subjective responses to various factors, drugs for example, has depended in very large part upon the study of pain as prototype. It has been clearly established [3] that pain of pathological origin differs greatly from experimentally contrived pain in its response to drugs. The presence or absence of anxiety can completely alter certain drug effects. Some of the very greatest stresses are present in disease, within the hospital. Great stresses can be produced by drugs. This rich field has hardly been tilled at all.

The university hospitals of the land have long been recognized as fields where already discovered concepts are applied, but now it is evident that they are the *only* places where certain discoveries basic to the advancement of pure science are likely to occur. Such institutions are indispensable units in the advancement of such aspects of conceptual science. In short, a new role of the great teaching hospital is emerging. A series of lectures has been gathered together in support of this view.[2]

We must remember that in an exact sense there is no such thing as clinical science, and there is no science of anesthesia. Anesthesia is an aggregation of clinical techniques built on several sciences, among others, anatomy pharmacology, physiology, biochemistry, physical chemistry, physics and mathematics. Anesthesia is not a science, which is one of several reasons why I do not very much like the term anesthesiology, meaning science of anesthesia; however, the term is well entrenched. There is a better reason than the semantic one for laboring this point, for herein lies the clue as to where research fundamental to the growth of the field is bound to occur; that is, in the basic sciences. Anesthesia greatly needs investigators capable of working in the basic sciences. As long as anesthesia (or any other specialty) leads a parasitic existence, scientifically speaking, depending greatly as it does on scientists in other fields for fundamental developments, it can hardly have much stature among other and stronger medical disciplines.

The Anesthetist's Participation in the Growth of Medical Science

Let it be granted that the greatest single threat to the specialty of anesthesia is the possibiliy—the actuality in too many places—that the anesthetist will fail to participate in medicine as a whole, forgetting that he is first physician and second anesthetist. The individual doctor may indeed carry out research in anesthesia, but if his work has significant value it is likely to be better characterized as research by an anesthetist, a nice distinction made about surgery by Edward D. Churchill in a recent Lowell Lecture.[2] The breadth implied not only enriches the field but serves to attract able young men to it, a critical need in the field of anesthesia. Just as the internist is the physiologist in the clinic, so also the anesthetist can be the pharmacologist. It is essential that there be continuous communication between the specialties and the parent disciplines. Anesthetists need to participate in the medical life of their community. They can do this especially through research, if it is fresh and original. The anesthetist will never be a significant part of the medical scene unless he promotes its growth. To live at all is to grow. The alternative is at least a moribund state and rejection by the body of medicine.

I have no objection to a preoccupation on the part of some with machines; this may best suit their interests and it has surely led to useful developments in the past and doubtless will in the future. One can object, however, to a confusion of such activity, however needful, with fundamental research. New concepts are the basic stuff from which significant research comes. There is in anesthesia, on the part of those who should know better, often a curious hostility to what might be called interest in concepts. One can be sure of this: There will be no enduring growth unless basic concepts are recognized and understood and new ones developed. It would be interesting to make a list of the principal ones underlying research in anesthesia.

My teacher of 30 years ago, August Krogh, carried out his celebrated work on the capillaries with only a microscope and a few homemade pieces of apparatus. This was neverthe-

less honored by a Nobel prize. He once expressed the view to me that obstacles should be placed in the way of those who showed an interest in doing research, and then, if they persisted and finally overcame a series of formidable difficulties placed in their path, they might perhaps be given a trial at investigation, but certainly no expenditures for elaborate equipment would be made then or for a long time to come. This might be called the aristocratic view of the investigator. There is, indeed, room for another approach. It has been expressed by Ramon y Cajal, also a Nobel laureate, whose view was surely colored by sad thoughts of the low state of Spanish science. Cajal believed that many should be encouraged to go into scientific research. He recognized that there would be few men with the intuitive power and originality which characterize the true scientist, but he likened science to an army, in which there are places for foot soldiers, corporals, and colonels, and a few generals. This proletarian attitude as opposed to Krogh's aristocratic one is closer to that now prevalent among one group of anesthetists, who seem to hold the view that nearly everybody should do research. The consequences of this are evident in much worthless stuff which finds its way into print, and the clutter grows mightily.

It is my conviction that no physician should be allowed to tie up large sums in complex equipment until he has demonstrated that he can first make a significant contribution to knowledge, with no more equipment than a notebook and pencil—and an idea—and such simple apparatus as he can build himself.

Unfortunately, persistent attention to a given problem is uncommon among young clinical investigators. One can only deplore the frequent mad scramble from band wagon to band wagon in the name of research. While this compulsion is not limited to anesthesia, it seems to be especially prominent in this field.

What is the road to progress? The young investigator must discover within himself his talents and interests and must determine the opportunities present in his environment, and all this may lead early in his career to brief appearances in several fields; nevertheless, the dedicated investigator will pursue one chief problem for years.

The anesthetist, like all other investigators, must seek useful new concepts, if his research is to be fruitful and broad enough to attract the attention of leaders in other fields. The anesthetist's primary concern will be the discovery and establishment of such concepts. It seems most unlikely that current preoccupation with machinery or even unmotivated general "courses for training in research" will promote this end. It is scarcely possible to think of any path out of the woodlot other than by apprenticeship of a relatively few young men to scientists and support of them by means of research grants. Such men must participate in, but have freedom from, the crushing clinical load common to the field of anesthesia.

An Example: Pain and Pain Relief

I mentioned earlier how the study of pain had served as a prototype for study of a broad area. This can serve as a useful example.

The fundamental reason for the existence of the anesthetist is the existence of pain—the need for its prevention or relief. This role represents doubtless the earliest activities of the physician. Possibly the ancient origins of pain relief may explain why the problems surrounding it have become so encrusted with folklore.

This illustrates how the physician anesthetist can with his special interests and viewpoints enter a well worked field and come up with fresh new concepts. The physiologists and pharmacologists were concerned with ever more fiendish ways of producing experimental pain. An anesthetist first showed—and he has now been confirmed by 14 other groups of investigators—that pain experimentally contrived in man in the several usual ways does not respond dependably to even large doses of narcotics, whereas small doses of narcotics will always lessen or relieve pain of pathological origin; *i.e.*, disease or injury.[3] Thus these simple observations have led to a new understanding of pain. The anesthetist has shown that a quantitative approach is feasible and rewarding in this elusive area and in doing so has laid the pioneer groundwork for general quantitive study of subjective responses and the effects of drugs and other stimuli thereon. Compelling evidence has been com-

piled that the original pain sensation is far less important than the subject's reaction to the original sensation, the so-called reaction component, and that this is the site of action of pain-relieving drugs. Thus the anesthetist-investigator's interest in pain problems has established a firm and legitimate area of common interest with the psychologist.

While there is no time to discuss these matters further here it can be pointed out that this work has led to a clearer understanding of the great power of placebos not only as pseudo drugs but in many therapeutic endeavors. Even surgery itself may in some instances provide nothing more than a placebo effect.[4] This work also provides a demonstration of a new principle of drug action: Some drugs are effective only in the presence of a required mental state.[5] This example illustrates how the anesthetist has an opportunity with his special interests to make contributions to many aspects of medicine far removed from the anesthetized patient and yet within his proper field of interest and competence. This illustrates further the insufficiently appreciated fact that some kinds of basic, that is, conceptual science can be advanced only by a study of abnormal or diseased states.[2]

Broad Generalizations and Relations Derived from A Study of Pain

Neurophysiological study of the intact human subject poses obviously great problems. It is in this area that measurement of drug-induced changes in subjective responses has shown usefulness in the past and promise for the future. There is the related problem of providing links between observations in man and those made in animals. While subjective responses cannot be studied directly in animals of course, useful inferences can often be drawn from behavior patterns in response to stimulation. In some instances subjective responses in man can be made to reveal themselves in objective change.

Advances in the medical sciences leading to increased understanding of disease, the rapid development of organic chemistry, as well as the pharmaceutical industry, have all resulted in a remarkable production of drugs whose purpose is to influence symptoms. While spectacular progress in chemotherapy has understandably held the limelight in therapeutics[6] the fact remains that much of medicine is still concerned with the treatment of symptoms. The scientist as well as the physician is confronted with a bewildering array of new agents launched with claims sometimes too eagerly accepted by a compassionate physician trying to help a patient in trouble. The properly controlled, quantitative approach holds the only real hope for dealing with the oncoming flood of new drugs.

The situation is difficult enough when the new agent to be tested is expected to produce objective change; it is more difficult when the hoped for effect is subjective. It must be agreed that thousands of experiences of hundreds of physicians over years of time can lead to useful drug evaluation; but at the rate new agents are appearing, it is unlikely that many agents will receive this useful but slow and costly appraisal. If chaos in therapy is to be avoided, it is plain that new and more accurate methods of evaluation, less costly not only of time but also of money, must be found. Accuracy here is desirable not only for obvious clinical reasons but also because accurate quantitative techniques for the measurement of drug effects can be important tools in the study of disease processes, their causative mechanisms and their relief.

This study of drugs and their effects plunges one into a consideration of the mind and its activities. It is widely recognized that certain physical differences can lead to different effects from a given drug, but it may seem heretical to find in these experiments[7,8] that a given drug does not always have a given effect but that it may have an *opposite* effect, perhaps depending upon the personality and make-up and mental state of the individual involved. For a familiar example, there is the sad drunk and the happy drunk. In addicts or postaddicts morphine customarily produces euphoria and in the inexperienced, the majority, dysphoria. There is reason to believe that by observing the response to drugs (euphoria or dysphoria, for example) one can gain insight into the personality structure. Work on subjective responses is of interest, then, not only because it opens up the possibility to gain new and accurate knowledge

of the effects of many useful drugs, but also because it opens up new vistas of how certain factors which are basic to an understanding of human behavior can be examined and influenced in a quantitative way. Thus, on starting with the anesthetist's everyday experience with pain one sees how wide the ramifications of this can be.

The behavioral sciences must, if they are to be soundly established, move onward from the present state, which in many areas is largely one of description, to one of measurement. Measurement depends upon the recognition and precise definition of variables and their relationships, and the development of tools and techniques for working with them in quantitative terms. As in all sciences, eventually there must be possibility of prediction. Implicit in this is the necessity not only to recognize elements that can be measured, but to understand the existence and nature of the essential safeguards, the controls, of observations made. One goal of science is rules ("laws") and the more invariable these rules are, the better it is. One seeks to predict from given situation to certain effect. Excepting the considerable body of successful quantitative work in psychophysics and psychometrics in the complex field of the behavioral sciences in man, observations have been until now largely descriptive.

Some problems of pain have served as examples to illustrate the breadth of interlocking interests available to the anesthetist for study. His legitimate interests can also be illustrated in another way. Consider for example the five principal classes of drugs used to produce subjective change:

Sedatives—Hypnotics—Analgesics—Ego Depressants—Anesthetics

A small dose of a barbiturate is a sedative. Increase the dose slightly and it becomes a hypnotic. With a further increase it is an analgesic. Still more and it becomes an ego depressant. A further increase and it produces anesthesia. Thus a single agent can carry the individual from the slightest mental depression through the three intermediate stages as indicated to the profound oblivion of anesthesia. It seems most likely that these five states have mechanisms in common since all five can be transversed by the simple expedient of increasing the dose of a given drug. This example illustrates, too, the close relation of anesthesia to states not ordinarily considered to be related. It is clear that the anesthetist's interests can cover a very wide area.

Some Ethical Problems

Human experimentation requires a *willingness* to experiment upon oneself as evidence of good faith, although in a given case self-experimentation may be wholly impractical. When it is carried out, it must be done with the same safeguards that are applied to other subjects. Ivy [9] cites a number of examples to indicate that willingness without the discipline of proper controls can be misleading or devastating, or both, to the participant: There was the case of John Hunter who inoculated himself, in 1767, with gonorrheal pus to prove the disease transmissible in this way. He succeeded. But from the same inoculum he also acquired syphilis and concluded that gonorrhea and syphilis were merely manifestations of the same disease! Purkinjé, in 1790, gave himself enough digitalis to kill nine cats in order to study the visual changes in himself. He had cardiac pain and irregularity and vomited for a week. Hales, enthusiastic about the marvels of intravenous injection, received a half ounce of castor oil by this route and lived to describe its remarkable effects. Tonery in 1830, in order to convince the French Academy of the extraordinary powers of charcoal to absorb alkaloids, took with this safeguard a dose of strychnine which without it would have been lethal. In 1857 carbon tetrachloride was tried out as an anesthetic in man; a few animal experiments would have shown it to be unsuitable. In 1894 Oliver told Professor Schafer that he had made extracts of all of the endocrine glands and injected them into his own son. Schafer altered the experiment and was first to demonstrate the pressor effect of epinephrine in dogs and cats. Ivy concludes that "these experiments may be a tribute to the enthusiasm and bravery of these early medical scientists, but they clearly show the limitations and dangers of uncontrolled self-experimentation."

Clearing a hundred years at one leap we can come down to the present and find able men still in difficulties. When one shifts from a study of objective manifestation of disease to subjective effects, specifically, for example, to a quantitative study of the effect of drugs on symptoms, it becomes apparent that added controls are mandatory. Chief among these is the use of the "double unknowns" approach to eliminate bias, not possible when the experimenters are also the subjects, who, as drug experience and sophistication grow cannot remain in ignorance of the "aura" produced by opiates, for example. The scores of studies that have been lost because of a failure to recognize and employ adequate controls have been reviewed elsewhere.[10]

Paradoxically enough, in the last century at least, those who experiment in man have been freer of attack than those who carry out animal experimentation.

Having seen what fundamental ends can be achieved, the experimentalist is led to carry on where Nature leaves off. The purposes of human experimentation thus become deeper and more complex than ever before and so also do the problems surrounding it, reasons enough for study.

The problems of human experimentation do not lend themselves in most cases to a series of rigid rules. It is profitable to examine views, concepts, even "rules" that have been accepted by one group or another; this will enable the investigator troubled by a given problem to study past thinking on this subject so that he can have a framework against which he can measure his problems in terms of the experiences and conclusions of others in similar situations.

The breaches of ethical conduct which have come to my personal attention were owing to ignorance or thoughtlessness. They were not willful or unscrupulous in origin. Study of "codes" of conduct, of rules elaborated by others will help those who would protect themselves from the errors of inexperience.

While human experimentation has accompanied the practice of medicine from times of antiquity, the current concept of medical research has not really been presented as such to the courts. As the courts have understood it, it has not been, nor is it now, *legally* recognized as a legitimate part of the physician's activities. "So far, planned and directed medical research on human beings has not been tested."[11] The universal and longstanding recognition that research is essential to the advancement of medical science and the new recognition that some aspects of basic science cannot advance without it, have led to a correct, although still extralegal, expansion of human experimentation. Curiously, such work when well conceived and soundly conducted is everywhere recognized as being properly within the ethical and moral concepts of our time, yet it remains outside legally. Legal inclusion will depend on an understanding of all facets of the problem. We have the curious situation where one branch of the government *requires* testing of drugs in man (the Federal Food and Drugs Administration) and another branch (the courts) declares that "a man experiments to his peril."

There are two problems in the field of human experimentation which in any hierarchy of complexity are at the top level of difficulty. They are interlocked. First, there is the problem of consent, seemingly so simple and straightforward, but often far from simple; second, there is the problem of the ethical justification for experimentation on one subject which cannot in any way be construed as for *his* benefit but is for *patients in general.** Granted the great ethical difficulties inherent in this second problem fairly well disappear if the first is solved, that is, if valid, meaningful consent can be obtained; lacking this, we are on very thin ice indeed as far as the second is concerned.

To face the difficulties involved in application of the principle of consent is not to attack the principle but rather to implement its accurate use as the investigator moves toward a more perfect understanding of his possibilities and his responsibilities. These difficulties have been examined in some detail, as well as I am able to do it, in the editorial on

* Experimentation in one patient, not for his benefit but for patients in general, poses problems: Many are in the painful position of not rejecting the benefits obtained from this source but of rejecting the means which produced the benefits. To me, this is indistinguishable from the view that ends justify means.

"Some fallacies and errors in the application of the principal of consent in human experimentation."[12] There is no time to review the material here.

Animal Versus Human Experimentation

I pointed out earlier that the anesthetist-investigator would do well to utilize his fine opportunity to study man. Nonetheless, it is desirable to have in mind certain facts concerning animals. One must recognize that experimentation in man differs in a number of ways from experimentation in animals. There are, however, ethical problems in both. Consent is necessary in both. Where man is concerned it comes from the informed individual himself or his guardian. Where animals are concerned, consent comes from a watchful society, from the body politic. Transgression of the rights and standards of either consenting source can be disastrous for the investigator and for science.

It is a curious thing that able investigators require a sound design of experiment in animals but often ignore this is man. When the matter is questioned, the bland reply is usually given, "You can't expect it in man." A little deeper thought on the subject would reveal that far from this preserving "the ethics of the situation," just the opposite very often transpires and the cost of disregard of sound planning in human experimentation is great in terms of time lost, money spent, suffering and life itself. This is so little understood and so important, I would like to give an example or two.

A few years ago there was a great vogue of ligating the internal mammary arteries in treatment of angina pectoris, and great improvement did occur following the procedure. There were three great difficulties: The effects were transient; the operation had its own death rate; *the effects were just as great when only a skin incision was made as when ligation of the arteries was carried out:* The sham operation was equally effective as the recommended procedure. Thus we were dealing with a "placebo" operation. Thymectomy for myasthenia gravis, which carries a solid operative death rate of 7.5 per cent both in this country and in England, may be in the same category. I am not competent to make such a judgment —nor is anyone else—since a properly designed study has not yet been carried out. Those who are competent to do so, not I, have raised the question. In the meantime deaths continue from the operation. Another example: Tens of thousands of sympathectomies for hypertension have been carried out, yet no less an authority than Sir George Pickering, Regius Professor of Medicine at Oxford, has said recently that no adequate studies of the matter have been carried out to indicate whether the procedure has any sure effect on morbidity or mortality. The cost in money, time and suffering of these thousands of procedures is astronomical and a number of people are dead. Such matters can be settled only, I believe, by alternating sham procedures, skin incisions, with the specific operation on a double-blind basis where neither the subject nor the appraising observer knows which has been done. The informed consent of the subject is absolutely necessary. It is no use saying this type of study cannot be done. It *has been done* in the two series which led to the prompt abandonment of ligation of the internal mammary arteries in the treatment of angina pectoris. The life cycle of this procedure was exactly two years from its enthusiastic introduction and wide use to its discreditation. These matters have been discussed in detail elsewhere.[4, 13-15]

In animal work sheltered, carefully bred, uniform stock can go far to give dependable answers. In man, no such background data are available; hence all the more reason for truly controlled studies. The examples just given are surgical since data were at hand for illustration. The anesthetist investigator, knowing full well the terrific emotional impact of his anesthesia procedures must realize the importance of sound design in his own studies. It would be a great error to assume that the results of this impact are only subjective: placebo effects are exhibited in objective change as well (*loc. cit.*).

In Conclusion

In the foregoing I have tried to show that the anesthetist in his scientific life has a very great opportunity to advance human pharmacology, that current trends in science, with

enlarged opportunities in "clinical pharmacology," enhance his opportunities. With the anesthetist's entry into the field of human pharmacology he encounters not only great opportunities but grave ethical problems and responsibilities as well. In his contributions to all of these aspects the anesthetist can advance not only his own specialty but medicine as a whole.

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