were by no means homogeneous. With respect to the hypothesis that the greatest improvement occurred in areas on which base-line performance was best, we analyzed the relation between the base-line scores and the mean improvement for all categories (high-preference, low-preference, and hidden conditions), and we found no significant correlation.

Barkan and his colleagues have restated one of our conclusions: that there appear to be serious limitations to educational self-diagnosis. The syllabi that we used did state explicit clinical implications; indeed, this may be one of the reasons why change in performance occurred with low-preference packages. The suggested refinements in learning strategies, such as designing educational interventions based on individual performance, are useful but may be costly. We repeat our encouragement to these colleagues and others to conduct randomized trials to test feasible educational strategies.

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MORE ON SCIENTIFIC JOURNALS

To the Editor: Dr. Berry[1] and others who decried the proliferation of scientific journals might well ask why their pleas and those of earlier generations were, for all intents and purposes, ignored. The fact is that most medical scientists manage, one way or another, to keep up with the literature. When Berry suggests a moratorium on publication, he is implying a moratorium on research. If his suggestion were taken seriously, it would be disastrous. Does he seriously believe that anyone would catch-up in one year?

The problem that scientists and physicians have faced for centuries is that they can never catch up by reading more. Reading must always be selective. The way to gain personal control of the literature is to perceive relationships between fields or topics. There are various ways we do this, not the least important of which is the comprehensive review paper.

The number of scientists alive and publishing today is about two orders of magnitude higher than that of a century ago. In spite of this, and contrary to the assertions of Dr. Berry and others,[2] the quality and information content of the average paper today are vastly greater. Furthermore, the average number of papers per author has not changed much in 100 years.[3]

We should not deplore the so-called proliferation of information. Even the absolute growth of information is a challenge worthy of the attention of our best scientists. Economic and other forces must eventually modify the system of publication so that it can accommodate our increasing ability to generate new and useful information.

Despite the figures cited by Berry, there are in fact only about 150 major medical libraries in the United States, and almost none of them can afford to buy every journal available. Furthermore, about 250,000 biomedical articles are indexed by the *Index Medicus* and the *Science Citation Index* each year. These articles include a great deal of preclinical material. Berry has not cited any statistical evidence of unrestrained proliferation. If publication is one of the ethical obligations of the research scientist, then there must be outlets for a growing worldwide population of scientists. The "twigging" of research journals is a necessary and inevitable outcome of the unpredictable way in which the tree of knowledge grows. To continue the metaphor, the creative scientist today, by judicious use of new and traditional methods, can make the literature of his field into a beautiful bonsai tree.

Some years ago, a group of biochemistry editors tried to put a moratorium on the growth of journals. Fortunately, they were unsuccessful. In spite of their unwarranted fears about journal proliferation, biochemistry and molecular biology have blossomed, and are now helping medical scientists make major improvements in medical care.

We must always be vigilant to maintain high ethical and editorial standards for publication. This is, in fact, one of the competitive factors in the economics of journal publication.

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A MYSTERY SOLVED

To the Editor: I am writing to inquire about an object in a photograph in the March 11 issue.* Perhaps if I lived near the seashore, I would be familiar with the object depicted, but I am an inland dweller. The "thing" reminds me somewhat of my garden hose in disarray, but it has a more natural quality. Is it the bowels of some denizen of the deep, the denizen himself (or herself), or is it a group of them? Walking down the beach (me or it), I would definitely stay clear of it.

Another thought is even eerier. Maybe the "thing" is not on a beach at all. Maybe this photo is an electron micrograph and the "beach" is really a cell membrane. Maybe the "thing" is doing something that I am always reading about in the *Journal*. Maybe it is attacking or forming a complex or waiting for another cell to come along to agglutinate or engulf or destroy. I hope it's a garden hose.

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*Gold J. (Photograph). N Engl J Med. 1982; 306:602.

Editor's reply: It's seaweed.

OCCASIONAL NOTES

COMPOUNDING THE ORDEAL OF ALS

Isolation from My Fellow Physicians

IT has been three years since my first symptoms suggested a diagnosis of amyotrophic lateral sclerosis (ALS). The pain and anguish of this illness are known to most physicians and are an inevitable accompaniment of the disease, but there are other unpleasant aspects that are avoidable. In this article I want to relate my personal story and to emphasize the extraordinary change that my illness brought about in my interrelations with fellow physicians.

I turned 45 in January 1979. I was then director of endocrinology at the Vanderbilt Medical Center, and my research in the areas of metabolism and reproduction was flourishing. I was supremely happy with my wife and family; we traveled often and enjoyed an active and varied social life. My wife and I had both graduated from the University of Witwatersrand in

Johannesburg, South Africa. After completing our postgraduate education at Johns Hopkins Medical Center, we had stayed on the faculty there for nearly a decade. We then spent five years in Israel working at the Hadassah Medical Center, and in 1975 we returned to the States and settled in Nashville.

My years at Vanderbilt have been very happy. The foundation for this happiness is the atmosphere of unusual cordiality and collegiality that is the hallmark of this medical school. I had known the rampant political intrigues of the academic world and had found them abhorrent, but at Vanderbilt there is a spirit of cooperation and collaboration that makes going to work a pleasure. Politics always exist in an intellectual and competitive environment. What is unique about Vanderbilt is the choice it offers to eschew such distractions and concentrate on the fundamentals of one's profession. As a result, my years here have been characterized by academic advancement, many friendships, and a sense of acceptance by students, house staff, and colleagues. This background is important to the story I am about to relate because, whereas I had previously been "at" Hopkins and "at" Hadassah, I now felt I was "of" Vanderbilt.

During my early years at medical school I had steeped myself in the study of neurologic anatomy and had shown precocious talent in clinical neurology. I did not choose neurology, however. My reasons were clear: the diagnostic problem seemed largely an academic exercise — so little, if anything, could be done for the patient in a definitive therapeutic way. The years, as well as my own illness, however, have taught me how wrong it is to focus on definitive therapy and how much can and should be done for the patient, even when one is confronted with so-called incurable illness. In any event, although my field became endocrinology, my knowledge of neurology did not evaporate. How ironic this would turn out to be. In June of 1979 I noticed some stiffness in my legs. Within two short weeks I discovered quite by chance that my reflexes had become pathologically brisk. When I could no longer dismiss fasciculation as mere "restless legs" and it became clear that there were no sensory symptoms, the diagnosis of ALS reached my consciousness despite every attempt at denial.

This story will confine itself to the effects of my illness on my relationships with my fellow physicians — whether they were my personal physicians, professional colleagues, or old friends. My strategy was to avoid disclosure of my illness for as long as possible, for the following reasons. First of all, my wife and I agreed that ignorance was a blessing, especially for our children, who would eventually have to endure with us the pain and suffering of a progressive, inexorable decline in my health. Secondly, even though I had and still have the greatest regard for my colleagues and know that the respect, affection, and admiration are mutual, I realized intuitively that their knowledge of my illness could destroy my professional life at the medical center.

Let me share some of the reactions of my professional colleagues, beginning with an account of the behavior of my personal physician. To confirm the diagnosis, I traveled to a prestigious medical center renowned for its experience with ALS. The diagnostic and technical skills of the people there were superb, and more than matched the reputation of the institution. The neurologist was rigorous in his examination and deft in reaching an unequivocal diagnosis. My disappointment stemmed from his impersonal manner. He exhibited no interest in me as a person, and did not make even a perfunctory inquiry about my work. He gave me no guidelines about what I should do, either concretely — in terms of daily activities — or, what was more important, psychologically, to muster the emotional strength to cope with a progressive degenerative disease. Stetten recently described his experience after receiving a diagnosis of progressive macular degeneration: "No ophthalmologist has mentioned any of the many ways in which I could stem the deterioration in the quality of my life." [1] The only thing my doctor did offer me was a pamphlet setting out in grim detail the future that I already knew about too well. He asked to see me in three months, and I was too polite or too cowed to ask him why — what benefit was there for me to make the journey again? I still recall that the only time he seemed to come alive during our interview was when he drew the mortality curve among his collected patients for me. "Very interesting," he said. "There's a break in the slope after three years." When, a few months later, I read an article by him in which he emphasized the importance of a compassionate and supportive role for the physician caring for the patient with ALS, I wondered whether he had been withdrawn because I was a physician.

By the fall of 1979 I was walking with a limp; I countered the queries I received in every corridor by saying that I had "a disk." This was not threatening to my colleagues, who profferred advice on how to deal with it and regaled me with their own back problems. I was still a full member of the fraternity, in excellent standing. By early 1980, however, the limp was worse, and I now held a cane in my right hand. The inquiries ceased and were replaced by a very obvious desire to avoid me. When I arrived at work in the morning I could see, from the corner of my eye, colleagues changing their pace or stopping in their tracks to spare themselves the embarrassment of bumping into me. This dramatic change in their behavior occurred when it became common knowledge that David Rabin had ALS. I state with total conviction that my colleagues never meant to hurt me. On the contrary, I was *of* Vanderbilt, and they grieved for me, yet were unable to express their grief.

As the cane became inadequate and was replaced by a walker, so my isolation from my colleagues intensified. I recognize that my own behavior and personality may have contributed to the situation: I am gregarious and, I believe, warm with people; I also value my independence. I did not call a press conference to an-

nounce that I had ALS; I did not raise a banner asking for help; rather, I continued to do my work insofar as I was able. Did that put them off? Did they reason, "He wants to pretend that everything is normal, so let's play his game"? How often, as I struggled to open a door, would I see a colleague pretending to look the other way? On the other hand, why was it so natural for the nonphysicians — the technicians, the secretaries, the cleaning women — to rush to open the door for me, even if it was the door to the men's toilet? I can only guess that my colleagues thought it would embarrass me if they offered help. How wrong they were, and how distorted their reasoning — accepting help is preferable to sustaining a fracture.

One day, while crossing the little courtyard outside the emergency room, I fell. A longtime colleague was walking by. He turned, and our eyes met as I lay sprawled on the ground. He quickly averted his eyes, pretended not to see me, and continued walking. He never even broke his stride. I suppose he ignored the obvious need for help out of embarrassment and discomfort, for I know him to be a compassionate and caring physician. In trying to understand the behavior of my colleagues I recall an experience I had when I was at Hopkins. I had worked with a splendid physician, Dr. Mason Lord. While still young he developed a brain tumor, and he lingered for six or seven months. I always thought up a dozen good reasons to avoid visiting him. Finally, I convinced myself that he really wanted to see only his close friends and family. Of course, I was merely rationalizing. We knew and liked each other, and I failed to go to see him because I would be uncomfortable — not he. I remember my sense of futility when I attended his funeral, because by then it was too late to comfort Mason Lord.

There are so many ways colleagues can help a sick physician. I have learned that the Vanderbilt community admired my ability to continue, in spite of my illness, to function, to maintain my lecture schedule, to write grants and have them awarded, to write papers and have them accepted. The school established an annual lectureship in my name, and my family and I were very moved by this expression of respect and acknowledgment. In the light of this, I may seem ungrateful, and my sense of isolation may seem unwarranted. Nonetheless, continuing personal contact with my colleagues has been rare. I have been working at home for the past year — an arrangement made possible through the consistent and unflagging support of my department chairman. A group of physicians, nurses, and technicians come on a regular basis to work with me. But very few of the physicians with whom I am not collaborating have either called, written, or come to visit.

Some of my close relationships with fellow physicians have also deteriorated since my illness. For a friend to maintain interest and empathy for a week or a month was relatively easy; to show sustained concern over three years required a commitment of quite a different order. I have received relatively few telephone calls or letters from the scores of colleagues I have met in more than 20 years of academic life: former fellows and students, fellow members of study sections, faculty members at numerous medical schools where I have lectured. I hear indirectly about their concern; however, the definitive step of writing me a letter of support is more than the majority can manage. Why this deafening silence? Perhaps it is because we, as physicians, are the healers. We dispense treatment, counsel, and support; and we represent strength. The dichotomy of being both doctor and patient threatens the integrity of the club. To this fraternity of healers, becoming ill is tantamount to treachery. Furthermore, the sick physician makes us uncomfortable. He reminds us of our own vulnerability and mortality, and this is frightening for those of us who deal with disease every day while arming ourselves with an imagined cloak of immunity against personal illness.

We can all recall times when we stood by while a fellow physician behaved irrationally or became frankly psychotic. Most of us are aware of colleagues who are abusing alcohol or drugs. Usually, we delicately ignore the obvious until disaster overtakes the unfortunate physician. I was glad to read in a recent issue of the *Journal* that Vanderbilt is taking steps to help alcoholic physicians.[2] I remember a sensitive and capable psychiatrist at Hopkins who was subject to manic-depressive episodes. His colleagues and I observed the development of manic behavior. We did not intervene, and shortly thereafter his body was found hanging from the ceiling in his hospital office.

It would be erroneous and unfair to say that all physicians avoid and neglect their sick colleagues. In my own case, there are several who have been doggedly and unflinchingly helpful to my family and me. "You have the illness," one friend told me, "but we are in this together." He meant it, and he has followed through with action consistently, to this very day. Although he has a family, a thriving practice, and many interests, he never hides behind the screen of a busy schedule. It has been the thoughtfulness, concern, and spontaneity of many people like him that has enabled my family and me to face the trials and sorrows of this disease. In fact, some physicians with whom we had very little contact before the illness have come forward in our time of need. There are close friends who live many miles away, yet make the time and incur the expense of coming to visit us frequently. One of my former fellows actually moved into my home and helped me in all kinds of ways, including getting me to and from work for eight months.

This account is not intended as a litany of complaint but as a call to physicians to express the compassion they feel toward sick colleagues. It is also meant to draw attention to our frequent inability as physicians to deal with members of our profession who no longer fit the mold of the compleat healer. Toward these ends, I would like to make some concrete suggestions. First of all, do not ignore your colleague. Greet him. Inquire about his health. Offer him support if he is physically handicapped. Don't assume that he prefers seclusion. Ask to visit him. Don't hide behind the false morality

of "respecting his privacy"; if it is inconvenient he will tell you.

Secondly, be conscious of the family and extend your support to them. Make a point of asking how your colleague's spouse is feeling and how he or she is coping. The spouse and the children are suffering at least as much as the victim and need support, encouragement, and acknowledgment of their travail. Do not expose the wife to the "premature-widow syndrome," as some physicians do who encounter my wife and never mention my name or inquire about me at all.

Thirdly, bear in mind that the absence of a magic potion against the disease does not render the physician impotent. There are many avenues that can be helpful for the victim and his family. I am often surprised and moved by the acts of kindness and affection that people perform. Fundamentally, what the family needs is the sense that people care. No one else can assume the burden, but knowing that you are not forgotten does ease the pain.

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BOOK REVIEWS

TEXTBOOK OF BIOCHEMISTRY: WITH CLINICAL CORRELATIONS

Edited by Thomas M. Devlin. 1265 pp., illustrated. New York, John Wiley, 1982. $35.95.

As the editor states in his preface: "This textbook deals with the biochemistry of mammalian cells and relates the biochemical events at the cellular level to the physiological processes occurring in the whole animal. The topics were selected to meet the needs of a medical school course in biochemistry, and, wherever possible, information or examples from our knowledge of the biochemistry of humans is presented."

This book is another in the attempt to sugarcoat biochemistry for medical students by incorporating clinical material — an approach that was used successfully by Montgomery et al. in their *Biochemistry, a Case-Oriented Approach*. This work will be judged in comparison to Montgomery's.

The clinical-correlation material is introduced at irregular intervals in gray boxes set in the wide margins of the text. The clinical material ranges from short paragraphs stating that a given biochemical pathway is not very important, to complete case histories and detailed analysis of laboratory data. In contrast, Montgomery's uniform format consists of case studies with questions on the biochemical implications at the end of every chapter. The clinical material in Devlin's book is sometimes sprinkled with medical jargon beyond the scope of the freshman medical student. On the whole, I prefer Montgomery's approach.

A new biochemistry textbook must also compete with the visual beauty and clarity of Stryer's *Biochemistry*. Although the black-and-white illustrations in Devlin's book help to keep the price down, they cannot highlight features that can be seen with the use of color. It is sometimes difficult to see which two or three of the many atoms in a complicated chemical structure are undergoing change in a reaction.

As in other multiauthored books the quality of the chapters is uneven. This is in contrast to the uniformly folksy style of the single-authored text by Lehninger and the homogenized editing of the text by White, Handler, Smith, Hill and Lehman. In Devlin's book I found the chapter on gas transport and pH regulation by Baggott to be the clearest. Many of the other chapters are verbose but still clear. Others are written in biochemical jargon or are poorly organized. The content is up to date. The references are few, located at the end of chapters, and concerned mostly with review papers.

When I showed this book to a freshman medical student, he said, "It's too big. I don't have time to read all that detail." He wanted a slender book that would give him the information needed to pass Part I of the National Board examinations.

I tried to imagine this book as a physician's reference. The clinical correlations help to bridge the gap between the needs of the physician and the frequently complex concepts that are described in the main text. However, the index needs an index. Some topics are difficult to find. A useful table of normal values is not in the index. Attempts to learn about rapidly developing fields were of variable success. The chapters on molecular biology are too detailed for casual reading. The information on prostaglandins is more compact. The chapter on membranes and transport, written by Devlin, is also long, but it is clearly written. On the whole, the details are present, but the grand designs are sometimes difficult to find.

The book deserves an A for effort. It is as useful as other modern textbooks; it is up to date. But it is not sufficiently superior to the others to recommend it as a clear-cut choice.

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GENERAL IMMUNOLOGY

By Edwin L. Cooper. 343 pp., illustrated. New York, Pergamon Press, 1982. $24.

In the introduction the author states that his aim is "to present undergraduates with a general overview of the immune system . . . in a comprehensive manner rather than as a narrow discipline as is usually the immunologist's style." He attempts to accomplish this goal by relying heavily on the phylogeny of immunology, which represents his primary interest, rather than by presenting recent advances that have begun to provide molecular explanations for many immunologic reactions. All of the approximately 200 references antedate 1977. There are inadequate presentations of immunogenetics, the major histocompatibility complex, regulatory T cells, lymphokines, complement, and the molecular genetics of antibody diversity. The remarkable technology of monoclonal antibodies that has been applied to many biologic sciences, including medicine, is not mentioned. There is no comprehensive analysis of the relation between immunologic reactions and disease. I cannot recommend this book for those wanting a review of molecular immunology as it has evolved in the past 10 years, although the work may be of some interest to those concerned with the phylogeny of the immune system.

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LYMPHOKINES AND THYMIC HORMONES: THEIR POTENTIAL UTILIZATION IN CANCER THERAPEUTICS

(Progress in Cancer Research and Therapy. Vol. 20.) Edited by Allan L. Goldstein and Michael A. Chirigos. 324 pp. New York, Raven Press, 1981. $38.

One of the most important conceptual breakthroughs in immunology has been the discovery of a hormone-like communication between cells involved in the immune response and those involved in the inflammatory response. Lymphoid cells synthesize and