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IMAGE MAGAZINE Feature: "Coronary Care
Comes to the Smokies"

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ROCHE MEDICAL Image & COMMENTARY



THE COVER:
High in the Nepalese Himalayas, in the rural village of Bista Chap, Dr. R. P. Shrestha examines a malnourished child on a farmhouse porch before giving her a TB vaccination.

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Contents

ON RESISTANCE TO NEW CONCEPTS

In IMAGE Commentary, Dr. John H. Mulholland analyzes the "alarm reaction" that makes some scientists respond with hostility to new truths..... 5

VAGOTOMY IN BILIARY TRACT DISEASE

For acute cholecystitis and other gallbladder syndromes, a new concept of surgical management is developed at Montefiore Hospital in New York..... 6

POETRY: NEW TOOL IN PSYCHOTHERAPY

Vast reservoir of human emotion recorded in verse is tapped for psychiatric patients, who gain support from poets' psychologic struggles..... 10

CORONARY CARE COMES TO THE SMOKIES

In a remote mountain region of North Carolina, a critical shortage of cardiac specialists is met with aid from the Regional Medical Program..... 14

TRACKING THE GASTROINTESTINAL HEMORRHAGE

By selective serial angiography, a Philadelphia team of surgeons and radiologists has succeeded in locating the most elusive bleeding sites..... 20

FOCUS ON ABRAHAM M. LILIENTHAL, M.D.

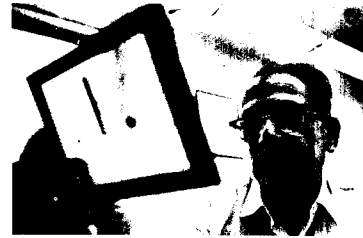
A "master of epidemiologic strategy," this Johns Hopkins physician and teacher has opened new avenues in the study of chronic diseases..... 24

MEDICINE ACHIEVES A Foothold IN NEPAL

After centuries of complete isolation, this Himalayan kingdom opens its borders to foreigners and establishes its first clinics and hospitals..... 28

THREE KIAI FOR KARATE!

Fastest-growing participant sport in the U.S. is an Oriental form of unarmed combat that, though potentially lethal, is actually quite safe..... 32



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HIGH IN THE SMOKIES, linemen check wires that transmit ECGs to Winston-Salem cardiology center.

THE MORNING AFTER the astronauts returned from the far side of the moon, Dr. William J. A. DeMaria took a ribbing from his colleagues at Duke University School of Medicine, Durham, N.C., where he is Assistant Dean of Continuing Education. In his "spare" time, Dr. DeMaria is exploring a novel solution to a serious problem of rural medicine: he is training homing pigeons to carry biologic specimens from small hospitals high in the Smoky Mountains to the nearest available clinical laboratories. It struck the Duke staff as wildly funny that, in an age when men could be rocketed to the moon and back, attempts should be made to deliver clinical specimens by pigeon wing.

Whether or not it proves feasible, Dr. DeMaria's experiment is highly practical in purpose. For many months of the year, the small community hospitals in the sparsely settled westernmost section of North Carolina are virtually isolated by narrow and tortuous roads too hazardous for cars and sky conditions frequently too rough for helicopters.

But if the delivery of blood, urine and tissue specimens from these remote areas of Appalachia still depends on simple and often inadequate transportation, ECGs now can be transmitted by telephone. And the fact that they are regularly so transmitted from the mountainous, seven-county section known as the state of Franklin (so-called because portions of Tennessee and North Carolina almost became a separate state during the Revolutionary War) highlights an advance in regional medical care that may serve as a

prototype for other hinterland communities throughout the nation.

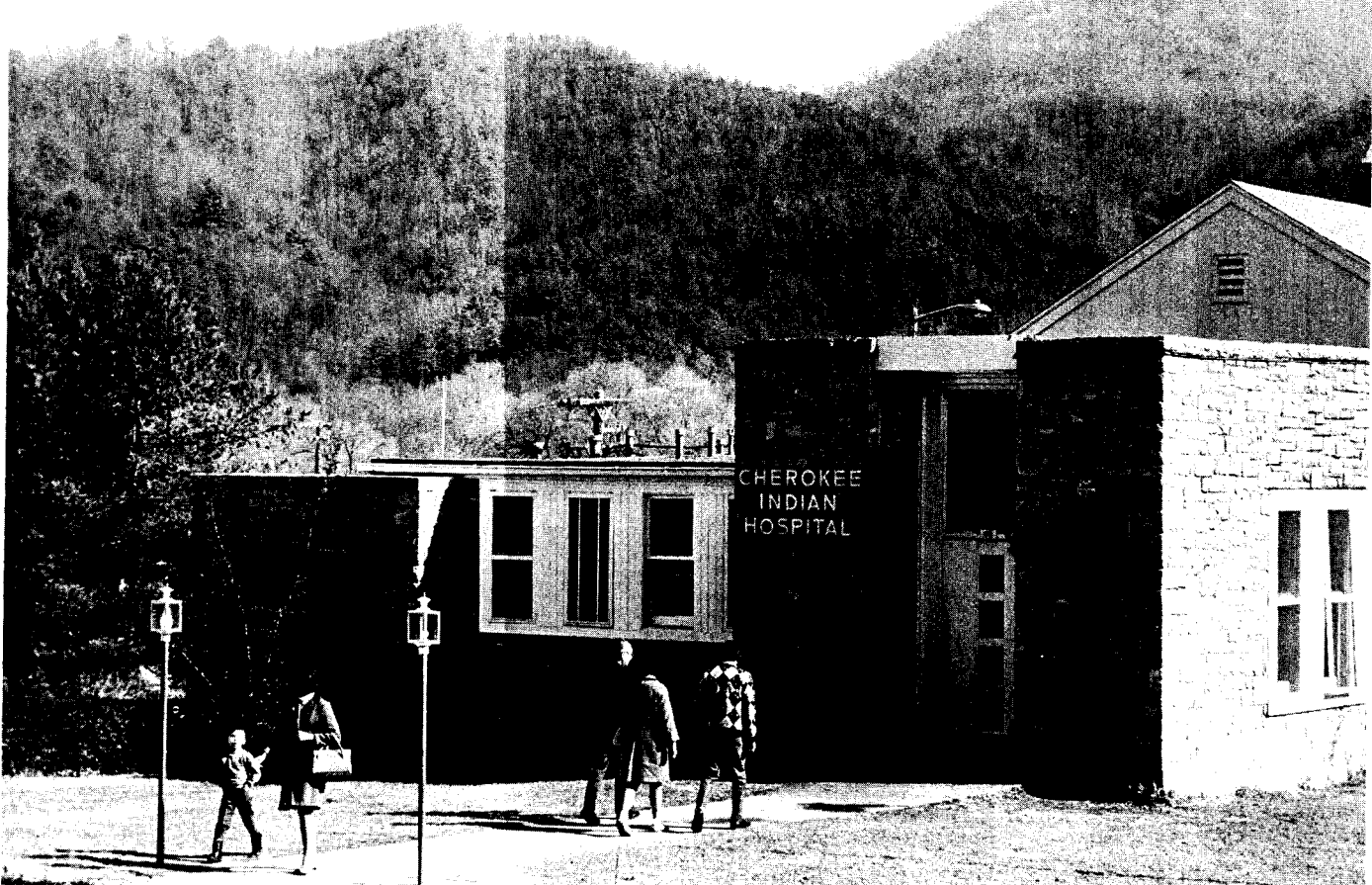
Since last July, the 115,000 citizens of the state of Franklin—largely of Scotch-Irish stock, and including some 4000 Cherokee Indians—have been host to a demonstration project aimed at providing optimal care for patients with acute coronary disease in rural America. Operating as a key phase of the Regional Medical Program (RMP) in North Carolina, a network of small coronary care units has been installed in eight of the community hospitals that serve the 3000-square-mile area.

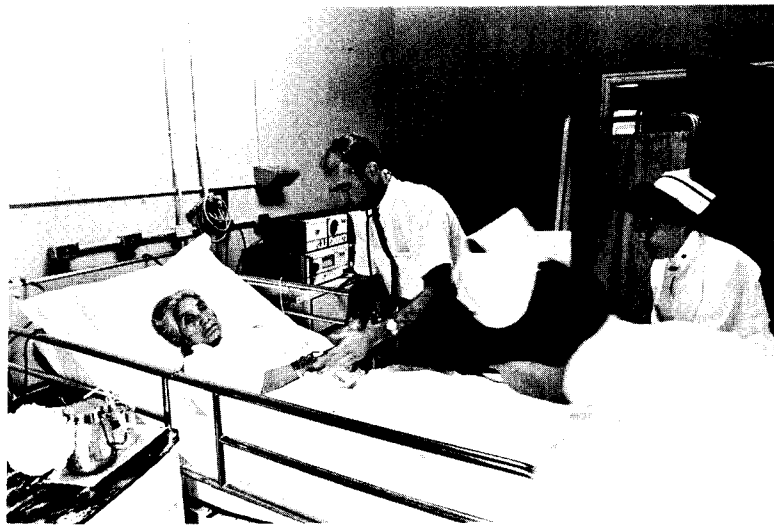
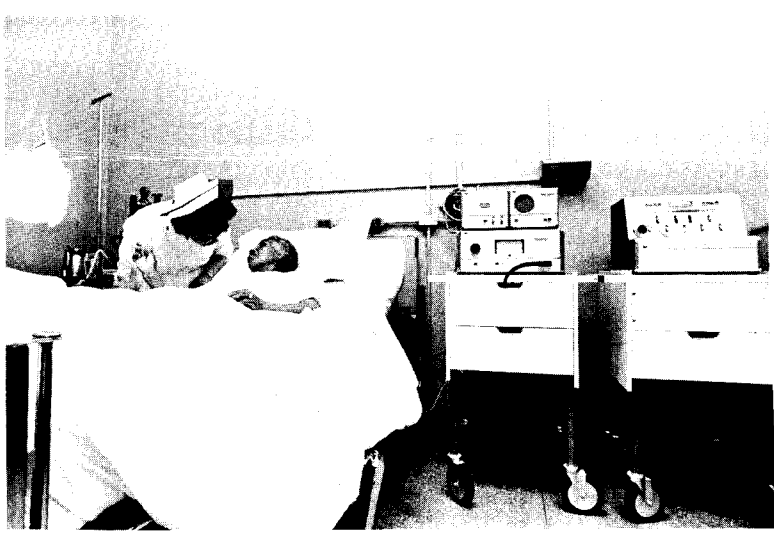
"The need for such care has been abundantly clear," says Dr. Robert N. Headley, Associate Professor of Medicine, Bowman Gray School of Medicine of Wake Forest University, Winston-Salem, and project director of the coronary care unit program. "Although our local physicians had mixed views about RMP and the Federal funding of medical services, they were of one mind that something had to be done to overcome the critical shortage of cardiac specialists and facilities in the area. This situation was compounded by the fact that the people of Appalachian North Carolina are largely native-born, with strong family and community ties, who feel uneasy about going to a city hospital. Many have never traveled beyond their mountain towns. Often they will resist hospitalization in an unfamiliar setting, even after they have had a heart attack."

An additional source of anxiety to the 63 overtaxed practicing physicians in the area

Coronary care in the Smokies

ISOLATED SETTING OF PHS HOSPITAL, CHEROKEE, N.C., AND ROADS OFTEN IMPASSABLE IN WINTER INCREASED THE NEED FOR REGIONAL PROGRAM AID





CHEROKEE PATIENT has lead II attached by Dr. Will Nash. Unit's oscilloscope, electrocardiograph and phone transmitter (right) are mobile. Dr. Nash

phones case history, which is recorded on tape at Winston-Salem cardiology center. Phone is then placed on converter, which transmits ECG as sig-

nals, later reconverted at center. Advice on treatment of patient's premature contractions will be phoned back within half hour by center cardiologist.

was the growing population of tourists and vacationers—many of them in the older coronary-prone age group—who visit the Smoky Mountains and the Cherokee Indian Reservation during the summer and fall.

"In view of this over-all situation, the idea of establishing a network of up-to-date coronary care units seemed both a challenge and a necessity," Dr. Headley recalls, "when it was first broached, in August, 1967, by the Health Council of the State of Franklin." The council is comprised of physicians, hospital administrators, educators and other health-minded representatives from each of the seven counties.

"No one could be sure that such a plan would work," according to Dr. Marc J. Musser, executive director of the North Carolina Regional Medical Program, which has undertaken to assess and apportion the statewide medical needs, with special emphasis on heart disease, cancer, stroke and allied diseases.

"After all, nothing in the whole range of medical literature offered any conclusive evidence that coronary care units can be operated efficiently and effectively in small community hospitals like ours."

Fortunately, the need and the determination to answer the need were so well reflected by the unanimous response of the Health

Council that a pilot program, known as the State of Franklin Coronary Care Demonstration Project, was soon under way. As recounted in the *North Carolina Medical Journal*, the application for this project "met and hurdled (relatively unscathed) all challenges presented by the review groups of the North Carolina Regional Program and the National Institutes of Health, and was approved and funded on March 1, 1968, in the amount of \$98,849 for the first year, with a total three-year grant of \$183,509."

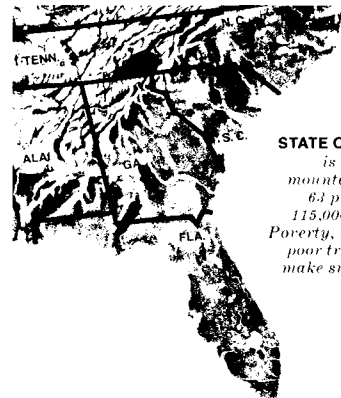
A supplemental proposal for two mobile intensive coronary care ambulances, to be attached to the four-bed coronary care unit of the Haywood County Hospital, was presented by Dr. Headley and Dr. Ralph N. Feichter of Waynesville, while the grant application was still under review. The ambulances would be manned by drivers trained in the use of cardiac monitoring and resuscitative equipment and would provide two-way radio contact with the hospital emergency ward and also with two on-call physicians.

Since it is believed that most deaths in myocardial infarction occur within two hours of the onset of symptoms and perhaps 60 per cent of those dying do so within the first hour, the use of such emergency intensive care vehicles, they argued, could play a significant

life-supportive role in areas that are many miles from the nearest hospital.

The ambulance proposal was approved and has recently begun operation. When a cardiac emergency is reported, both the ambulance and the on-call physician converge on the patient at the site of the attack, thus providing intensive care measures during the critical first hours of a myocardial infarction.

To compensate for the dearth of local heart specialists, the coronary care units in the eight participating hospitals maintain a round-the-clock telephone tie-in with a monitoring and consultation center at the Bowman Gray School of Medicine. This telephonic system, which was urgently requested by the



STATE OF FRANKLIN is seven-county mountain area with 64 physicians for 115,000 population. Poverty, isolation and poor transportation make swift coronary care difficult.

unit directors, only one of whom is a cardiologist, serves a variety of functions. Hooked up to a special device that converts kymographic tracings into phonic signals, it can be used to transmit 12-lead ECG data of a critically ill patient to the receiving center, where a similar unit reconverts the beeps into a standard ECG. Verbal information about the patient's history and condition, called in by the unit director or coronary care nurse, is automatically recorded at the center for a follow-up reply after the ECGs have been read by the physician on call.

The practice of centrally taping or graphing all data from the community hospitals assures a permanent record of clinical experience at the coronary care units and permits the most flexible use of diagnostic personnel at the center. Consultation advice in critical cases is usually given within a half hour of the incoming call; less urgent questions are answered within 24 hours by telephone or letter.

Although guidance and supervision of the coronary care program have been provided from its inception by personnel and agencies outside the state of Franklin, emphasis throughout has always been on the encouragement of local control. Thus RMP's contribution to the project has been restricted to the purchase of equipment (e.g., mobile consoles that are used mainly to monitor standard lead II, and remote oscilloscopes that can monitor four patients simultaneously) and the provision of educational facilities and training for physicians and nurses.

Each participating hospital provides rooms to house the units plus accessible space for the remote monitor, which has an adjustable alarm bell, at a nursing station or in the hall. All payment for patient care is covered pri-

vately on a graduated-fee basis or by insurance, according to the prevailing patterns of the area.

Ultimately the success of the project, its leaders agree, will depend on the level of professional training that is achieved by the physicians and paramedical workers who operate the coronary care units. To this end, an impressive program of classes and seminars for physicians, nurses and auxiliary personnel is being conducted in the hospitals and at the state's three medical schools—Bowman Gray, Duke University, and the University of North Carolina—on various phases of cardiac monitoring, recognition of arrhythmias, therapeutic management of acute myocardial infarction and related problems. Attendance at these courses has exceeded all expectations, sometimes necessitating the expansion of teaching quarters or the setting up of extra classes.

Improvement of emergency techniques

"Clinically and educationally, there's been a lot of valuable spin-off from the coronary care program," says Dr. Feichter of the Haywood County Hospital, at Waynesville. "From ambulance to emergency room to unit, it has improved the way we handle shock—regardless of cause—as well as our use of cardiovascular drugs; it also has greatly shortened the crucial period between the onset of an attack and the beginning of treatment."

"After all," he adds, "there's no longer any mystery about treating coronaries. But to an untrained nurse, the idea of using a defibrillator or giving drugs was frightening. These in-service courses will save many lives."

The impact of the CCU program on local practitioners who have participated actively in its implementation has been well expressed by Dr. Doralea Harmon, unit director at the Angel Community Hospital, in the town of Franklin: "Before this development we felt so isolated from the larger medical communities that we lost a lot of the enthusiasm of our medical school days. Furthermore, for years we contrasted ourselves with the large medical centers, which resulted in a feeling of 'we can't compete with them, so why try.' Now we are aware of the fact that we are a part of the larger units, yet we are able to retain our local autonomy."

"In the beginning, when we first talked about the idea of establishing coronary care units throughout the area, a lot of people said 'It'll never work,'" says Dr. Walter Mauney, unit director at Providence Hospital in Murphy, a low-income community of 2300 people at the edge of the Smokies near the Georgia border. Murphy has no heavy industry, nor does it enjoy the seasonal tourism that is the mainstay of neighboring, more mountainous towns.

"Many poor and elderly citizens of this area cannot afford the additional expense of a long trip to a major center for coronary care," says Dr. Mauney, "even supposing they could survive it." The unit already has saved the lives of several neighbors, and Murphy citizens are so proud of their new coronary care facility, says Sister Mary Francis Xavier, director of the 31-bed hospital, that they constantly display it for visitors when the unit is not in use.

Perhaps nowhere in the state of Franklin is intensive coronary care more welcome than at the Public Health Service hospital on the Cherokee Indian Reservation. The Cherokee suffer a singularly high incidence of diabetes,



EXAMINING TAPE. Dr. Ralph Morgan and Viola Williams, R.N., discuss changes in the patient's medication. Nurse (upper right) hurries to view the

and arteriosclerosis of all organs is common among them.

Dr. Will Nash, unit director, cites the example of a 65-year-old diabetic—a music teacher on the reservation—who was stricken with Stokes-Adams syndrome and admitted unconscious to the hospital. Despite his age and poor vascular condition, the patient responded so well to drug therapy that he was transferred to the ward.

"This improvement was transient, however," relates Dr. Nash. "Within a short time the patient developed ventricular tachycardia, and we put him back in the unit, where we could monitor his rapidly deteriorating course. When third-degree heart block developed, I had him transferred to Asheville for the insertion of a transvenous pacemaker (no surgery or catheterization is done in this unit), and today he's fine."

"Were it not for the intensive management made possible by continuous monitoring in the coronary care unit," Dr. Nash asserts, "I believe this patient would not have survived the initial attack, when the long trip to Asheville would have been extremely hazardous. In small community hospitals like ours, where you're always short of staff, the units provide badly needed eyes and ears."

The crucial role of local practitioners in making the CCU program effective is stressed by Dr. Musser. "Every physician today is making a real effort to find a way to provide better patient care," he says. "RMP is trying to help him, but we can only do this by relying on the doctor to tell us what his patients'

AT 4500 FEET in the mountains, Dr. William Oglesby, at Highlands Cashiers Hospital, reads ECG. Coronary care units were welcome at the hospital, which treats many of the area's aged vacationers.





oscilloscope in the hall when warning bell rings. Remote monitors can be placed at central nurse's station, as seen in the Cherokee hospital at right.

needs are. Without him there would be no program as such. That is the unique feature of RMP—decision making on the local level to solve local problems.”

Of the early resistance met by RMP to “one more Government-sponsored medical program,” Dr. Musser says: “It was natural enough for the local physicians’ reaction to be ‘the medical schools will get all the money anyway, so why should we care?’ But once they realized that the program’s initial thrust was to reach them and that the money really was going to solve local problems, they came to us with a host of proposals.”

Before any proposal can be implemented, it is exhaustively reviewed by RMP’s Administrative Core (which provides professional guidance), Board of Directors (which initiates, reviews and approves applications) and Advisory Council (which evaluates programs for relevancy to community needs). Once a program has proved feasible (three years is the usual time allotted for this determination) the RMP steps out and the local practitioners, community hospitals and medical societies assume full responsibility. If the coronary care units continue to prove their value, for example, funds for additional units and equipment will be raised locally.

If a visitor came to the C. J. Harris Community Hospital in Sylva today, he would see a sign that is sharply reminiscent of the controversy that once faced the proponents of RMP: “Belligerence can be a smoke screen for ignorance.” To Dr. Ralph Morgan, the unit director, this characterizes some of the early



fighters that greeted the idea of Government-sponsored equipment, which everyone now finds so indispensable.

“Advances in knowledge were bound to bring changes in patient care,” he says. “But provision of this kind of unit and the teaching that goes with it can only improve medical practice. The RMP has already been

responsible for the accreditation of several of our small hospitals, and even in this short time has improved the delivery of health care to our patients. We may be in a remote area, but our patients read the papers and watch television, and now they know that you don’t have to live in one of the big cities to get up-to-date medical care.”