disease, or what Moser[2] has called diseases of medical progress. His recent book includes 27 chapters describing a host of problems from discoloration of the teeth, to drug dependance and death. A search of the medical literature during a recent four-year period revealed 178 citations on the untoward effects of iron; in less than three years, 63 articles on the effect of tetracyclines on teeth; and in a four and one-half year period, 112 articles on the adverse effects of LSD.

Attention is now being directed to many of these problems. In one recent study, of 830 patients with chronic illness admitted to the medical wards of a hospital for treatment and rehabilitation, approximately 35 percent reported at least one adverse reaction to drugs administered during their hospital stay. This incidence of adverse drug reactions is considerably higher than the 5–20 percent reported in earlier studies of hospitalized patients.[3] It should also be noted that 80 percent of the reactions observed were moderate or serious.

Studies of adverse drug reactions on an outpatient or ambulatory basis are, of course, far more difficult. In recent years several computer based systems have been developed that will permit study of this problem as well as the prescribing habits of physicians. At the University of Southern California a study of prescribing patterns has identified four types of inappropriate prescribing: (1) inappropriate drug quantities by single prescription; (2) inappropriate amounts of individual drugs in patients' possession that result from multiple prescriptions; (3) inappropriate concurrent prescriptions; and (4) inappropriate drugs for specific disease entity.[4] One example of the kind of problem uncovered in this study was the patient who received over 100 prescriptions for trannquilizers and hypnotics over a nine-month period. She received the prescriptions from her regular clinic and from a hospital emergency room. Neither facility has access to the other's medical records. At the end of the nine months, the patient had over 1,100 fifty-milligram capsules of chlorpromazine, 2,000 ten-milligram tablets of trifluoperazine, and 650 two hundred-milligram capsules of amobarbital theoretically in her possession. The potentials for abuse in such a situation are obvious.

Another kind of problem more subtle and more difficult to assess has recently been discussed in an excellent editorial in the *New England Journal of Medicine*.[5] This is the duress imposed by the attitudes of the medical profession and society. The physician knows he will be more severely criticized if he fails to treat a curable condition than if he overtreats a dozen that require little or no treatment. As the editorial stated.

"Actions speak stronger than words, but strong words scold inaction. Treatment, moreover, is gratifying to both doctor and patient in proportion to its specificity, incisiveness and magnitude. Under conditions when choice is possible, operation is preferred to pills, pills to diet, diet to nothing at all. The patients' desires, the doctors' peace of mind, the opinion of the medical profession, and the societal attitudes press for vigorous treatment. Is it therefore any surprise that the physician who has to choose between over- and under-treatment almost invariably opts for the former?"

The editorial concluded: "Basic to good treatment are the physician's integrity and education. The shape of the therapeutic structure erected on these two foundations is determined by the interaction between individual and circumstances. It is a complex process which pharmaceutical advertising influences but usually does not dominate, and constraints placed on this factor alone will improve therapeutics but little. A better appreciation of the principles of medical therapy is required by society at large, and the necessary educational process must involve everyone—those who give, those who receive, those who intermediate, and the many who choose to write about what's wrong with medicine. When one man treats another, the exchange involves not only a whole patient, but also a total physician."

Mr. Chairman, I have tried to describe and diagnose, if you will, a malady that affects physician, patient, and the public generally. If the diagnosis is accurate a prescription is in order.

One of the basic ingredients of this prescription must be education. In pharmacology, the major problem is that the subject is taught early in the medical cur-

[2] Moser, R. H.: *Diseases of Medical Progress*, Springfield, Illinois, Charles C. Thomas, 1964, p. 543.
[3] Borda, I. T., Sloan, D., and Jack, H.: "Assessment of Adverse Reactions Within a Drug Surveillance Program," JAMA 205:644–647, August 26, 1968.
[4] Maronde, Robert, M.D., Professor of Medicine and Pharmacology School of Medicine, University of Southern California: Personal Communication.
[5] Editorial: "Treatment by the Whole Individual," New England Journal of Medicine 280:271–272, January 30, 1969.