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SURGICAL EXPERIENCE AND SURGICAL KNOWLEDGE

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I HAVE chosen for my text the last sentence of the seventh verse of the first chapter of the book of Dionis, entitled "A Course of Chirurgical Operations, demonstrated in the Royal Gardens at Paris," by "Monsieur Dionis, chief chirurgion to the late Dauphiness and to the present Dutchess of Burgundy," translated from the Paris edition and printed in London in the year 1710:

"But it must be granted that the Chirurgion, to whose lot no more than this practical Manual and Operative Chirurgery falls, will frequently run the risque of Killing and Laming his Patients, when without the Direction of a Physician; and, even in the Presence of the Physician himself, will he not be in danger of committing Faults, if his Hand be not guided by his Head? 'Tis certain, that to walk well good eyes and agile and pliant legs are requisite, and that the one without the other is insufficient for that purpose. A blind Man, for instance, provided with good Legs, and led by a quick sighted and faithful Guide, may stumble for want of Light. So, whatever Experience a Chirurgion may have, if he have not the Knowledge which ought to direct him in his Operations, he will work in the dark; and if he be not a good Theorician, he will never prove an able Practitioner."

I have chosen this text because in conferring upon me the deeply appreciated honor of delivering this annual oration, it is to be assumed that I was supposed to have some message of interest to bring to you. If I have any such message, it is to be found in the advantageous position in which I find myself, standing midway between the theorists of the laboratory and the men of practice. This position offers me, perhaps, a slightly different point of view from that possessed by either group alone, and even makes it incumbent upon me to attempt to reconcile the opposing ideas of two, sometimes unfortunately hostile, forces.

The position is not unlike that taken by the man who feels called upon to intervene in a family quarrel; and fortunate indeed the interventionist, upon whom both sides do not finally fall, to his eternal damnation!

Is there any wrong which needs righting? I feel that there is, because for many years now I have watched young men go out from the medical schools with ideals which are certainly broader because of the improvements in the laboratory courses now in force in our medical schools. They go into our hospitals, and the next time I see them their ideals have been changed to the more narrow ideals of pure practice. The laboratory means little to them, the laboratory training in the art of acquiring knowledge has vanished, the use of books as tools seems to have been forgotten. If it be not a fact that something is wrong why does the committee of this academy find it needful to issue such an appeal as the one which we have all so recently received?

Now part of the trouble, which our committee thinks must exist, and I am sure exists, may be the fault of ourselves. We have allowed the academy to become a clearing-house of experience, rather than a clearing-house of knowledge. In part it may be due to that defect of human nature which compels men to follow a leader. If this is the case, I would fill these meetings by making the leaders of surgery promise to attend; the rest would then come. I know it does not seem to sound quite right, but my meaning may be clear to you if I say that if I wanted to catch fleas I would first catch a dog.

The chief trouble, I believe, lies elsewhere. Somewhere between the time of leaving the medical schools and leaving the years as hospital internes, someone, something, has undermined the efforts of the teachers of the medical schools to give to the students a broader point of view. Does the fault lie with the men who teach them in the hospitals, with you practical men of surgery, or does it lie with the conditions existing in our hospitals? If it is with the conditions as they exist, who shall remedy these conditions?

I have had many young surgeons come to me for special work along certain lines. They come with two desires, to do some dissecting of the human body, to learn surgical technic by practice on the living animal. Never yet has my heart been gladdened by the sight of the would-be abdominal surgeon coming to learn the physiology of the gastro-intestinal tract. Once in a while one appears with a glimmer of the value of pathology, yet without the realization that, since pathology is only physiology gone wrong, pathology cannot be understood

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without knowing the basal physiology. Why is this? Has no one pointed out to them that the "when" of pathology and the "why" of physiology are of far greater importance than the "how" of anatomy? Has no one pointed out that while anatomy is the foundation stone, one who has climbed to its very top is still unable to even reach the place where the builders of to-day are working? Is it because the teaching of the writer of our text is less true to-day than it was two centuries ago, "if he be not a good theorician he will never prove an able practitioner"?

The pure theorist is not entirely free from blame. The value of pure science taught for its own sake is unquestionable, but since we are training men for medicine and surgery, the laboratory which helps in that training need not be too proud of its purity. It would seem, too, as though these exponents of pure science might more often permit us to catch a glimpse of their beloved mistresses, minus some of the veils of language and technicality. But since I am talking to you practical men, I shall refuse you the further comfort of thinking of the faults of the pure theorists. You will recall that when the mountain refused to come to that great prophet of Islam, Mohammed did swallow his pride, gird up his loins and go to the mountain.

I firmly believe that something is not right, and I further believe that this something can be expressed best by pointing out the difference between surgical experience and surgical knowledge as it is seen in a consideration of certain surgical procedures of to-day. I am aware that there is perhaps no difference between the broad definitions of experience and of knowledge, since knowledge must be defined as the sum of experience. Yet over two hundred years ago our friend Dionis perceived a difference in the common acceptation of the terms, and this difference exists to-day as then; and there certainly will be a great difference in the effect on the aspiring candidate for surgical fitness, whether you continue to emphasize the necessity of gaining surgical experience or whether you begin to point out to him by example and by precept the greater importance of gaining surgical knowledge, the sum of all human experience, which bears immediately or remotely upon the art and science of surgery.

It is so self-evident that it is banal that one must know the anatomy of a part before he can operate, but why stop there? Think for a moment of the present status of gastric surgery. The anatomists have not yet taught us the position and shape of the stomach. The Röntgenologists have taught us further that it does not make much difference where it is, so long as it is working properly. Now physi-

ology has as one of its fundamental precepts, the fact that Nature will have things go her way regardless of man's wishes in the matter; yet in spite of this fundamental fact, in spite of Kelling's¹ demonstration of this fact sixteen years ago and Cannon's elaboration of this fact eleven years ago²—that in the presence of a normal pylorus food will not pass out of the stomach through a gastro-enterostomy opening but through the pylorus as normally (see Figs. 1, 2, and 3)—in spite of the fact that men like our own great leaders of surgery have pointed this out and with sufficient force, I cite the paper read by our own President in December, 1914³—how many simple gastro-enterostomies have been done this very day for gastric ulcer, and how many will still continue to be done for years to come, or, indeed, until our surgeons have learned to differentiate between, and rightly evaluate, experience and knowledge?

You may say that conditions are not normal in the presence of an ulcer; that a pylorospasm exists, that the operation does do good in many cases. But do you know, even, whether the operation or the real surgical rest in bed accomplished the result? Can you assure any given case that the operation will cure? Can you restore to normal unless you understand and know the normal? Are you doing 100 per cent. surgery?

Why does it take so long for knowledge to be disseminated? Why must a whole year elapse in the state of Pennsylvania before the average cancer patient sees the surgeon after he has seen the physician? Is it because the physician does not know the facts of cancer, because he has forgotten that there are other ways of acquiring knowledge beside the hopelessly narrow one of personal experience? Has he forgotten that books are tools and must be used to be kept bright? Must so many cancers of the breast be concealed from the physician until the present tendency in woman's dress fails to conceal them from the world? Will any change for the better occur until our young men can be made to see that the experience of four surgical dispensaries is of less value than the experience of one appointment, with the time that would be spent in the other three devoted to reading the wisdom of the past or to adding to the sum of knowledge by laboratory work?

Part of this difficulty is due to the methods in vogue in surgical teaching and writing. Since surgery always presents a condition in which something must be done, a surgeon must act, and he does that which seems to him best. But how often, even to his audiences of surgeons, does he say that that which he is about to do may be useless,

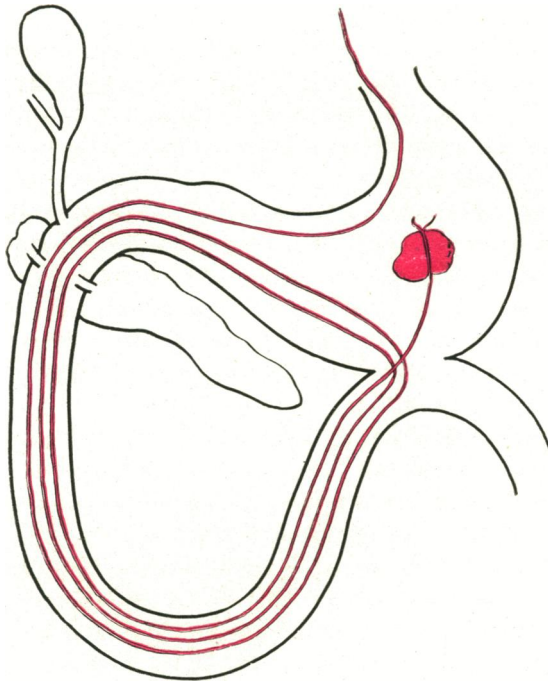


FIG. 1.—Draper's demonstration of the course followed by a bolus of food, to which a string has been attached, in an animal in which a gastro-enterostomy has previously been performed.

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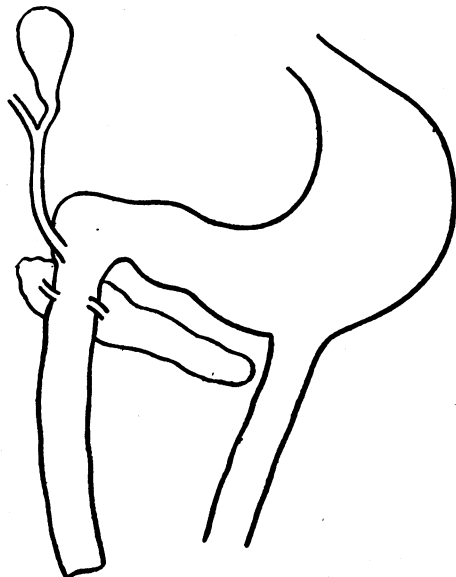


FIG. 2.—If the duodenum be cut and turned in at a point as indicated in this diagram, the lower end being anastomosed to the stomach by an end-to-side as shown, or by the ordinary lateral gastro-enterostomy, a certain number of these animals will die with all the symptoms of high intestinal obstruction.

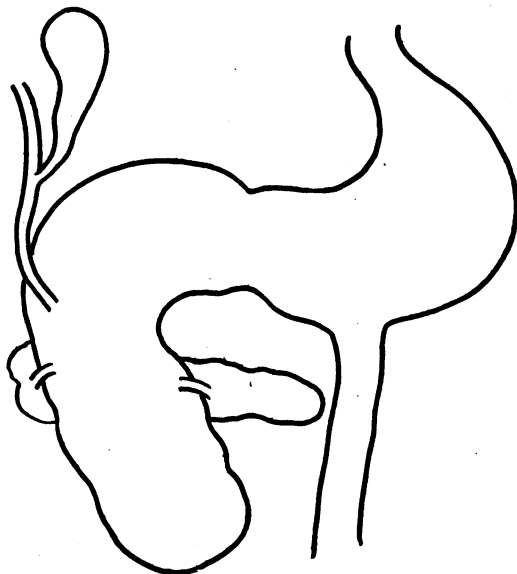


FIG. 3.—Some animals operated as in Fig. 2 will live, showing at autopsy an enormous dilatation of the blind end of the duodenum or else less dilatation but extreme hypertrophy of the muscularis of the duodenum. Therefore, while food has passed through the gastro-enterostomy opening as shown by the animal's living in good health, the autopsy nevertheless reveals that nature has been insisting upon having things go her way.

is certainly irrational, but he does it because we know nothing better to do? Let me quote this sentence from a recent article on the thyroid—and every man who writes thereby becomes a teacher and must remember a teacher's responsibilities: "One indisputable fact established by recent studies stands out most prominently, and it is that goitre, with the possible exception of the colloid thyroid of adolescence, is not a disease to be treated medically but is distinctly a surgical condition." So far as I can find, the only indisputable fact concerning the thyroid, aside from the fact that we do not know its function and must needs work in the dark until we do know it, is that there is a growing dissatisfaction with the results of thyroid surgery; I mean of course with the surgery of the toxic goitre. Therefore the attempts at something more than surgical intervention, the Röntgenization of the thymus for instance;⁴ therefore we read as in Mackenzie's Bradshaw lecture⁵:

"Klose published in 1913 a table giving results of operations for exophthalmic goitre by various surgeons from 1896 to 1912. The percentage of cures or considerable improvement ranges from 50 to 98.7, Th. Kocher claiming 93.7 per cent. and Mayo 97.8 per cent. The percentage of deaths allowed by Th. Kocher was 1.3 and by Mayo 2.2. These figures, I have no hesitation in saying, should be received with great reservation."

"A more convincing report has recently been published by Judd and Pemberton . . . In this the 97.8 per cent. of cures or considerable improvement has fallen to 70 per cent., but even that is, I am sure, much too high if the cases operated upon are true cases of exophthalmic goitre."

It is idle to retort that Mackenzie is only a medical man. Our medical friends are as acute observers as are we. I regret to say that as a class they are better trained in the art of acquiring knowledge; and they doubtless see more of the unsatisfactory results of thyroid surgery than does the surgeon, because the patients, having tried surgery and found it wanting, can do naught else than seek the comfort of medicine, small comfort though it may be. Mackenzie's refusal to accept surgical statistics need give no offence to the surgeon who in the past few years has been devising schemes and systems for following up his cases, since every such invention but proves anew either that he has just awakened to the necessity for finding out what he has been accomplishing, or at least, having awakened, finds his present system inadequate. We must permit others the pleasure of criticising things which we ourselves criticise in ourselves.

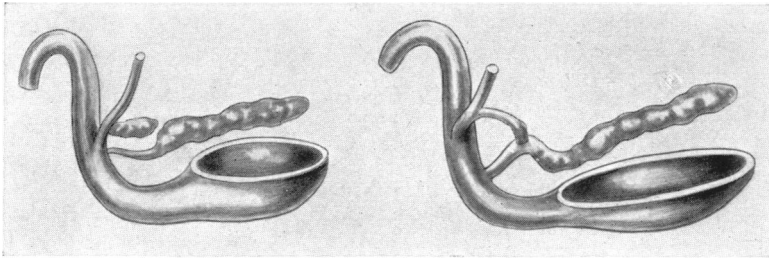


FIG. 4.—From Hamburger⁷—shows the manner in which the two portions of the pancreas, derived from separate anlagen, eventually fuse.

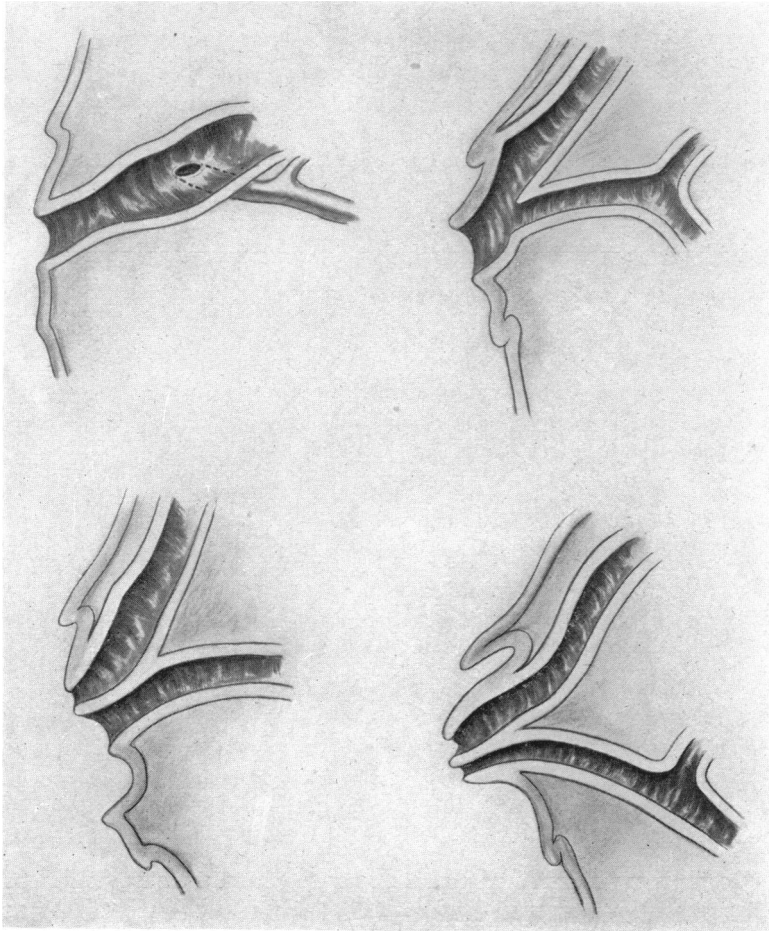


FIG. 6.—From Letulle et Nattan-Larrier⁸—the various types of the opening of the common and pancreatic ducts into the intestine.

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No student of the thyroid can ignore the opinion of the internist. Whenever there are two radically opposed points of view between surgeon and internist, it means at the very least that surgery is not convincing—it is not 100 per cent. surgery. Nor can the argument hold that if these views are presented, some patients will be held until too late by the general practitioner. If the seeking for patients conflicts with the seeking for truth, we must do without the patients. We have long since emancipated surgery from the bondage of working under a physician as they worked in the days of the writer of our text. Surgery is no more the carpentry of medicine. But the habit of gently sneering at our medical colleagues, while known to be but a mild form

Opie's Statistics.

100 subjects examined.

10 cases, no anastomosis of the two duct systems.

4 additional cases, the two systems united only by a minute branch.

11 cases, the duct of Santorini equal in size to, or larger than the duct of Wirsung.

FIG. 5.

of mental exercise to the big minds of the leaders of surgery, is too often taken seriously by the student, to his own detriment.

The surgery of the pancreas offers several splendid examples of what I would impress upon your minds. In one of our most recent text-books, Moynihan writes,⁶ in relation to the treatment of chronic pancreatitis, "The majority of surgeons follow Robson in preferring cholecystostomy, or if permanent drainage is required, cystenterostomy, if the gall-bladder is sufficiently healthy." Now such a procedure must be based upon the assumption that the infection is duct-borne, otherwise mere drainage of the duct could serve no end. It also must assume that, granting the assertion that it is duct-borne, the ducts of the pancreas could be drained through the gall-bladder. Let us look into the matter. Fig. 4 is only twenty-five years old.⁷ It shows the

development of the pancreas. The surgeon who studies this picture with a thought to the vagaries of embryologic development should not be surprised to find irregularities in the pancreatic ducts. The results of Opie, Fig. 5, published in 1903,⁸ are not surprising, nor need Fig. 6⁹ surprise the surgeon. Yet in the ten out of one hundred cases of Opie, where the duct of Santorini drains the greater part of the pancreas, and in Fig. 6 in certain types of papillæ, there can be no doubt that neither cholecystostomy nor cystenterostomy would help. In view of these considerations alone, the drainage of the ducts could not give 100 per cent. surgery. Moynihan, in vol. iii, Keen's Surgery, reproduces Fig. 6, but fails to apply the lesson it carries to the question of treatment. Even granting that ascending infections are mucosal infections, which in any case of ascending infection they are most likely not, we might assume that chronic pancreatitis could not occur in these cases where the ducts of the pancreas enter separately from the bile-ducts, but this would need to be mere assumption.

You may say that it is easy to reason *post hoc propter hoc*, that hindsight is notoriously clearer than foresight; that since two of our own Fellows have so clearly demonstrated the true nature of chronic pancreatitis as have Deaver and Pfeiffer,¹⁰ it is a simple matter to look backward and criticise. But the point I wish to make is that Opie's work was published in 1903, that the pictures I have shown you of the peculiarities of the openings of the ducts are from a paper of 1899, and that the peculiarities of the development of the organ, to which I drew your attention, are from a paper published in 1892. I would emphasize here what is a well-known fact to those who know books, that a text-book in any growing subject is behind the times before it leaves the printer's hands, that the surgeon must keep in touch with the original sources, and that not only in the journals devoted to surgery.

Certainly this takes time, certainly it takes effort, certainly it is something each must do for himself. You cannot hire someone to think for you any more than you can hire someone to perform many other of your personal physiologic functions. He who embarks on the surgical cruise ships for no joy-ride. If we wish to raise the standard of surgery, if we would weed out undesirables, let us get this idea clear before the minds of the aspirants to surgical success, that the real surgeon must know as much as any man in any branch of medicine and then some, this "then some" being the whole field of surgical technic.

There is no doubt that the living pathology can teach some things

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that the dead pathology cannot teach, that it can teach many things better. There is no doubt that human vivisection—I use the term before a body of surgeons and do not care if over-zealous ladies wish to misinterpret it—is superior to animal experimentation, wherever it can be utilized; but living pathology does not supersede the basic pathology of the microscope. It cannot stand alone, nor is it intended by its most able exponent that it should stand alone.

The operating room teaches physiology, but not the whole subject. For instance, there can be no doubt that the whole picture of acute pancreatitis can only be explained by the activation of the proteolytic fermentogen of the pancreas, not in the intestine where the enterokinase normally activates trypsinogen into trypsin, but abnormally, in the gland itself or in the peritoneal cavity. This activation is brought about by the action of some unknown substance set free from the tissues under the conditions of autolysis. Therefore any process, infectious—though not all infections—embolic, mechanical, which can injure cells and permit autolysis may start the process of activation, and once started it is probable that the products of tryptic digestion themselves can in turn activate the fermentogen.¹¹ This fact is based on the evidence of painstaking researches, finished and published long before Körte wrote¹² in regard to acute pancreatitis:

“So now the majority of surgeons recommend the exposure of the inflamed pancreas; while some are satisfied with draining the surface of the pancreas by gauze and tube, others advise to go on into the diseased organ. As I have explained above, I join the latter and believe that by this means one lessens the inflammation and prevents more extensive necrosis.”

Yet Körte grants but five lines to a discussion of all the work on pancreas poisoning, the understanding of which clears up so many of the problems of the surgery of acute pancreatitis. We know why injuries of the organ during digestion are more serious than at other times, there is more zymogen present to be activated. There is no need for an elaborate classification of acute pancreatitis, since the various classes into which the disease has been divided are but degrees of the same process. The problem of the time of operation becomes clear. It is a progressive process, progressing under its own power, progressing more and more rapidly as it gains headway, therefore the sooner we operate the better. The question of drainage ceases to be a question; a means of escape for the infection, which may be present or so soon will appear from the neighboring intestines, and for this activated pancreatic secretion must be provided and must extend into

the gland itself, where the trouble lies. Here more surely than Dionis ever dreamed, will the surgeon "not be in danger of committing faults if his hand be not guided by his head?"

The operating room cannot teach these facts of physiological chemistry; therefore as much as we may hate to do it we must go to the physiological chemist, begging him on bended knee to converse in words of one syllable.

Let us not forget that the greatest lesson which surgery will read out of the Great War promises to be the Dakin-Carrel treatment of infected wounds. Let us consider how this has come about. Certainly not out of the depths of the surgical experience of an experimental surgeon. It has come because Carrel possesses the genius of appropriating knowledge to the needs and purposes of surgery; and therefore he made use of the knowledge of the pure chemist Dakin. Not only that the ends of justice and fairness may be met, but that all may realize the importance of applying all knowledge to surgery, let us always think of and speak of the Dakin-Carrel treatment of infected wounds rather than the Carrel treatment. No better example of what I am trying to emphasize could be found.

Now let no one go from here thinking that I have minimized the importance of surgical experience or of surgical judgment, which can only come from a proper combination of common sense, experience and knowledge. Neither the writer of the text, nor I, nor any one in the two hundred years between us would divorce experience from knowledge. The point we would make is that the one without the other is just one-half a whole, and "if he be not a good theoretician he will never prove an able practitioner."

You may tell me that the trouble lies with hospital conditions; that there is so much routine to be done that the spirit needed to encourage the search for knowledge is crushed, and all the young surgeon can hope to do is to learn what he may from experience. You may tell me that the blame for multiple hospital appointments in dispensaries and hospital services lies with the boards of managers. I will not venture into your own field, but I will point out to you that you will either change these conditions or someone will change them for you.

We hear to-day a great deal about the full-time idea in schools and hospitals. Now do not be misled that this idea is being discussed because it has been started at the Johns Hopkins and at St. Louis and is being started in Chicago; nor is it being discussed because the Rockefeller Foundation is behind it. It is being discussed because of

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dissatisfaction with existing conditions, and unless these existing conditions are changed it will come here. This dissatisfaction is with the men who hold hospital appointments and give to the hospital nothing more than the gleanings of their own experience. The dissatisfaction is with the men who hold so many hospital appointments that they have not the time to give more than gleanings, even though they are capable of better things; with the men who, having ideas, have only time to pass them on to their assistants, who pass them on to the internes, who pass them on to the head nurses, who pass them on to the probationers, who pass them on to the orderlies, who pass them on to the bed-pan; dissatisfaction with the men who use the hospitals for gaining experience and never hand back to the hospital a quid pro quo in the form of crystallized experience or knowledge.

You give your time to the ward patients, you keep your appointments promptly, the wards are getting as good treatment as other hospitals, your mortality is as low, your operating staff is well trained? I should hope so—but is this enough? If you drop out to-morrow, will your hospital be any the better for your having worked there? Will the thousands who are to come be treated better because you treated the tens who were there?

These are the questions in men's minds which are leading to the discussion of the full-time idea. I do not know personally if it be the ideal; I do not know, if it were ideal in one place that it would necessarily be generally applicable. We are the servants of convention and custom in surgery as in life—even a musical comedy would fall flat among the naked natives of Africa. But I do know that something will be done to force from surgeons, in return for surgical experience, a commensurate quota of surgical knowledge.

If you do not believe that I am right, look around the country today, and I think you will find, without exception, that the men who are advancing the art and science of surgery are one-hospital men, that the hospitals whose names are associated with surgical progress are essentially one-man hospitals.

I do not represent any pessimism in regard to Philadelphia surgery. No city in the country, from the placid eastern coast over the western prairies to the Golden Gate, boasts as many great surgeons to the square inch as does Philadelphia. We would make it a post-graduate centre. Then remember that post-graduate centres are the outgrowth of undergraduate centres, that they do not spring full-panoplied from the head of an oil well. The undergraduate school of surgery only begins with the diploma and it is up to you who teach in

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every hospital which has an interne, whether you will teach or not, to keep up the standards of the schools. You are the teachers of surgery!

I lay no claim to originality in this idea I have endeavored to present to you. I chose my text indeed from the writings of a surgeon of the long dead past. This is not the first time that this thought has been presented in this same place on this same occasion. What but this same idea prompted Ross to write in the annual oration of 1913:¹³

“Experience must set its seal deeply upon him who aspires to the heights of the surgical art. Each case must carry its lesson, however slight. The work and experience of others should be weighed in the balance.

“And granted that the surgeon has those qualifications which are so necessary to him, what is it that will enable him to further advance the science and art of surgery?

“Primarily it is the ability to profit by the experience of others, and the constant endeavor to add something new, seem it ever so trifling, to the fund of acquired knowledge.”

And again, “And so the true surgeon cannot be too narrow a specialist. Specialism in modern surgery is necessary, but even more necessary is the well-grounded, thorough man who combines with his highly specialized vision openness to facts that lie beyond his immediate horizon, and an ability to interpret them.”

Going back but two years more, we find the same thought underlying the annual oration of 1911, and summed up by Ashhurst in the last paragraph:¹⁴

“To know the wisdom and accomplishments of the past, and from them to gain a clearer vision of the needs and the possibilities of the future; to record and to study the experiences of the present, and compare them with the learning of others; to recognize the shortcomings and the disadvantages of current methods and theories, and to search for better; to let neither feeble health nor prosperity, neither the indolence of youth nor the procrastination of advancing years divert them from the path of learning and of progress; to prove all things and hold fast to that which is good: this is the patience of the saints, this is the patience of surgery.”

I have ventured to presume upon this same topic to-night, because if I had any criticism of these two presentations from which I quote, it would be that they were too masterly, too scholarly, and slid softly and gently over our heads. Most of us are so constituted that the stars of heaven are not seen so clearly as are those stars perceived after

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a blow on the head with an ax. My hope is that I may have brought close home to you, who are the teachers of surgery, though you may not have the title of professor, the truth of our text—"Whatever experience a surgeon may have, if he have not the knowledge which ought to direct him in his operations, he will work in the dark; and if he be not a good theoretician he will never prove an able practitioner."

Coleridge says, "To most men experience is like the stern lights of a ship, which illumine only the track it has passed." Are you leaning over the stern rail, watching the turmoil of the waters raised by the propeller, not knowing whether the propeller is turning forward or backward? Get up on the bridge, steer by the stern lights of the ships that have gone before. From the bridge you can look back over your own track, seeing it perhaps the clearer if not too near. From the bridge alone can you see these stern lights of other ships. Only there can you follow the charted paths; only there can you keep your ship in line of battle.

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