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Sherman M. Mellinkoff, M.D.  
Dean

Roger Sperry

UCLA School of Medicine  
Center for the Health Sciences  
Los Angeles, California 90024

# Two hemispheres and the medical connection

Sherman M. Mellinkoff, M.D.

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*Dr. Mellinkoff (ΑΩΑ, Stanford University, 1944) is dean and professor of medicine at the UCLA Medical School. He is also president of Alpha Omega Alpha. This paper was based on the J. Englebert Dunphy Lecture at the University of California, San Francisco Medical Center, delivered by Dr. Mellinkoff in November, 1983.*

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Roger Sperry, in accepting the Nobel Prize he shared with David Hubel and Torsten Wiesel in 1981, describes "Some Effects of Disconnecting the Cerebral Hemispheres."<sup>1</sup> Sperry and his colleagues revealed the great part in thinking played by the half of the brain that cannot express itself in words or numbers and that was so long and so mistakenly thought to be of little value. Sperry suggests:

The whole world of inner experience (the world of the humanities), long rejected by 20th-century scientific materialism, thus becomes recognized and included within the domain of science. . . .

. . . Where there used to be conflict and an irreconcilable chasm between scientific and the traditional humanistic views of man and the world, we now perceive a continuum. A unifying new interpretive framework emerges with far-reaching impact not only for science but for those ultimate value-belief guidelines by which mankind has tried to live and find meaning.

In referring to the "chasm between scientific and . . . humanistic views," Sperry is, of course, pointing to an old problem, the one C. P. Snow discussed in *The Two Cultures and the Scientific Revolution*.<sup>2</sup>

The great medieval scholar, Lynn White, identifies origins of "the two cultures" with intellectual currents of European universities in the fourteenth century.<sup>3</sup> At that time the limited curriculum consisted of seven subjects divided categorically into

two parts, the "quadrivium" and the "trivium." The four courses of the quadrivium were arithmetic, astronomy, geometry, and music. These were the primordia of science; music was included because it was in this context the study of acoustical relationships. The three courses of the trivium were rhetoric, logic, and grammar. The quantitative subjects of the quadrivium burgeoned and became enormously productive, but progress in the less quantifiable material of the trivium gave rise to the modern meaning of the word *trivial*. Thus were "the two cultures" divided in the Renaissance and, increasingly, in the contemporary world.

Science generated enormous material riches as well as a vastly greater understanding of nature. The humanities, in contrast, were perceived as trivial, although what could be of greater importance to human life than such unscientific concepts as love, beauty, truth, courage, justice, mercy, and honor?

Sperry has brilliantly illuminated the functions of the right side of the brain, where in right-handed people the capacity for speech and writing do not reside, but the recognition of facial expressions does. His great work points to the complementary interdependence of the two sides of the brain. Whether these revolutionary discoveries will help to bridge "the two cultures," as Sperry, and perhaps all of us, might hope, or whether these great advances in neurophysiology and psychology will enrich both "cultures" but not necessarily bring the two together, I lack both the knowledge and the wisdom to say.

Nevertheless, I am deeply moved by the visions of Sperry, Snow, and White, because they have, I think, a powerful relevance to the daily work of physicians and, therefore, to their education. Nothing could be clearer than the huge and still accelerating contributions of science to the practice of medicine. Striking differences in therapy in nearly every branch of medicine and the proliferation of diagnostic precision in-

struments have surrounded our own professional lives.

Yet there remains another side of the practice of medicine that is less scientific and more difficult to explain. In part because it is more difficult to explain, it is also more difficult to test, to identify, or to nurture in the curriculum. Even to say what it is is difficult. It has been variously called the human side of medicine, clinical skill, "sagacious empiricism" (Abraham Flexner)<sup>4</sup> or, quite simply, in Hippocratic terms, "the art."<sup>5</sup> The inadequacy of these terms, and many others often used, may be reflected by the diverse feelings they evoke.

To some university review committees the statement that an assistant professor is good at the art of medicine may be the kiss of academic death. To some reviewers "excellent clinician" could translate into such notions as unscientific, unscholarly, mediocre or, simply, not up to university standards.

To a classics professor, the comment that this same assistant professor excels in the human side of medicine might suggest that he is not altogether ignorant of history, that he is sure Gustave Flaubert was not a shortstop for the New York Yankees, or that there is a slim possibility that the doctor, so long confined to laboratories and wards, may once have studied Latin or even Greek.

Patients usually recognize the qualities of "the art." They feel that "the good physician" has understood them and has helped them as much as possible. We must admit, however, that some patients will resent some excellent physicians (a matter of chemistry or personality clash) and that some doctors, even while practicing bad medicine, through ignorance, or through temperamental incapacity to recognize their own limits, or through lack of conscience, will nevertheless come across to some patients as charismatic paragons.

Often the most reliable recognition of excellence in the human side of medicine comes from physicians as they perceive one another directly

or through the eyes of patients. Perhaps this is a natural and gross manifestation of Sperry's linkage of the interactions of the two sides of the brain. A good physician will have gleaned from such sciences as physiology and biological chemistry and from his own experiences a sufficient appreciation of the relevant principles to be able to appraise a colleague's judgment and skill in applying scientific knowledge to specific human situations.

Here it is important to note that the human side of medicine includes but is by no means confined to integrity and compassion. Obviously, a doctor might possess great knowledge but still not be able to help his patients, simply because he does not care what happens to them. This point was well made in 1926 by Francis Peabody: "The secret of the care of the patient is in caring for the patient";<sup>6</sup> but there is another aspect of the human side of medicine, often, I suspect, associated with caring, that has to do with a kind of understanding that must at least involve the mute, agraphic hemisphere that recognizes facial expressions.

Some years ago a very bright engineer interested in developing the computer as a diagnostic aid asked me, "If I told you I had a patient in the emergency room complaining of abdominal pain, and you could ask only one question to guess the nature of the illness, what would you say?"

"Does the patient look sick?" I replied. The engineer smiled sadly.

"I was afraid you would say that," he complained good naturedly. "That's the same thing all the other doctors I asked replied. I was hoping it might be something we could put into a computer."

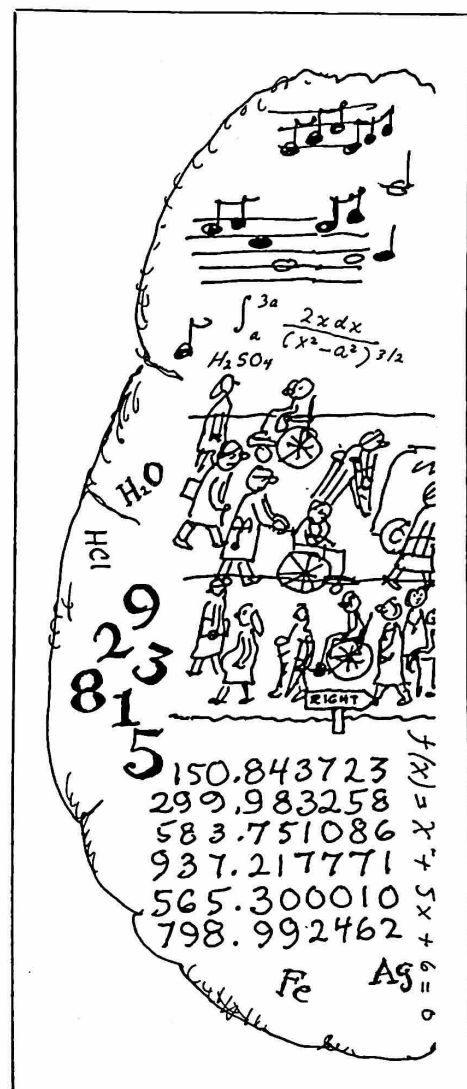
Whether a patient "looks sick" or not is of course difficult to describe mathematically. Computers do not recognize facial expressions. Sometimes it is even difficult to describe verbally what is clear from a glance at a human face. The Hippocratic facies are readily seen and described, but it might require a truly great writer to differentiate in words

what every good doctor has learned to see with fair reliability, for example, differences in the facial expressions of patients with acute infections and those with a mechanical cause of pain, like a ureteral stone, or those with a complaint of pain generated by some emotional predicament.

I am indebted to William P. Longmire for calling to my attention an article by Nicholas J. Odom in the *Annals of the Royal College of Surgeons*.<sup>7</sup> Mr. Odom describes "a characteristic expression which can be elicited by gentle pressure over the [inflamed] appendix." The expression reflects a mixture of pain and nausea. Mr. Odom, unable to record the expression by photographing a patient, is shown trying to imitate the expression. I believe I recognize from memory what his face is trying to say.

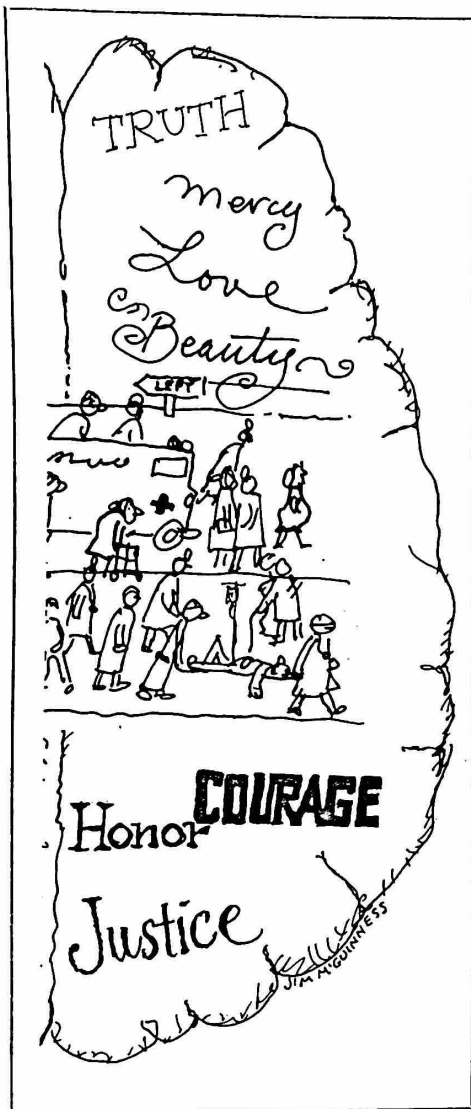
This ability to see in a patient's face some clues to understanding both the patient and the illness, and adumbration of that understanding with the appropriate questions, with timely withholding of questions in order to listen more effectively, and the doctor's whole attitude toward the patient, as will surely be reflected in the doctor's own facial expression, his manner, and his speech — all of these seem to me to be a part of the human side of medicine, a part that is often critically important in both diagnosis and treatment. Without the contributions of both sides of the brain, of the whole person, as it were, a physician is apt to generate greater expenses, more adverse drug reactions, more lawsuits, and fewer benefits to patients. Not surprisingly, he may also find less to laugh about. No wonder the life of J. Englebert Dunphy, a great physician, was so rich with laughter!<sup>8</sup>

In what ways can a medical school nurture the human side of medicine? It seems to me that aptitude for the scientific side of medicine is much easier to identify than is aptitude for the human side of medicine. While both sides are of surpassing impor-



tance — the "humanities" in this sense are quite the opposite of "trivial"! — the most deliberate and energetic efforts to develop the "human side" of our students are far less likely to succeed than are the unstructured interactions among patients, students, and teachers — uncluttered by lectures, "cold dope sessions," computerized tapes, and handouts.

Much of the aptitude for the human side of medicine must be the product of genes and early environment. Certainly, one who in his twentieth year can no more tell right from wrong than can a color-blind man tell green from red is not going to be able to learn to care for patients. I refer here not to fine debatable points in medical ethics, such as the definition of death, but rather to universal



qualities of human decency. These are described in such words as *honesty* and *mercy*, and they are often more clearly recognized as being absent in others than they are in ourselves, especially when the phone is ringing in the middle of the night.

Of course, these are qualities that everyone *should* have, that perhaps no one apart from saints has *all* the time, and that all people we call normal have *some* of the time. Doctors, however, need these qualities in special measure. In addition to what might be called honesty and mercy in, say, an engineer building a bridge, the doctor must have skills of interpersonal communication that are best described by remembering clinicians who had these skills and

others who did not. Some who are absolutely honest and merciful to a degree quite satisfactory for a banker or a prosecuting attorney might still lack a certain combination of tenderness and understanding that marks the effective physician.

If these attributes are set to a great degree before medical school begins, and I believe they are, two questions arise. The first is, Why do our admissions committees not always select students who turn out to be the kind of doctors we would choose to have? The second is, What effect, if any, does the curriculum have upon the nurture of the art?

As to selection of students, I think our admissions committees generally do well. Most of our young doctors are well suited to this ancient profession. Inevitably, admissions committees make some mistakes, and more in weighing character than in judging the ability to understand biochemistry. This is bound to be so, I think, in our present state of ignorance because we know so little about testing for character as compared with testing in "scientific" subjects. Perhaps Sperry's opening of a new door to the world of the right cerebral hemisphere will bring great changes in this field, but for the present we are often confronted by our own errors. I do believe we make fewer mistakes than we might otherwise make when our admissions committees are composed of people who are free to choose on the basis of merit as well as they are able to learn to identify it and who are willing to spend time in that learning process. That learning process itself must have a lot to do with the right hemisphere, and some members of any excellent faculty are better at it than others.

Once we have selected the students, what about the curriculum? I have heard some learned men lament the cultural ignorance of physicians. Eric Severeid recalled that when he and most of his classmates at the University of Minnesota were studying and debating political science, the "pre-meds" were too long cloistered in chemistry laboratories to become aware of great social prob-

lems. There may be some truth in that observation, especially since the explosion in scientific knowledge calls for more required subjects in medical school than, for example, in law school. This is so because, to take one illustrative sequence, pharmacology cannot be understood without biochemistry, nor biochemistry without chemistry, nor chemistry without a certain amount of mathematics; whereas an understanding of the language itself may suffice to undertake the study of law.

Nevertheless, it often but not always turns out that excellent medical students and doctors have read great novels or, like Theodor Billroth, narrowly escaped a career in music, or have retained a lifelong interest in the history of medicine, which, of course, cannot be separated from the history of man. Be those vagaries as they may, I cannot agree with some splendid professors, among them Charles Odegaard, former president of the University of Washington, that the medical school curriculum itself — as distinct from pre-medical studies — should be substantially more intermingled with the study of sociology and other cultural subjects. What comes naturally in the direction of reading, great plays, lectures, discussion groups, or concerts often enriches the intellectual climate, but the medical school curriculum is already overstrained, and further overload is more apt to cause decompensation or aversion to the humanities, and, incidentally, to patients, even if the subject matter is superb. It is just too taxing to be required to study too many subjects at once!

Many variations on this theme — the inculcation of understanding — are heard from members of our faculties, from our colleagues in professional and learned societies, from health activists of many kinds, from clergymen, authors, public officials, and patients. Thus, I have received earnest pleas for special designated courses in the medical school curriculum for many subjects that are already implicit in existing courses. These include medical ethics,



geriatrics, drug abuse, child abuse, alcoholism, human sexuality (a term that has acquired a special meaning not in modern times to be confused with the old word sex), nutrition, behavioral medicine, forensic medicine, medical economics, cutting medical costs, social medicine, ambulatory medicine, health promotion, and holistic medicine. I intend no disrespect for the advocates of these studies nor for the importance of those topics. It is rather my belief that if every important aspect of medicine were taught in a separate course, there would be no time in four years to study (1) the cardinal scientific foundations upon which an understanding of clinical medicine rests, and (2) the fundamentals of clinical medicine.

I believe that the second of these two groups of major subjects — clinical medicine — is too often invaded by too much that is too abstract and not directly related to the understanding of an individual patient. Even such knowledge as is encompassed in clinical pharmacology is more readily “learned” in the sense that it becomes usable by the student-doctor when it is related to a particular patient rather than presented didactically. The student is likely to learn more about the selection and fate of antibiotics in deciding how to treat a patient with aspiration pneumonia than by reading a treatise on that subject during a period when he is trying to keep abreast of a patient with congestive heart failure.

Thus, there is no substitute, despite many trials and even more proposals, for allowing ample time for the student to seek knowledge on his own, starting with his own patients, and asking questions raised by this patient contact — asking them of the house staff, the attending physicians, and the library. There is a point of diminishing returns when we try to impose upon the student the answers to questions he has no occasion to ask, no patient's face with which to associate the answers.

But there is, I think, an even more important reason to lengthen, or at

least not to shorten, the classical clerkship time and perhaps the portion of the residency devoted to caring for patients. There is no better way to enhance development of the human side of medicine. There are portions of some histories that cannot be rushed, especially at a time when the student still is learning what questions to ask and when to listen. I can think of no better way to engender frustration in clinical medicine than to give a student so many things to read and so many lectures to attend that he does not have time to listen to his patient, or to profit from discussing that individual patient with his attending physician and often with other physicians, like the radiologist or the pathologist, who are interpreting key portions of the total picture.

Mark Ravitch, like Bert Dunphy a great combination of surgeon and raconteur, once impressed upon me a part of a patient's history I had neglected with a story about William Thayer, Boston Brahmin and successor to William Osler, and Dean Lewis, sometimes called “the poor man's William Halsted.” It seems that one Sunday morning Dr. Thayer called Dr. Lewis to inform him that Mrs. Thayer's laundress had developed acute appendicitis with pain in the abdominal right lower quadrant. Dr. Thayer said the patient was going to be brought at once to the Johns Hopkins Hospital and that Dr. Lewis was to perform an appendectomy. Sometime later, to his utter astonishment, Dr. Thayer stood in the amphitheatre watching Dr. Lewis make a right upper quadrant incision through which he delivered an inflamed gallbladder full of stones.

Later, when he was asked how he had had the temerity to ignore the diagnosis of appendicitis, Dr. Lewis reported that he had asked the patient, “What were you doing when the pain started?” Without hesitation the patient replied, “I was putting a collar button in one of Dr. Thayer's collars.”

I have often remembered this little story, when trying to visualize, to understand, to feel a patient's be-

havior before, during, and after the onset of his or her illness. Every one of us, I suspect, remembers poignantly some collar-button stories, some experiences with patients, colleagues, or teachers, many of them commingled, that have over the years sustained our love for this blessed art, medicine. I know of none other so crucially entwined with the two cultures, with the two hemispheres, with science and with humanism, with general principles and infinitely variable individual people, with high precision technological devices, and with those powerful imprecise qualities that are at the heart of human existence. I know of no sure way to meld such disparate elements, but I feel that as medical educators our best hope lies in good students, time to listen to many patients, and great teachers.

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