. . . Mr. Nixon has paid only lip service to civilian science and technology. We still have far too many people in the scientific community working in military-related programs. And 'increases' in funds for research really are only recategorizations of funds, taken from one program to build up another. Things that obviously are not basic research are being called that because it sounds better. . . .

From personal observation, I think Senator McGovern has a sincere belief in the need for building a better America with the help of science and technology, and a firm commitment to emphasize civilian R & D. This, Mr. Nixon lacks.

The message of the Republican Science and Engineering Council seemed approximately the same, with the names reversed. "Our view is that the Nixon record is superb," Goldmuntz said. Baker reiterated the Administration's claim to have increased federal funding for R & D on domestic problems by 65 percent in the last 4 years "or about four times the general price increase" during that time. "At the same time," Baker said in a statement, "the Administration has maintained a sufficient military R & D program and begun to capitalize on our past investments in space."

What differences, he was asked, existed between the candidates on matters of science and technology? Baker replied that basic objectives seemed much the same, but that "their ways of getting there are different."

On the bread-and-butter issue, Baker was asked why the White House had terminated its widely advertised program of some 400 internships for unemployed scientists and engineers. He said that "it was canceled because it was so successful. . . . During the summer there was a drastic turnaround in unemployment," a point the McGovern group heartily disputes. Did that mean the problem had been solved? "Well," Baker replied, "for the man who's unemployed I guess there is still an unemployment problem."

The council seemed undecided as to how it would communicate its message, although Baker said that it stood ready to serve the campaign staff by advising on any technical issue that might crop up—perhaps by writing position papers. After the election, he said, the group might continue as a "public interest" link between the Administration (presumably Republican) and the scientific community.

Some observers suggest that the council's main purpose is defensive, that it would rush into the breach in the event McGovern succeeded in raising an issue of science or technology. Clyde Cowan, for one, a member of the council and a professor of physics at Catholic University in Washington, D.C., disagreed. "It's more than that," he insisted during a conversation. "We're supposed to be a collecting point for ideas from the scientific community." What kind of ideas? Cowan replied that the council has forwarded for the President's consideration a proposal to set up a study committee to examine the feasibility of damming the Bering Strait as a means of controlling the climate of North America and Siberia. The idea hasn't popped up yet in the President's campaign speeches, but if it does, his Science and Engineering Council can take full credit.

—ROBERT GILLETTE

Medicine at Michigan State (IV): Osteopaths and Allopaths

The presence on the same campus of two schools of medicine, one training M.D.'s and the other doctors of osteopathy (D.O.'s), would seem to guarantee a sibling rivalry along the lines of Cain and Abel. Osteopaths and allopaths—the latter are the majority party in Western medicine—have a century-long history of mutual hostility. At Michigan State University (MSU), however, the apparent misalliance seems to be working. In part this can be attributed to the fact that state legislators have made it clear that they would smile on the enterprise only if the two schools cooperated wholeheartedly (*Science*, 22 September). But, in addition, there is the mildly iconoclastic atmosphere at MSU which is hospitable to innovation. And at the personal level, witnesses in the legislature and the university say the necessary note of bonhomie has been set by the two deans, Andrew D. Hunt, Jr., of the College of Human Medicine and Myron S. Magen of the College of Osteopathic Medicine.

Hunt came to MSU from the Stanford medical school's ambulatory care program. At Stanford he had become particularly interested in making behavioral and social sciences a more meaningful part of medical education, and innovations in the MSU program testify to this interest. As for the issue of accepting a school of osteopathic medicine as an institutional equal, Hunt says the mandate for it was clear when the legislature passed the proposal by the largest bipartisan vote of that year. According to Hunt, John A. Hannah, MSU's president at the time, "saw it could be managed as a separate college," and Hunt worked with the faculty of the College of Human Medicine to accept it. Hunt says he saw it as a "social opportunity." The Hunt style is low-key, and he gives the faculty most of the credit for the accommodation, noting that perhaps a key action came when the psychiatry department voted unanimously to be jointly administered by the two schools.

One practical reason perhaps why there has been little fraternal infighting is that everyone is too busy. The College of Human Medicine has been fully engaged in organizing a clinical education program using far-flung community facilities (*Science*, 20 October). The school has also been going through the usual problems of developing a curriculum compounded by the ascent from a 2-year to a 4-year program.

The challenges faced by the College of Osteopathic Medicine (COM) are of a different order. MSU's COM is the first college of osteopathic medicine to receive full state support and to operate on a university campus. As a result, many things are expected of it and it is suspected of a lot of things. The COM will be called on not only to train D.O.'s and specialists, but to im-

prove on the relatively lackluster research record of schools of osteopathic medicine. At the same time, many D.O. practitioners disapprove the juxtaposition of the schools of osteopathic and allopathic medicine at MSU since they see the COM as in danger of being absorbed by the M.D.'s.

If osteopaths are suspicious, it is partly because they feel they are misunderstood. Many laymen and a lot of M.D.'s believe that osteopathic medicine is dominated by the use of manipulative therapy. Osteopaths feel this is a distortion, noting that, although they do indeed put strong emphasis on the importance of the musculoskeletal system, they use all tested and approved methods of medical treatment including drug therapy, surgery, and psychiatry. Nonetheless D.O.'s insist that they have a philosophy of medicine, stressing treatment of the whole patient, that departs significantly from that of the allopaths. This can be discussed in the perspective of the history of osteopathic medicine.

The foundations of osteopathic medicine were laid to a remarkable extent by one man, Andrew Taylor Still (1828–1917). Still was the son of a physician-preacher who went as a missionary to the Missouri frontier in the late 1830's. Andrew Still received a medical education probably somewhat better than was typical in the West in those days and served as a Union army doctor during the Civil War. He seems to have been a nonconformist by temperament and a man who acted decisively on his convictions. Before the war he had been an outspoken Abolitionist in a border state; after the war he was openly critical of the condition of medicine. He pressed forward with his own studies in anatomy, physiology, chemistry, and mineralogy, and began to evolve his own philosophy of medicine. Still reacted against the indiscriminate use of drugs by many physicians of the day which he felt simply put further toxic burdens on the body. He developed manipulative techniques which gave practical expression to the theory of disease indicated in this excerpt from Still's writings.

> The structure of the body is reciprocally related to its function;
>
> Progress can be achieved in the study of disease if first a study is made of health;
>
> The body's musculoskeletal system—bones, ligaments, muscles, fascia, etc.—forms a structure which, when disordered, may effect changes in the function of other parts of the body. This effect may be created through irritation and abnormal response of the nerve and blood supply to other organs of the body;
>
> The body of man is subject to mechanical disorder.

It was in character for Still to seek to persuade the medical profession of the value of his innovations. The reception ranged from indifference to ridicule, but his successes with patients began to attract followers. The first school of osteopathic medicine was established at Kirksville, Missouri, in the 1890's and became the mother church of the profession. Five other schools are in operation—at Chicago, Des Moines, Kansas City, Philadelphia, and Fort Worth—plus the new school at MSU.

Still's active professional life spanned a period of extreme controversy and change in American medicine. The spread of the use of antiseptics and anesthesia, the discoveries in bacteriology, and the development of the use of x-rays transformed the practice of medicine. By the time Still died in 1917, the Flexner report had appeared. It proved to be the death warrant of the proprietary medical schools and cleared the way for the rise of the modern, university-related medical school.

The osteopathic medical schools absorbed the lessons of scientific medicine but remained outside the mainstream of the American health-care system. The schools of osteopathic medicine were not linked with universities, and research was conducted on a relatively modest scale; there were no D.O. Nobelists. Relations between D.O.'s and M.D.'s varied. In general there were parallel structures with D.O.'s operating their own hospitals and medical societies. In some places D.O.'s were granted staff privileges in M.D. hospitals, but just as often they were treated as medical Snopeses by the M.D.'s.

The mirror-image principle extended to the national scene with the American Osteopathic Association (AOA) serving as the counterpart of the American Medical Association. For D.O. students, requirements for admission to medical school, preclinical, and clinical training closely resemble M.D. educational models. D.O. specialists are trained in osteopathic hospitals under separate boards of certification supervised by the AOA.

The isolation of the osteopaths from big medicine has actually been a source of one kind of strength. A large majority of D.O.'s are in family practice—perhaps three quarters of the roughly 30,000 D.O.'s—rather than specialties, and schools of osteopathic medicine stress preparation for family practice. In a number of places D.O.'s have helped fill the medical vacuum left by the flight of M.D.'s from general practice, and this has raised the stock of the D.O.'s with the public.

The status of osteopathic medicine, as a matter of fact, has improved considerably during the last generation. For example, D.O.'s, who were not drafted into medical services in World War II, are now given full recognition as physicians and surgeons under federal programs. In part, this has been due to the upgrading of osteopathic medical education and hospital service and the requirement of continuing education for practicing D.O.'s. But the fact that D.O.'s were filling a gap in the medical care system also contributed.

The approach to parity seems to have been achieved at the cost of a threat to the osteopath's separate identity. In California, a recent law provided for a uniform license for M.D.'s and D.O.'s. A school of osteopathic medicine in Los Angeles was "taken over" as the basis for a new allopathic state medical school. The California experience has caused many D.O.'s to see grave perils in this kind of equality.

At MSU, therefore, the COM has had to live under scrutiny from the profession. The scrutiny has been particularly sharp because a private school of osteopathic medicine at Pontiac was transplanted to the MSU campus at the behest of the legislature and against the wishes of most D.O.'s who would have preferred that it remain in Pontiac as an independent, state-supported school. COM dean Magen acknowledges that a lot of practicing D.O.'s thought the move to MSU was "a ploy to sell us out to the state medical society." There are no signs of this happening, but the D.O.'s still suspect that it might.

Magen, a practicing D.O. pediatrician when he was named dean of the COM at Pontiac, has a relaxed, forthright manner which helps him in dealing with sectarians in both medical camps. He acknowledges that his school must establish its bona fides with the medical academic community. He also stresses that, if a college of osteopathic medicine is to survive in an academic setting, it will be necessary to develop a scientific rationale for the techniques and beliefs that distinguish osteopathic medicine. This includes providing a

theoretical basis for manipulative therapy. Some work in this direction has been done, says Magen, particularly at the Kirksville school. But the point is, says Magen, "we don't have a good scientific basis, no large volume of literature."

The first priority at COM naturally has been to assemble a faculty and staff. There was no reservoir of D.O.'s with university teaching and research experience, so the decision was made to look for D.O.'s with an academic bent, and in some cases to make D.O.'s of academics rather than academics of D.O.'s. For some clinical faculty spots, recruiters looked for people with good backgrounds in the basic sciences and are giving them clinical instruction and experience. "We doubt that we'll make great clinicians of them," says Magen, "but we're attempting to get the best of both worlds."

On the administrative side, it was necessary to find people who knew the university. "It's a fantastic maze, like a labyrinth," says Magen. The upshot has been some unorthodox recruiting. As an associate dean, Magen brought in John Barson from the College of Education. Barson's specialty is instructional media, and he has a knowledge of the university which qualified him for a role as an administrative Theseus. Celia B. Guro, with a doctorate in education, is an assistant to the dean with special responsibility for helping to develop the academic structure of COM. Gerald Faverman, a former college history teacher, came to COM as assistant to the dean for planning from a stint as a fiscal analyst for the state legislature which equipped him with a knowledge of the realities of state support. Magen says he is trying to build up a staff with "a knowledge of the university and a long-range view." He also notes that he has turned to the College of Human Medicine for help in dealing with the university.

The first priority of the COM, of course, is to turn out physicians, particularly for family practice. Because this is the first university-based college of osteopathic medicine, there is also an obligation to train researchers and medical school faculty. "We have to be careful not to be blinded by the light of academe," says Magen. "There is a crying need for academic physicians. There is also a crying need for family physicians. I think we can [respond to both needs]."

COM, for one thing, has a department of family medicine which will be

Health Fad Underworld Surveyed

A people among whom copper bracelets are worn as a cure for rheumatism, where two-thirds of the adults believe that a bowel movement every day is necessary for health, where diet is considered to be the most powerful single influence on health—could this medically backward populace be a tribe of New Guinean primitives? Europe in the Dark Ages? Cos before Hippocrates? It's today's United States, where a vast netherworld of medical superstition has been brought to light by a Food and Drug Administration (FDA) survey. Coexisting side by side with conventional medical knowledge in what must be the most educated population in the world, this corpus of antirational beliefs springs from what the authors of the FDA survey describe as "rampant empiricism," an urge to try out almost anything regardless of the likelihood of success.

The survey* was undertaken at the suggestion of the Senate Committee on Aging after hearings on how elderly consumers were being victimized by frauds. A questionnaire submitted to some 3000 adults revealed the substantial popularity of certain health practices and beliefs that are either fallacious or, at best, of unproved value:

► Three-fourths of those polled believe that extra vitamins provide more pep and energy. One-fifth consider that many diseases, even arthritis and cancer, are partly caused by a lack of vitamins and minerals. The survey was conducted in 1969, before the extensive publicity given to Linus Pauling's theories on vitamin C, yet 58 percent of the sample believed that vitamins prevent colds.

► More than a third of the adult population, to judge by the sample, believes in various erroneous concepts of weight control. The commonest such belief is that sweating is a means of substantially losing weight. Other sworn-by nostrums are nonprescription appetite depressants, massage, and keeping up with the latest published diets.

► A quarter of those polled claimed to have rheumatism, arthritis, or some similar disease. Nine percent of the sufferers—representing about 2½ million people—had tried diets or special foods. Ten percent resorted to massage. Thirteen percent used "something to lubricate their joints." And one percent said they had worn brass or copper jewelry to relieve their symptoms.

Very sizable portions of the population appear to be susceptible to "doctors" or advertisers advocating questionable practices, according to National Analysts, the Philadelphia firm that conducted the survey for the FDA. Many people believe that advertisers are so closely regulated that they wouldn't dare to make false claims.

The questionable health practices do not tend to be based on specific faulty beliefs. The practices are better accounted for, the National Analysts conclude from in-depth interviews, by the widespread concept that, since individuals vary in response to treatment, anything is worth a try. This rampant empiricism is sustained by two less philosophical attitudes. Public awareness of psychosomatic effects leads people to believe that if faith in a treatment can work wonders, then any treatment can work. Second, the placebo effect is sufficiently strong to prevent the empirical trial of treatments from eliminating those that are ineffective. In this way vitamin pills have become so entrenched in the public mind as the source of energy-creating and other wide powers that even doctors may be more or less deliberately prescribing vitamins very much like placebos.

The government has two potential approaches for curbing fallacious health practices, the National Analysts report concludes—education and regulation. But since the fallacious practices derive not from misinformation, but from empirical trial and error processes, supplying correct information does not solve the problem. Educational efforts cannot replace regulation.—N.W.

* *A Study of Health Practices and Opinions*, National Analysts, Inc., 1972. Obtainable from National Technical Information Service, Springfield, Va. 22151. $6.

as large as that of any American medical school. Research in family medicine is being encouraged, and there has been some success in acquiring research funds.

Although arrangements are not finally fixed, it appears that the two schools will share administration of the departments of anatomy, pathology, and pharmacology. Clinical departments exclusive to COM, in addition to family medicine, will be community medicine, osteopathic medicine (the analog to the department of medicine in an allopathic medical school), and biomechanics.

Biomechanics is a term that is beginning to show up in other medical school catalogs, but at COM it has a special local significance. Magen says the department "addresses itself to what osteopaths do that's different and how you research it." To oversimplify, one principal effort of the department will be to develop the theoretical basis for manipulative therapy. Chairman of the department is a D.O., Philip Greenman, who is recognized as having a high degree of expertise in manipulative diagnosis and therapy. At present, the department has five basic scientists including two biophysicists and a biochemist. One early effort will be to examine existing relevant literature to identify material valid for future research. Projects generally will follow the osteopathic preoccupation with establishing the interrelation of structure and function in health and disease. Greenman emphasizes that the department is just getting organized and laying out its research plans. The department's aim is to produce clinically useful results, however. An example of a possible project might be a study of chronic, obstructive lung disease. Manipulative therapy has proved to have value in some respiratory diseases, says Greenman, and an effort would be made to establish the basis for such clinical results.

Members of the department will also do some teaching. In part this will serve to communicate research results, but it is also possible that the skill of the members of the department in manipulative therapy may make biomechanics the logical place to locate a specialty or subspecialty in manipulative medicine. Manipulative therapy is now taught in the department of family medicine.

COM has stressed the importance of keeping the walls between departments low, and the options on final organization of clinical training in COM remain open. Anesthesiology, pediatrics, obstetrics, and gynecology could be taught in separate departments or could be made divisions of other departments. It seems likely that COM and the College of Human Medicine will jointly administer departments of surgery and radiology.

At this point it seems fair to describe the relations between the two medical schools as "prudent accommodation," the phrase supplied by Robert C. Ward, chairman of COM's department of family medicine. Each school seems too fully occupied with its shakedown cruise to do much detailed thinking about coordination with the other. Clinical training differs particularly in the two schools. Like the College of Human Medicine (*Science*, 20 October), COM stresses use of community facilities for clinical teaching, but D.O. students begin serious clinical exposure early under preceptorships with D.O.'s in family practice. In their clinical years D.O. students will spend much time in four osteopathic hospitals in the Detroit area, rotating through the services identified as the strongest in these hospitals.

COM is also arranging some less conventional clinical experience. Ward observes that "Most physicians are uncomfortable with drug abuse problems, and these problems are ubiquitous." Arrangements have been made for the college to collaborate with the local county health board in a methadone maintenance clinic. D.O. students will get experience in clinics in outlying rural regions. And COM is making efforts to develop a group practice stressing preventive medicine in a changing neighborhood in Lansing. Links are also being forged with the state department of corrections and nursing homes in the area.

Frictions and Pressures

An era of good feeling prevails in medical education at MSU, but internal frictions and external pressures will inevitably increase. The two medical schools will be expected to bring their costs into line with the "unit" costs of other state medical schools. In the start-up period both MSU schools have had a relatively high ratio of central staff and faculty to students, and Hunt and Magen recognize that this cannot continue.

Other segments of the university made sacrifices to assist establishment of the medical schools, and their indulgence is unlikely to be limitless. Basic science departments have extended themselves to accommodate the medical schools. And the College of Veterinary Medicine, which formerly had the highest status and salary structure at MSU, moved over to make room for the new medical schools and could grow to resent the new alignment.

The implications for the administrative structure of the university have not really been determined. The standard university arrangement these days is for a vice president for health affairs to be responsible for the medical and nursing schools and other health-professions education programs and to report to the president. Under the MSU system, medical education remains in the domain of the provost, the university's chief academic officer, and the medical school deans report to an assistant provost. While the schools are small and no major clinical facilities are involved, the arrangement should work. But growth in scale and budget will put serious strains on the existing system. MSU president Clifford R. Wharton, Jr., notes that "We are not satisfied with the structure for all time," but says at the same time "we don't want to contribute to the isolation of the medical school."

In the future, the most sensitive issues between the two medical schools are likely to arise from questions of professional integration. It is anticipated that D.O. and M.D. students may share some classes, and individual students of one school will probably take courses in the other. Some D.O.'s take a jaundiced view of this prospect but the sorest point is likely to be on residency training, particularly if D.O. students train in M.D. programs. Osteopathic hospitals now take a hard line, for the most part not recognizing specialist certification of D.O.'s who have taken M.D. specialty training. And practicing osteopaths tend to view the opening of M.D. programs to osteopaths as bold-faced proselytizing.

The American Medical Association policy for eventual amalgamation of allopathic and osteopathic medicine was roundly repudiated at this year's meeting of the AOA, and the problematical course of negotiations between the two professions will inevitably influence relations between the two schools. But the odds against the experiment at MSU succeeding seem no greater than they were against establishment of the two schools in tandem in the first place. For at MSU, as one faculty member put it, "the assumption here is that nothing is impossible."—JOHN WALSH