The 24th John P. McGovern Award Lecture

Is Scholarship Declining in Medical Education?

by

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Delivered April 21, 2009
at the 39th Meeting of the American Osler Society
Cleveland, Ohio

John P. McGovern

JOHN P. McGOVERN AWARD LECTURESHIP

Through the generosity of the John P. McGovern Foundation to the American Osler Society, the John P. McGovern Award Lectureship was established in 1986. The lectureship makes possible an annual presentation of a paper dedicated to the general areas of Sir William Osler's interests in the interface between the humanities and the sciences—in particular, medicine, literature, philosophy, and history. The lectureship is awarded to a leader of wide reputation who is selected by a special committee of the Society and is especially significant in that it also stands as a commemoration of Doctor McGovern's own long-standing interest in and contributions to Osleriana.

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Dr. Patrick A. McKee, George Lynn Cross Professor of Medicine and Laureate Chair of Molecular Medicine, University of Oklahoma Health Science Center, was born in Tulsa, attended University of Tulsa, and graduated from the University of Oklahoma College Of Medicine in 1962. He did his internal medicine residency training at Duke University Medical Center as well as a fellowship year in molecular/cell biology. He served in the U.S. Public Service for two years as a clinical research associate at Framingham Heart Program and then accepted the chief residency in internal medicine at the University of Oklahoma Health Science Center, which was followed by a fellowship in hematology. He returned to Duke University Medical Center in 1969 as a faculty member in the Department of Medicine, eventually achieving the rank of Professor of Medicine. At Duke, he was appointed a Howard Hughes Medical Institute Investigator for nine years and was the founder and first chief of the Division of General Internal Medicine until he left in 1985 to become Professor and Chairman, Department of Medicine, University of Oklahoma Health Science Center. Following ten years in that position, he accepted an endowed chair and moved into a full-time career as a researcher and teacher. His primary research interests have been in structure-function relationships of blood clotting/fibrinolytic proteins, including von Willebrand factor, Factor VIII, fibrinogen/fibrin, plasminogen/plasmin, and more recently, a_2-antiplasmin. He has authored over 100 publications in first-line, peer-reviewed journals. Besides past funding from the Howard Hughes Medical Institute, he has also received research support from NIH, the William K. Warren Foundation, Department of Veteran Affairs, and other state and national agency sources. Dr. McKee has served on several NIH and AHA study sections and committees as well as on boards of NASA, U.S. Pharmacopeia and the Medical Guidelines Expert Committee for Part D coverage by the Committee on Medicaid and Medicare Services. He has been an editorial board member of four prestigious scientific and medical research journals, including a stint as an Associate Editor of Circulation and 10 years on the editorial board of Journal of Biological Chemistry.

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It is with a deep sense of honor and pleasure that I deliver the McGovern Lecture today. The subject I have chosen has increasingly caught my attention as a concern, but my thoughts about scholarship as part of medical education are not without risk for being dismissed as the carping, cynical views of an aging professor preoccupied with past memories. The following three quotes are riveting reminders that relying heavily on the past to critique the present is not a new phenomenon:

> "What a strange coincidence it is that everything changes for the worst during a single lifetime." (Hugo Williams, British poet-journalist, 1942-)
>
> "What has been is what will be, and what has been done is what will be done, and there is nothing new under the sun." (Ecclesiastes 1:9)
>
> "The earth is degenerating these days. Bribery and corruption abound. Children no longer mind their parents. Every man wants to write a book and it is evident that the end of the world is fast approaching." (Assyrian tablet, 2800 B.C.)

Clearly, advancement of medical scholarship is impacted greatly by societal attitudes about academic medical centers (AMCs) and their functions. It still remains undecided in this country if health care is an entitlement, and if so, how it will be carried out. Despite the fact that burgeoning complexities and demands of programs such as Medicare, Medicaid and the myriad of insurance plans consume inordinate time and effort by faculty, participation by AMCs is essential for making up necessary financial support not available from state or private sources. Figures 1 & 2 reflect the increasing dependence on clinical practice income as well as the increasing numbers of full-time faculty necessary to accomplish this.

Albeit not always distinctly enunciated, AMCs are usually viewed

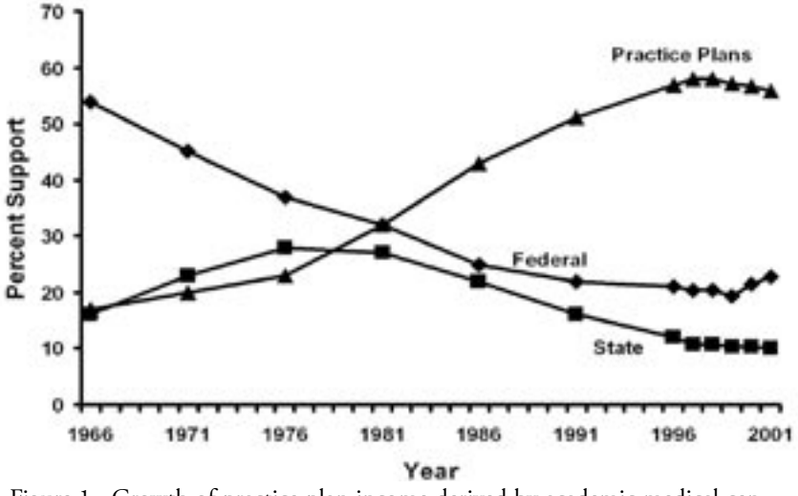

Figure 1. Growth of practice plan income derived by academic medical centers as federal and state support shrinks (AAMC data).

as places expected to serve the medically needy. Shortened hospital stays and requisite faculty documentation for patient care diminish teaching time. Particularly affected by increased clinical activities are faculty, who now have far less time for teaching and academic pursuits as personal and institutional needs for clinical income grow. Simultaneously, with the expectation of increased clinical activities, AMCs are also whipsawed by the "too many, too few physicians" cycles, and current societal/governmental demands are for more. As the number of expensive diagnostic and treatment regimens continue to escalate, so have costs to the health care system, especially if non-recovered as usually occurs in AMCs. Diseases of habit, e.g., obesity, smoking, alcoholism, remain prevalent and present enormous costs to society, especially to AMCs, where reimbursement for their care continues to be grossly inadequate. The belief that funding medical research will cure or at least alleviate the discomforts of disease persists and adds to society's expectations of AMCs. In response to all of the above, AMCs continue to grow enormously in physical size and personnel, and as a consequence, even greater financial needs are generated. Considerations that might benefit academic programs such as bigger is not necessarily better, and how big is big enough, are seem-

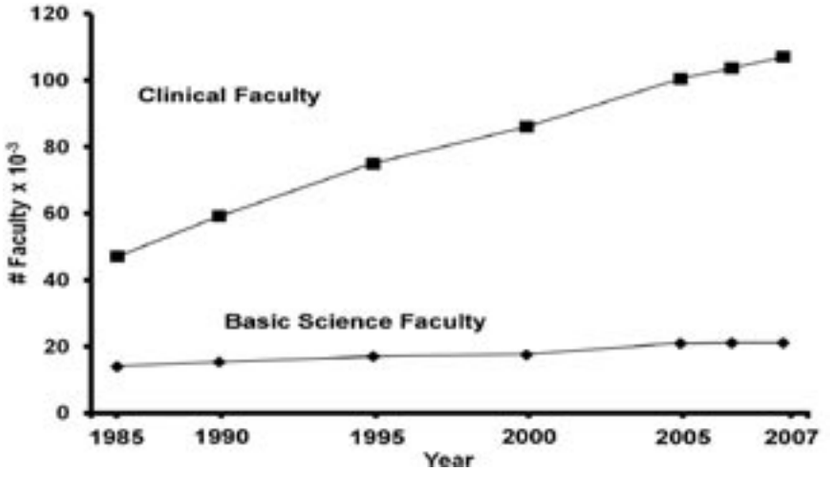

Figure 2. Growth of clinical and basic science faculty in academic medical centers over the years (NIH grant data).

ingly ignored by AMCs. All of these phenomena persist today as the entire country, and particularly medical academia, grapple with the growing reality that resources are finite.

Without doubt there is much more to learn today in medical school and residency than a few decades ago. Scientific progress marches on and new information accrues exponentially. Advantage is taken of this new information, and it eventually results in spawning even greater amounts of basic and clinical scientific data, largely as a consequence of micro-miniaturization of sensitive instrumentation which provides rapid and highly accurate chemical and immunologic analyses. Direct visualization of internal structures of the human body or its component cells can be easily done by laser optics and high resolution radiology imaging techniques. Biotechnology affords a plethora of new pharmacologic and diagnostic agents. The era for attempting to understand brain function, particularly in relation to behavior, is exploding. Necessarily, all of these advances are accompanied by analytic complexities and reconstructions that have created needs for mathematical rigor such that bioinformatics is now an accepted discipline on most campuses. The volume of new and useful knowledge has prompted the development of new medical subject areas now deemed

essential in the education of students and residents. Usually these new knowledge areas are simply crammed into an already overstuffed curriculum. Table 1 offers a list of subjects which frequently find their way into current curricula, and albeit many occur as short-term exposures, they still take students' time and attention.

Table 1: The Ever Expanding Curriculum

Alternative medicine	Systems-based medicine
Office management	Ethics
Humanities	Women's issues
Child abuse	Bioterrorism
Practice-based learning	Managed care/HMO
Domestic violence	End of life/palliative care
Homecare	Hospice care

It is disconcerting that many academic decision-makers seem to actually believe that students must be knowledgeable in all such areas to be a complete physician, suggesting that their own words and confidence about learning information when needed, i.e., "just in time learning" (1), as should occur in a lifetime of learning, may only be platitudinous.

The attention focused on memorization, and not actual problem solving, is exemplified by the great concerns most medical schools have about student performance on the United States Medical Licensing Examination, which mostly tests recall and to a certain extent, comprehension of facts. Similarly, the ability to recall and understand facts is the mainstay of the American Board of Internal Medicine (ABIM) examination (2). The level of success with this examination is typically considered a quality benchmark of a medicine department's educational activities and commonly used for attracting students into its residency program. Overemphasis on board examination performances, whether during medical school or after residency, serves well the perception of students and residents of needing to spend significant amounts of time memorizing and recalling facts. Figure 3 shows

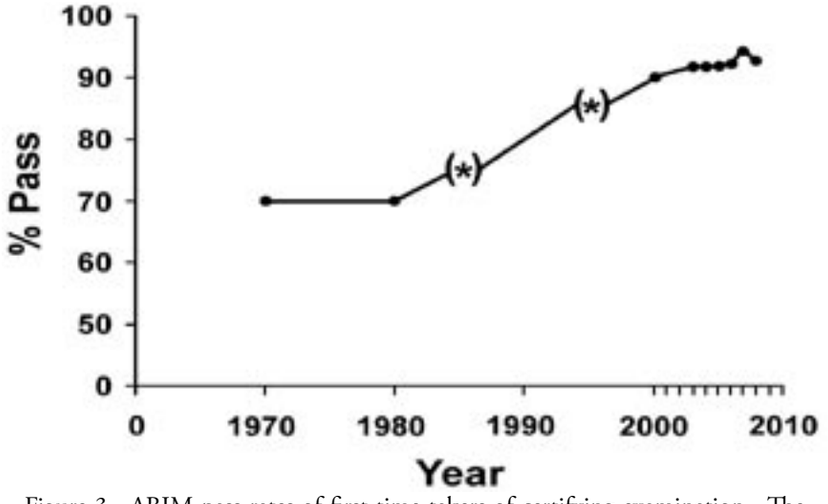

Figure 3. ABIM pass rates of first-time takers of certifying examination. The asterisks indicate an estimated average for that period as exact annual percentages could not be obtained. Filled circles are precise passing percentages for first time takers of the certifying examination. (Data provided by ABIM).

that those taking the ABIM examination are able to do this well.

Over about the past eight years, more than 90% of first-time takers have passed, suggesting that candidates have been exposed to a level of information that virtually all can master; however, the test clearly does not distinguish exceptional abilities for doing so. The value of the ABIM exam for estimating the quality of a physician's ability to engage in useful thinking for developing effective care of patients is said to be limited at best, and the ABIM makes no such claim that the test bears on this latter issue (2). Interestingly, pass rates on ABIM recertifying examinations (taken after an interval of 10 years) tend to fall significantly, probably due to the reduced exposure of practicing physicians to uncommon medical problems as well as to less formal teaching than what occurred in residency. Simply put, examinations such as the USMLE and ABIM that focus on memory recall and convergent thinking are poor indicators of whether the taker has learned to integrate and use medical knowledge effectively and wisely to solve patients' problems.

After succeeding with the ABIM exam, many now "boarded"

internists become members of the American College of Physicians (ACP) and elect to pursue fellowship status, giving them the distinction and privilege of having FACP behind their names. Table 2 shows the general, guiding principles, one being the expectation of scholarship, for this undertaking (3-7).

Table 2: Guidelines For ACP Fellowship

Personal integrity
Superior competence
Professional accomplishment
Scholarship

Interestingly, at one time this recognition reflected a level of scholarship achievement that was clearly a rung higher than ACP membership only. Table 3 indicates criteria used before 1989.

Table 3: Requirements For ACP Fellowship

1975-88

Written materials
Multiple certifications
Significant teaching
Scholarly presentations at scientific mtgs
Participation in CME
Hospital activities

1989—Present

Pathway 1—published articles
Pathway 2—multiple certifications &/or degrees
Pathway 3—active ACP member ≥ 2-5yrs
Pathway 4—distinguished teaching, pt.care, prof. service

Clearly stated are scholarship requirements similar to those suggested by Lindstrom (8) as will be discussed later. Table 3 also shows guidelines for becoming an FACP since 1989. The apparent dilution now allows virtually all with ABIM certification to easily achieve FACP status if they so desire. No longer is evidence of scholarship requisite. Hence, it seems that many current test results and guidelines considered to reflect medical knowledge during and after medical

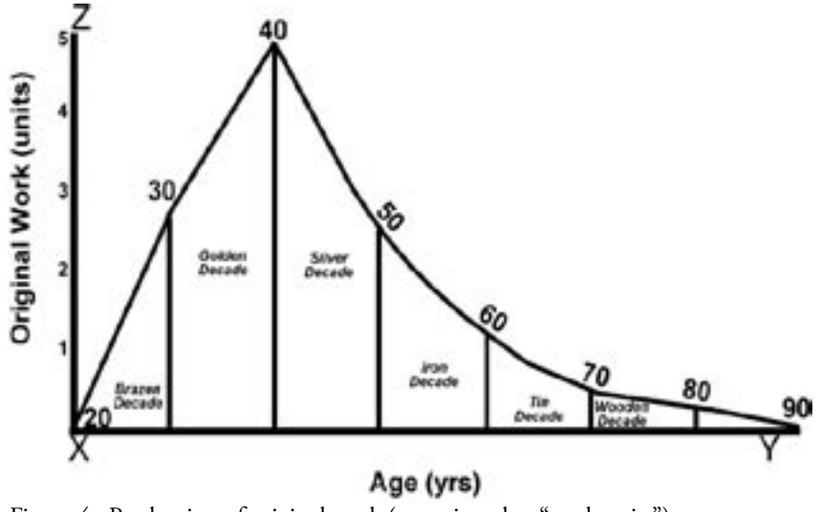

Figure 4. Production of original work (quantitated as "work units"), no matter what type, by so-called "brain workers" versus age (12).

school have little or nothing to do with estimating useful, creative or scholarly thinking and may now mirror the prediction of Gilbert & Sullivan in *The Gondoliers*: "When everyone is somebodee, then no one's anybody!"

During medical school, residency or fellowship, sufficient, concentrated time is seldom available for meaningful inquiry and investigation, although a few do manage to present this option (9-11; & Table 8). Many departments regularly indicate a lack of funds for supporting such endeavors. Moreover, as competition tightens for governmental and private funding, support for serious scholarship during residency and fellowship is becoming less and less available. Given that physician trainees tend to be older than a decade or so ago, those in whom scholarship should be fostered when early in their careers are now not so early. As a rule rather than an exception, students and residents carry substantial educational debt and may also be saddled with family responsibilities. The steady trend for subspecialty fellowship training to become longer only accentuates existing time constraints for inquiry and study. Finally, opportunities for enriching one's knowledge by committing to a concentrated period of self-learning can be

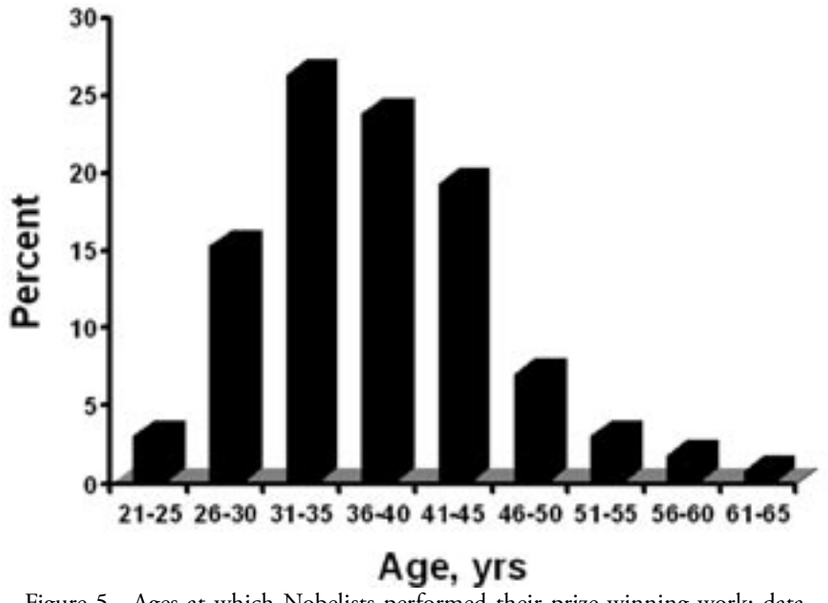

Figure 5. Ages at which Nobelists performed their prize winning work; data shown modified from Stephan and Levin (13).

diminished even further if "moonlighting" is taken on as an option or necessity.

Well-documented analyses as early as 1881 indicate the inverse effects of age on creative thinking (12). Scant attention has been given to the possible dampening effects of age on trainees' enthusiasm and energy for becoming disciplined in creative thinking. As shown in Figure 3, the noted neurologist George M. Beard established that one's highest quality original and creative work, whether scientific, literary or cultural, occurs between 30 to 45 years of age, usually cresting around age 39, after which it declines fairly steeply.

Using a slightly different approach some 130 years later, Stephan and Levin (13) published similar data showing that the majority of Nobelists performed their prize-winning work within the same span of 30-45 years of age (Figure 5).

Given the advice and admonitions which medical students and residents hear about the importance of scholarship, just exactly how might one prepare for becoming engaged in scholarly activities dur-

ing medical school? While commonly used in academic parlance, the terms "scholarship" and "scholarly activities" are not always accompanied with a clear, uniform notion about what the process entails. Hence, it would be helpful to examine the elements of scholarship and along the way, assess the groundwork, exposures, and experiences of students and trainees that might be used to actually initiate and fulfill expectations for "learning how to learn" and engaging in scholarship. Unarguably, factual knowledge, curiosity, and creativity form the platform for pursuit of scholarship, and it is probably worthwhile to discuss these aspects first.

Factual Knowledge

Exposure to facts and committing them to memory is requisite for initiating and expanding learning in a particular knowledge domain. The ability to think and address questions in that knowledge domain requires a distillation of facts into bits of information that can be combined and assembled into patterns helpful for understanding a specific subject or solving a problem (14-16). Students regularly take tests at virtually every level of education to estimate their ability to recall facts, this usually being done in a convergent fashion, meaning questions will have a single answer, even when presented as problem-based. The examinations typically do not test how to assemble recalled information in useful patterns to solve problems, i.e., to think. In the process of evaluating students' knowledge, the "forgetting curve" is forgotten. For example, students typically can "cram" large amounts of information into their memories a few days before an examination and perform well. But if tested again within days on the same information, and without another period for "cramming," they will recall significantly less information. Memory and forgetting are directly related to the frequency of recall and review of information, and even the timing and spacing of such reviews are critical for maximizing remembering (17).

Taking time to accomplish at least four reviews within a 30-day period for each hour of lecture may seem relatively doable until one considers the amount of new information that medical students are bombarded with daily. But unless repeated reviews occur, or the

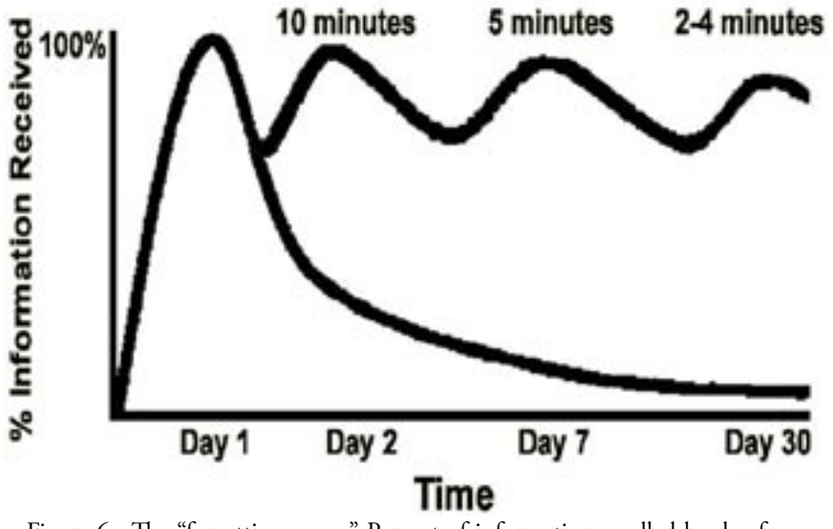

Figure 6. The "forgetting curve." Percent of information recalled by day from single exposure and without any interval review (17). The top curve shows the amount retained if short, regularly conducted reviews occur.

new information is made relational to people (e.g., patients), actions, events, or visual imagery, the downward leg of the curve does not shift to the right, and as shown in Figure 6, only about 2-3% of information taught 30 days previously will be remembered. While learners in virtually all fields are advised to find ways that serve them most effectively for recalling information, the first principle of learning, i.e., repetition, and ideally, its amplification through association with a memorable circumstance, forms the linchpin for effective learning. As Ralph Waldo Emerson (1803-1882) put it: "There are no days in life so memorable as those which vibrated to some stroke of the imagination," but also worth noting is the complementary observation of the French philosopher, Joseph L. Joubert (1754-1824) who emphasized the criticality of sufficient factual knowledge to initiate productive learning when he noted: "He who has imagination, but no knowledge, has wings, but no feet."

Hence, particularly for educating medical students and trainees, a learning environment should possess attributes that maximize the ability to use both remembered and newly acquired knowledge efficiently

for generating useful thought, and ultimately, understanding. As Osler so carefully emphasized for learning medicine, this is best done through frequent direct contact with living, breathing patients in all their stages of illness. When details of a patient's illness and aspects of the patient's life impacting that illness are collected and combined with applicable medical knowledge, learning begins and grows towards an understanding of the patient. Moreover, with mentoring by a physician-teacher, the stage is set for advanced learning as additional necessary facts and information, not immediately recalled, or unknown to both student and teacher, are gathered from other sources, discussed together, and applied to the patient's care. A multiplicity of such experiences essentially "fixes" newly acquired knowledge and understanding in students' and residents' minds. Then, as future patients are encountered, recall of some of these same facts and experiences further reinforce this entire process. It is in this manner that students and residents "learn how to learn" as these repetitive occurrences significantly add to their knowledge base and ability to think productively. Disconcerting in today's medical teaching environments are the lessened one-on-one student and house staff hands-on, face-to-face experiences with patients, particularly with an experienced, thoughtful attending physician. Despite most physician teachers agreeing with Osler's dictum that patients are the cohesive element for learning medicine, most time spent in clinical teaching interactions now occurs sans patient. An example of anti-Oslerian learning forces in today's academic world is the preoccupation and emphasis on learning to move patients "through the system." Often this seems to have trumped the importance of learning how to care for the patient, i.e., to know the patient, make correct diagnoses, order appropriate diagnostic studies, use proper therapies, and arrange the right follow-up. A not uncommon occurrence is that of "group work-ups," meaning a different component part of a patient's history and physical exam is performed by a specified member of a house staff/student ward group, usually while the patient is still in the E.R., perhaps waiting for an x-ray, laboratory studies, or a bed to open. These "consensus" work-ups are then followed by working out logistics for obtaining lab, x-ray, and consultations, with the aim being to discharge the patient as soon as possible. The preoccupation with "process" is time- and energy-consuming and diminishes the likelihood of substantive learning experiences becoming stamped into the memory of a learner. Interest in a patient's life, i.e., his or her attainments, expectations, day-to-day concerns and spirituality rarely exceeds the mere listing of smoking, alcohol and illegal drug use. On my last rotations as an attending, it was common for students and house officers to not own an ophthalmoscope, sphygmomanometer, and other common "tools of the trade;" only two carried reflex hammers. PDAs and cell phones, they did own. Automated BP readings from the nurses' notes often served as initial values on student and resident physical exams. To my dismay, during the preceding month's medicine rotation at another hospital, only one team member had performed a rectal examination and only two a funduscopic exam; none had ever dilated a pupil. My observations and concerns about clinical skills are not unique (18) and are also in keeping with those communicated to me personally by two outstanding faculty colleagues at well-known Midwest and West Coast university medical centers. How might I ask is proficiency in talking with patients and conducting adequate physical examinations to be learned without numerous repetitions? Might such a necessity be analogized to that of a quarterback needing to take literally hundreds of "snaps" from his center during spring and fall practices to achieve mastery of his team's offense?

Curiosity

If one is to use and expand factual information in a particular knowledge domain, then nurturing and advancing curiosity as an adjunct to the process becomes essential for eventually promoting effective, creative thought. It is said that all animals are curious and that this is an innate characteristic which differs from instinct, the latter being more or less fixed in outcome. Curiosity seeks information that interdigitates with one's current level of facts, and which over time, complements and enhances those facts in ways that expand knowledge. Curiosity not only identifies applicable facts that might lead to understanding, but also helps identify clues for how those facts can be placed into patterns for understanding. For example, it is not only necessary to learn about a patient's illness, but equally critical is to

know about the patient's handling of illness, as so beautifully stated by Fitzgerald (19) in her essay on "Curiosity":

> ". . . it is curiosity that converts strangers into people we can empathize with.
>
> To participate in the feelings and ideas of one's patients—to empathize—one must be curious enough to know the patients: their characters, cultures, spiritual and physical responses, hopes, tasks, and social surrounds. "

Hence, in its simplest form, curiosity is the desire to understand, and although occasionally disputed by a minority, it is generally accepted as an inborn attribute of being human. Clearly in dealing with patients, teachers can stimulate curiosity in students, but must recognize that barriers do exist, such as a student's fear about not knowing; a lack of confidence; presence of apathy; or a tendency towards avoidance—not infrequently due to intellectual inertia or inconvenience. If successful in promoting the development of a nascent curiosity, students and residents soon exploit its use as they become challenged by more and more patient experiences and recognize their need for greater knowledge.

Accepting that curiosity and creativity are inextricably linked, and that creative productivity trends downward with aging, curiosity, albeit difficult to measure, might be predicted to decrease as one grows older, and evidence seems to support that it does (20,21). As an aside, however, continuing exercise of one's curiosity predicts a higher retention of cognitive abilities and longevity (22).

Creativity

Given an adequate level of factual information (usually assumed that more is better) and a responding curiosity, then original ideas or thoughts may develop for assembling knowledge into fresh ideas that advance understanding (23-25). Whether all persons possess creativity remains uncertain, given that creativity cannot be clearly defined nor reliably predicted by testing (26). Objective criteria for scoring responses on so called creativity tests have never been established, and even tests that modestly correlate with each other do not accurately

predict the presence of a creative mind. Interestingly, speed at solving problems on tests is likewise not a benchmark of creativity. In general, we are left with defining creativity as searching for and discovering new solutions to problems or developing new expressions of visual, auditory or emotional sensation.

Even when creativity is clearly present, it remains unknown whether it can be grown or enhanced by experience. There is agreement that IQ plays a role in creativity, but only at relatively low IQ levels does there seem to be a correlation for diminished creative abilities, probably due to decreased cognitive capacity. The range of relatively average to high IQ shows poor correlation with creativity. For example, beyond an IQ of about 120, there appears to be no correlation as to whether creativity develops, perhaps explaining why some valedictorians are not necessarily apt at producing original thought. It does seem that an environment which encourages or discourages early novel thinking is far more important for predicting whether the fire of creativity becomes lit within an individual. The fact that the standard IQ test measures mostly convergent thinking, i.e., the ability to come up with an, answer, instead of divergent (or "lateral") thinking, which draws on a variety of new and unusual approaches that may provide several possible solutions or art forms, may explain why IQ lacks correlation with degree of creativity. Biographical studies of those successful in producing original creative works, indicate that they possess the required, thorough knowledge in the domain in which they work, and in addition, have the ability to understand specific strategies for how to use that knowledge. Creativity is probably not a general process, but instead results when high competency and knowledge synergize with curiosity to motivate a desire and willingness to commit long-term to the pursuit of a question or idea. Being creative in one domain does not guarantee creativity in another, although some believe that an expansive factual knowledge combined with a passionate curiosity may provide the rare individual sufficient mastery over different areas, so that creativity might then occur in more than one.

Important to mention is that creativity seems to have two levels, namely: exceptional creativity and everyday creativity (27). The former might be manifest by artists, successful composers, architects, engi-

neers, scientists, etc. Most of these persons tend to break free from the acceptance of traditional or standard beliefs to explore diverse combinations of ideas that are often random and unconstrained by past experiences as they consider wider ranges of actions and possibilities. The second level, or "everyday creativity," is used to characterize those persons capable of recognizing promising options that lead to novel insights about commonly encountered events, activities and problems.

If placed in the context of scholarship, then it might be said that (i) a broad factual information base in a particular domain; (ii) a curiosity for becoming passionately involved in learning more about that domain; and (iii) a willingness to explore and contribute novel solutions to problems, or sensorially important expressions in that domain, form the basis of scholarship. As alluded to earlier, what comprises scholarship is often not clearly conceptualized and can pose problems, perhaps most commonly in the evaluation of faculty for tenure conferral. Even aside from this utility, however, there seems to be little in the way of a universal definition of scholarship. Over the past several years, this subject has been reviewed in some detail by representatives from a number of universities with accompanying discussions of their experiences and opinions about what constitutes scholarship (28, 29).

Scholarship

In general, most agree that scholarship means expanding knowledge by study and research in a particular area that ultimately equates with one of the following: (1) discovery of new knowledge; (2) integration of existing knowledge to provide new insights or understanding; (3) development of new methods and approaches to specific activities; or (4) contribution of new expressions within artistic disciplines. The suggestions of Boyer and Glassick (29) some 20 years ago are considered by many as the most definitive and useful. In short, they described four types of scholarship as shown in Table 4:

Table 4: Types of Scholarship

Discovery
Integration
Application
Teaching

Table 5 lists descriptors suggested by Lindstrom (8) for what should compose scholarship:

Table 5: Ingredients of Scholarship

Obvious curiosity and intent to better understand an unknown area or topic
Has sufficient knowledge and experience to explore the subject area
Topic or idea is worth studying
Hypothesis or idea needs answering
Overall effort must be documented, analyzed, presented and written
Must pass evaluation and validation by peer review

Table 6 shows activities not considered to be scholarship as slightly modified from Lindstrom (8):

Table 6: Non-Scholarship Activities

"Keeping up with the field"
Meritorious social or civic duties
Carrying heavy teaching loads
Substituting published abstracts and short presentations for full papers
Presentations to non-peer audiences
Outstanding administrative accomplishments and job dedication
Developing a clinical practice
Teaching, if simply as an "information transfer agent"
Literature or drug reviews that are not peer reviewed
Photocopying and providing handouts of tables, charts and other persons' papers
"Working hard and trying to do several things", i.e., combinations of above

Certainly, "gray" areas exist as listed in Table 7, and these require careful consideration on an individual basis as to whether they actually represent scholarship.

Table 7:
Activities in the "Gray-Zone" of What's Scholarship

Creative works—bulletins, videos, computer programs, manuals, websites
Program development with outcome metrics
Leadership of program(s)
Invitations to be on public/private panels & symposia due to unique expertise
Patents & start-up companies
Significant workshop and continuing education conferences

While some of the forgoing definitions and guidelines have been used by university and medical school promotion and tenure committees, they are not always applied systematically and with a stringency that is necessarily measurable and defensible. Widely differing views continue among academicians about what constitutes scholarship, and in the process, its meaning seems to have become diluted within medical schools and medical organizations. Seldom noted is how this vagueness is perceived and translated by students, house staff and young faculty as they are encouraged to engage in scholarly activities.

So, in medical school or residency, how does scholarship begin? What is its embryonic form? If it is agreed that adequate factual information must be linked with a well-cultivated curiosity to inspire creative, novel thinking in the care of patients, then the very namesake of this society may have provided the keystone for initiating the process of scholarship in medical students. In perhaps his most memorable quote, Osler emphasized the criticality of patients for students to learn that which books can never teach. Even Peabody's dictum, "…the secret of the care of the patient is in caring for the patient" (30), would seem impossible to follow in its fullest form without including recurrent, substantial encounters with patients that augment understanding, and in the process, empathy. Similar observations and reasoning have likewise been espoused by a number of widely recognized and highly influential, physician educators and teaching virtuosos [for me personally: Drs. Stewart G. Wolf (31, 32) and Eugene A. Stead (33, 34)]. They clearly subscribed to the notion that patients are the alpha and omega for learning medicine. They taught students and residents through intense mentoring relationships and shared concerns for patients. Real-time learning occurred that

centered on real patients—not simulated or standardized (35)—with real illnesses and real problems in dealing with their illnesses. Teaching included formal and informal discussions of a patient's illness, requisite diagnostic and therapeutic interventions, and follow-up. Virtually all of these interactions occurred at bedside with the patient present, and not in a ward office or clinic conference room while gazing at diagnostic and laboratory results on a computer screen. Bedside interactions allowed expansion of selected features of the patient's history; demonstration of physical examination findings; and education of the patient about his or her illness (36, 37). Perhaps the most compelling benefit to students and residents was directly observing how an experienced physician interacts with a patient. None of these professors proffered lessons on techniques or mechanics for undertaking a "lifetime of learning." To them, a continuum of experiences with large arrays of sick patients ensured that learning could only escalate for the conscientious student or resident who possessed a hard-wired factual knowledge base and could be prompted toward developing an active curiosity. Then "everyday creativity" would follow and predictably catalyze useful patterns of thought for managing a patient's illness. In these professors' minds, repetition of this process with many patients would inescapably lead to mastery, and through it, the seeds of scholarship would also be sown.

However, an even more rigorous pursuit of scholarship for students was also advocated by Osler (38). In 1917, as the featured lecturer at Harvard on the occasion of the John Harvard Scholarship Awards, he laid down guidelines that strikingly parallel those from the previously mentioned recent symposium on this subject. Table 8 summarizes the elements that Osler defined for scholarship. It seems that like many current academicians, he too was concerned about the length of time students spent in formal lectures in universities and medical schools. Even in 1917, Osler thought the curriculum was overstuffed and contained too many required courses. He advocated combining teaching with experiences that promoted skepticism, inquiry and investigation.

Table 8: Osler's Elements of Scholarship

Same for historian, philologist, lawyer, physician, etc.
Classics, languages, mathematics & natural sciences
Shorten time spent in university
Relax overcrowded curriculum & required courses
Relax graded class system
Teach methods to prove assertions
Stimulate a love of inquiry and investigation
Travel to include medical meetings
A year or more of original research after internship
Become known
Cultivate recreative interests

Notably, he recommended that one to two years of original research was important, and as young scholars developed, he thought that they should try to become known, presumably implying by publication of their work. Travel to medical meetings was recommended, where presentation of research results might help a budding scholar to become welcomed in informal exchanges with other scholars. In today's medical centers, despite belief that the doors of scholarship are widely open, anti-scholarship factors do exist. Academic leaders frequently do not "stay on message" regarding their publicized positions about the importance of scholarship and what exactly signifies scholarship. Some continue timid about whether independent, self-defined and well-documented inquiry should receive unmodified academic credit within traditional grading schemes. Often little concern is exhibited for protecting residents' time for a period of inquiry, and importantly, ensuring that quality research experiences really occur. Students are rarely exposed to "hands-on" laboratory experiences in any of their courses, and as already pointed out, sufficient time, and formal pathways for inquiry and investigation are commonly not available. To be clear, comments here are not intended for M.D.-Ph.D. programs that are purposefully constructed to meet expectations of scholarship; unfortunately, however, the time required for obtaining both degrees, and then subspecialty training, can delay the start of independent careers to an age that is predictive of short-lived originality and productivity.

The current preoccupation of many medical centers with the tech-

nology of teaching and the technology of practice adds to distractions for developing formal tracks that approximate and allow scholarship for students and house staff. Recently, an insufficiency of mentors with time and willingness was singled out as a serious barrier to residents who wished to study an area in depth (39). Likewise, AMCs seem constantly committed to physical and programmatic expansion, and have now added to their platters the relatively new thrust of promoting commercialization of scientific findings by faculty researchers. Albeit not necessarily related, such preoccupations do diminish time and attention of academic leaders for developing novel and useful curricula that attract and encourage student and trainee participation in scholarship. Although rarely considered, "campus sprawl" in some instances acts to separate and partition faculty in ways that lessen spontaneous and informal interactions among students, house staff and faculty. As a consequence, opportunities are lost for spontaneous discussions of provocative ideas and their potential study.

Is there a place for the Oslerian tradition of learning on one's own, for having time to think and reflect on how to solve an unknown, or to clarify and expand prior observations—in other words, to participate in scholarship? This would seem an important inclusive in a medical school's curriculum, and a few medical centers have established such (9, 39). Individual student participation in serious inquiry is central to any other doctoral pursuit. But such a recommendation does present problems to the long-standing traditions of many medical schools.. Processing large numbers of students through formal periods of scholarship is formidable, but not impossible. Overly regimented curriculum guardians will fear that students won't learn enough and that testing and grading will run amuck and become more difficult. Current prescriptive regimens would probably diminish in detail, and non-uniform guidelines and expectations could end up mostly in the province of mentors. The origins of scholarship would be best referenced to patients, and a return to Osler's advice should be helpful. A roadmap for undiluted, formalized scholarship could be established to include pathways of scholarship within all the broad knowledge domains available in any AMC. Selection of a pathway should be required in the educational journey of every medical student, if for

no other reason than it represents the most effective and canonical mode for becoming proficient in learning on one's own. Time for this activity can be garnered within the curriculum by moving ahead with electronic methods for accessing the elements of basic medical knowledge, since presently in most medical schools, shockingly low class attendance already provides evidence that students have mastered this technique for memorizing and understanding factual information. Computer testing to regularly evaluate a student's ability to recall and comprehend facts can be easily designed, thereby allowing students to sit for examinations whenever they feel ready. Fundamentally, what's being suggested is to couple a "correspondence course" approach that teaches and tests factual knowledge with regularly mentored live, real patient encounters for teaching students how to think about sick people. Ultimately, these experiences would be capped by inquiry and investigation of a biomedical problem by each student, again under guidance of a mentor, and that experience would be described and communicated in oral and written form. Indeed, just as has now been adopted by at least nine medical schools (Table 9), a thesis requirement for graduation is suggested here as the best, most intense, and most fulfilling method for experiencing self-learning and scholarship (11).

Table 9: Thesis Required For Graduation

Medical School	
Albert Einstein	Duke Univ
GW Univ	Mayo
Robert Wood Johnson	UCSD
Univ New Mexico	Univ Washington
Yale Univ	

How to engage in scholarly learning and how scholarship augments useful thinking about patients would become indelibly engraved in the minds of future physicians. My only evidence that such an approach yields benefits stems from hearing the reflections of several great and wise professors. They independently agreed that they could easily

identify those students and house staff who had sailed an uncharted course on a sea of medical unknowns and who had contributed in even some small way to new knowledge. Those who had done so were judged to know more, to know how to use what they did know, to know when they didn't know, and to know how to find answers. They were usually considered more thoughtful in integrating illness with the humanity of a patient, more careful in the management of patients, and more mature in their judgment than those not having such an experience. Could it be that Osler's views on educating doctors how to think might again be telling us something?

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