

1954-55



Our readers will recall that two years ago we published a series of letters from Dr. Ancel Keys, head of the department of physiological hygiene at the University of Minnesota, to Dr. J. A. Myers and the readers of THE JOURNAL-LANCET. The letters were accounts of his medical observations during a year of foreign travel. Dr. Keys is now in Naples doing further research and studying in more detail cholesterol metabolism and its relationship to nutrition and cardiovascular disease. We are delighted to have the opportunity to present the first in another series of letters from him telling of his work and impressions in a foreign country.

Notes from a Medical Journey

February 24, 1954

Faculta di Medicina, Universita di Napoli, Naples, Italy

Dear Jay:

Two years ago in Naples at this time we were finishing our first field exploration of the relationships between "degenerative" heart disease, the cholesterol in the blood serum, and the habitual diet. Now we are back again in the shadow of Vesuvius, doing a much more detailed study with a wealth of experience gathered since in England, in Spain, and Minnesota, to guide us. The guesses we began with are now a theory. So far it stands up under the test of many new data and clearly it warrants the most intensive examination. We are a long way from having all the answers, but it is certain there is a major relationship between the diet and the blood serum cholesterol and lipoprotein picture, on the one hand, and between the blood chemistry and the development of atherosclerosis, on the other.

Evidence continues to accumulate that the incidence of atherosclerosis and "degenerative" heart disease in Italy, is, indeed, much less than among American men of the same age. And this fact nicely explains why the total mortality rate from all causes for men of given ages from 35 to 65 is considerably lower here than at home. That this is related to the low fat content of the diet is further indicated by the new (unpublished) data from our colleagues in South Africa who have been studying the local Bantu in comparison with South Africans of European descent who are, like ourselves, on a high fat diet.

The most important characteristic of the diet seems to be the content of total fats. We are unable to find any difference between the various common food fats and oils in this regard and even the total calorie content of the diet seems, by itself, to be of relatively small consequence. That is to say that, other things being equal, relative obesity may be of small consequence in producing atherosclerosis, though it may aggravate the clinical picture resulting from a given degree of atherosclerosis. Finally, all of the evidence continues to indicate that the cholesterol in the diet is of no importance to man. Switching from butter to margarine will not help!

This is the general picture of the problem as we begin the work here under far more auspicious circumstances than faced us two years ago. On the practical side, I now have about a dozen collaborators here instead of just Margaret and Dr. Flaminio Fidanza as before, and our thorough preparations have provided us with highly efficient methods and an abundance of human subjects. Dr. Fidanza, grown in local prestige and in experience from his year's Rockefeller fellowship with me in Minnesota, has the laboratories well arranged, the subjects on tap at the right time, and dashes around in high good humor attending to a thousand details. Professor Gino Bergami has oiled the way in high official circles and has taken great delight in devising a most efficient apparatus to dry our cholesterol extracts. Professor Ruggiero Marotta is working hard to make the clinical and hospital material available, and Professor F. di Lorenzo has seen to it that we have the city clerical workers and the entire fire department personnel as subjects.

Margaret again manages the department of cholesterol analysis with the able assistance of Dr. Ratko Buzina of Zagreb, Yugoslavia, while Dr. Bengt Swahn of Lund, Sweden, runs his paper electrophoresis analysis of the lipoproteins on all of the samples. Dr. B. Bronte Stewart of London and Cape Town helps in these chemical studies as well as in some of the clinical work; he is to return to Cape Town where our old friend Professor John Brock is starting similar work in a long-distance collaboration. Dr. Joseph T. Doyle of Albany, New York, currently has charge of the clinical work and is preparing the ground for the arrival next week of the rest of the clinical team consisting of Dr. Paul D. White of Boston, Professor H. Malmros and Dr. Gunnar Björck, both of Lund, Sweden. Finally, Ernest Klepetar, Actuary of the Mutual Service Insurance Company (St. Paul), is in constant consultation and work with the Italian insurance companies gathering data on the mortality experience here as compared with the United States. In this project we have true international collaboration without a hint of politics.

Naples has changed little in two years except for the increased traffic, which now truly surpasses description and is calculated to terrify the inexperienced driver and pedestrian alike. I find the Plymouth station wagon is a lot harder to drive here than the little Hillman we had the last time, but it is invaluable and is constantly at work carting around subjects, staff, and apparatus. One important group of subjects consists of the heavy workers at the ILVA steel mills a few miles out of Naples proper, and there we start work each morning at 7 a.m. A little after 9 a.m. we are back working with the firemen. The main university clinics are close to the "Istituto" where we have our headquarters, but some of the biggest hospitals are a long way off and the net result is that the Plymouth is constantly hard at work.

We, too, are constantly hard at work on a schedule that must be cut down a bit eventually before chronic fatigue leads to collapse. Not all of us are up at 6 a.m. to start for ILVA, but the full day at the lab starts at 9 a.m. and we are not always able to finish by 7 p.m. The Italian custom is to take close to two hours for lunch but we all eat in the lab; it takes ten to fifteen minutes to eat our bread, cheese, sausage, fruit,

and wine. Breakfast is a cup of coffee and milk ("caffè latte") and a raised doughnut at a coffee bar. Our one real meal a day is taken, after a glass of vermouth, at about 9 p.m. But the work is going very well indeed and we are all feeling fit except for the cold which congeals the marrow of our bones in the laboratories and all the official buildings. Today it has warmed up a bit and the temperature in the lab is now at noon 59° F.

Obviously, there has been little opportunity for sightseeing and relaxation so far. Spare moments are snatched for studying Italian -- which has more grammatical complications than German, I think -- and for essential correspondence. I have a lot of the latter in connection with the forthcoming World Congress of Cardiology in Washington next September. The Congress is to open with a morning devoted to the epidemiology of cardiovascular disease for which Paul White and I are to be co-chairmen. I have the first half on coronary disease and have now lined up top-flight speakers from England, South Africa, Japan, and Sweden, as well as the United States, so this job is about done. Now I may have time to write to our children who are with their grandparents in La Jolla, California. And tonight we are going to the opera, "La Nozze di Figaro."

So far we have been to the opera only once ("Rigoletto") on this visit. As always seems to be the case at the Teatro di San Carlo, the singing was wonderful, the orchestra more precise than at the Metropolitan in New York, the audience dazzling with jewels and magnificent gowns, and the whole experience an adventure into never-never land. And so tonight it will be a mad dash to get into evening clothes, grab a bite and hope to get into our seats before the curtain rises at around 9:20. The coffee we shall take between the acts will not, I trust, keep us awake when we get to bed at about 1:30; I know it will not help me to pop out of bed at 6 a.m. tomorrow morning!

With best wishes to all our friends in Minnesota,

As ever,





Our readers will recall that two years ago we published a series of letters from Dr. Ancel Keys, head of the department of physiological hygiene at the University of Minnesota, to Dr. J. A. Myers and the readers of THE JOURNAL-LANCET. The letters were accounts of his medical observations during a year of foreign travel. Dr. Keys is now in Naples doing further research and studying in more detail cholesterol metabolism and its relationship to nutrition and cardiovascular disease. We are delighted to have the opportunity to present the second in another series of letters from him telling of his work and impressions in a foreign country.

Notes from a Medical Journey

March 17, 1954

Faculta di Medicina, Universita di Napoli, Napoli, Italy

Dear Jay:

The time goes flying by; we still work from early morning until far past a reasonable supper time and Naples is still colder than would seem comfortable for the palms and the orange trees. But every other day now is really spring-like, though the laboratory temperature has yet to go as high as 63° F. We now start at about 8 a.m. instead of before 7 as we did the first few weeks when we were studying the heavy workers at the steel mills. But, best of all, we have done a great deal of work with, we think, highly significant results. The end of this research project promises to be much more accomplished than we could have expected when we planned the "invasion" of Naples.

Drs. Paul D. White, H. Malmros, and Gunnar Bjorck (the latter two from Sweden) have arrived on schedule and we have an unexpected addition to our group in the person of Dr. Robert Dale of Australia who is a new major member of the staff of Dr. J. N. Morris' Medical Research Unit in London. Dr. Vittorio Puddu of Rome, Drs. Poppi and Postelli of Bologna, and Dr. Bendandi of Modena have all visited us for some days with the result that we have access to much more material in Italy. In a couple of weeks we shall move operations to Bologna for a week where we shall see what the situation is in the Province of Emilia, the region of Italy with the highest fat consumption and -- reputedly -- the highest incidence of coronary disease. Our work in Bologna will be only exploratory but our colleagues there will carry on after we leave.

We finally finished the study of the heavy workers with a sample of 140 men, nicely distributed for age. And we discovered that by sticking to our professional job and treating the men as fellow human beings we could get along very well, in spite of the warnings we had about the impossibility of getting cooperation from "that bunch of communists." True, they all belong to a union completely dominated by the communists, but then they are all Italians, which means they are very human, essentially cordial, and not really dominated by political theories. I suppose if

my Italian were more fluent I should be more exposed to political discussion, but I must say that the heat of politics is less evident here than in the States.

The analysis of the data will take a long time, but several points are abundantly clear. The cholesterol values are much like those we found with the small sample of firemen we studied in Naples two years ago. There is the same rise in the serum with age until around 30 or 35 and no further age trend to 60. And the serum cholesterol values are low; at age 50 the mean value is about 50 mg. per 100 cc. lower than our "standards" for Minnesota. We are also interested to find that these heavy workers are, like the firemen, just about as frequently "overweight" as our businessmen "guinea pigs" in the Twin Cities. And it may be significant that we find practically no evidence of myocardial disease in this group, in spite of the fact the group was not preselected for health and more than half are over 45 years of age. Finally, the diet is low in fats and oils.

Since finishing the heavy workers, we have been studying the firemen. This time we shall do the entire fire department, or rather we shall study as many as we can before we leave, and then Dr. Fidanza will carry on through the rest of the group of some 550. On the firemen, as with the steel workers, we are doing the usual physical examination, a series of anthropometric measurements, a complete electrocardiographic study, serum cholesterol, and a detailed analysis of the serum lipoproteins by means of Swahn's new paper electrophoresis method. The latter method works beautifully; 2 analysts working together can keep up a pace of 12 samples a day if they count a "day" as ten to twelve hours. Swahn himself returned to Sweden last week end, but now Dr. Buzina (of Zagreb, Yugoslavia) carries on with the help of whoever else can be spared. There is no doubt that the concentration of the beta lipoproteins in the serum has importance for the development of atherosclerosis, but whether this is more significant than the cholesterol measurement remains to be seen.

One result of Dr. White's joining us here for a month is that he was immediately sought out by a former patient, now a prominent businessman here, and both of us were presented to the Naples Rotary Club last week. Besides a good lunch and another view of life in Naples, a real accomplishment was to interest the local "big shots" of business and to secure about 50 volunteer "guinea pigs" among them. Naturally, we are interested in studying these men because they live much as we do at home. Though their diet is much lower in fat than ours, it is still much higher than that of the general population. Like the poor, they eat a lot of spaghetti and bread, but they have more oil and fat on the spaghetti and about half of them use butter on their bread. And, like their American counterparts, they are almost completely sedentary and are mostly overweight. Already 10 of these men from 40 to 60 years of age have been in as subjects. Their cholesterol values are considerably higher, on the average, than we are finding in the poor men, and at least 3 of the electrocardiograms show evidence of myocardial disease. The most startling finding was that 4 of the first 10 have pronounced xanthelasma. We have yet to see xanthelasma in almost 300 men of the general poor population.

The clinical members of our team, that is Drs. White, Malmros, Bjorck, and Doyle, have spent most of their time visiting the local hospitals and clinics and talking with innumerable local physicians. They have systematically gone through the hospital wards looking for heart disease. There is no doubt that a lot of rheumatic fever and valvular disease is here, but the absence of myocardial disease and coronary occlusion is really remarkable. Of course this gives us much more confidence in the evidence from the vital statistics as to the relative rarity of coronary disease in this area. If anything, it may be that "myocarditis" is overdiagnosed here because we have found a number of cases in whom the diagnosis was based on nothing but fibrillation or flutter with otherwise clean electrocardiograms and no angina. But the problem of getting an exact estimate of the incidence of coronary disease is extremely difficult. It is not made easier by the fact that the various medical services, even in the university or in the same hospital, are quite independent and do not exchange services or information.

This letter is all work and no play or "tourism" but that is the way we live. Naples teems around us, noisy, dirty, colorful, but we forget much of the strangeness and no longer look out the window when we hear street musicians outside, as I do at the moment, nor comment to see a small boy go down the corridor carrying a tray of tiny coffee cups and a pot of "caffe espresso." Lunch of half a loaf of wonderful Italian bread, an ounce of cheese, an orange, and a glass of red wine seems the most natural thing in the world and the clarity with which we see Capri across the Bay is noted only because of its relevance to the likelihood of rain in the next few hours. When Capri is very clear, rain is in the offing.

Speaking of Capri, last Sunday we all went there for the day and visited the delightful little villa at Anacapri where Paul White wrote the first edition of his book "Heart Disease" just 25 years ago. Dr. and Mrs. White were thrilled to show us around and to recall how they worked and savored the sea and the mountain that spring a quarter of a century ago. Though the sun stubbornly refused to beam, we had a wonderful time and plan a similar excursion next Sunday to the island of Ischia. Very appropriately, the first Italian edition of Paul's book (translated from the fourth American edition by our friends Poppi and Postelli) is just coming out and an advance copy arrived here last week.

Morning comes to us here in Naples seven hours before Minneapolis and I like to think the sun carries our greetings westward each day. Anyway, this tiny branch of the University of Minnesota sends best wishes to you and all our good friends back home.

As ever,





Our readers will recall that two years ago we published a series of letters from Dr. Ansel Keys, head of the department of physiological hygiene at the University of Minnesota, to Dr. J. A. Myers and the readers of THE JOURNAL-LANCET. The letters were accounts of his medical observations during a year of foreign travel. Dr. Keys is now in Italy doing further research and studying in more detail cholesterol metabolism and its relationship to nutrition and cardiovascular disease. We are delighted to have the opportunity to present the third in another series of letters from him telling of his work and impressions in a foreign country.

Notes from a Medical Journey

April 14, 1954

Universita di Bologna, Policlinico, Bologna, Italy

Dear Jay:

The work in Naples finished in a frenzy of work and we have moved north. Here in Bologna the peach blossoms are in full glory, but a top-coat is appreciated in the mornings and evenings. Spring is late and the Bolognese complain that by now they should have strawberries and nights when they can stroll the streets until midnight or later, chatting with friends and sipping coffee ("espresso") at the innumerable coffee bars.

Margaret and I drove here from Naples with Dr. Flaminio Fidanza and are attempting in a week to finish work that should take a month. Our friends here, Professor Sotgiu, Poppi, and Postelli, prevailed on us to study a sample of men of Bologna where the diet is higher in fats than in other parts of Italy and where heart disease is much more of a problem than in Naples. So now we are at it early and late with policemen as our subjects. By the weekend, when we must stop, we shall have covered about 60 men as our exploratory sample here. Our facilities, and the medical school in general, are much better than Naples, but always some motion is lost in setting up shop in a new place. In the meantime, our friends are determined to demonstrate the traditional hospitality of Bologna and so far we have not had a meal alone or an evening when we can simply go to bed. This evening we go to Modena (only 20 miles away) to dine with Dr. Coppo, the professor of Medicine at Modena. If we are lucky, we can finish at the lab by 7:30 and arrive at Dr. Coppo's home, a little breathless, by 8 p.m.

Our collaborators, except for the Italians, have all gone their several ways and we are receiving notice of their arrivals in Sweden, South Africa, England, Yugoslavia and the States. On the way out of Italy, Drs. Paul White and Gunnar Bjorek (of Sweden) stopped here in Bologna for six days and covered a prodigious amount of ground, making an inventory of the 1,156 patients they checked in the various hospitals and clinics. I have just received Paul White's report (14 closely written large pages).

from which it appears there is a high incidence of rheumatic fever and hypertensive heart disease and a moderate amount of coronary and myocardial disease. The difference from Naples seems clear enough and, together with the evidence of vital statistics and insurance company data, should allow some pretty firm conclusions, particularly when the parallel surveys in Sweden and the States (Boston, Albany, New York, and the Twin Cities) are finished. We shall have much to report at the World Cardiological Congress in Washington this September.

Bologna has been a great medical center for centuries and from what I have been able to observe, the medical school is still first class. Drs. White and Bjorck found good doctors, hospitals, and records. We could mention other places we have been in the States as well as abroad which would not bear comparison. We were surprised to find more than 100 American medical students in the school here. They have a long grind of six years, but they seem to be pretty good boys and to be receiving good training. So far, about 20 Americans have taken their degrees here in the past two years and all have passed their State Boards, etc., at home with no difficulty. Most of them like many things about the life here, but agree that there is no place like home and have no idea of settling down here in Italy. They enjoy the fine (but rich) food, the architectural beauties, the evidences of the continuity of history reaching back to the Romans, the excellent small Italian cars, and all that, but they do not really belong and miss friends and families.

On Sunday, Dr. Postelli showed us around a bit of Bologna with the kind of guidance that only a local scholar, imbued with the real love of his subject, can give. Of course, we saw the monument of Galvani and the frog and we were treated to all the details of the radiologic study of the bones of Saint Dominic. We visited the great orthopedic center and the tomb of Dr. Putti in the attached chapel at the "Istituto Rizzoli" and lunched with gastronomic delight at "Ristorante tre Galli d'Oro" (Three Golden Cockerels). Fortunately, the excellent local "Lambrusco" wine, which is red and naturally sparkling, is very light and long ago we learned to forego both appetizers and desserts, so we were able to look at the leaning towers of Bologna later without misgivings about our own equilibrium and even, at 9 p.m., to sit down to another notable meal at the "Ristorante Pappagallo in Brodo" (Parrot in the Soup).

(Later) My effort to write to you was interrupted by the arrival of another batch of policemen and then, at 1:30, we were driven off to have lunch at the top of the hill of San Luca far above the red tile and brick of Bologna, with all of the plain of Emilia stretching off into the golden haze of spring sunshine below. The local "Monte Albano" wine (golden, naturally sparkling, and just as light as Lambrusco) was the proper foil for the "lasagna gialla" (casserole of fresh noodles, cheese, chopped meat and butter), veal cutlet, baby fresh peas and diced, smoked ham, french fries, and oranges; but we followed up with concentrate of black coffee ("espresso") to give us strength for the long afternoon of work ahead. Now we are back at the Clinica Medica and I am pounding this out to the tune of the blower drying our cholesterol extracts and the chatter of half a dozen assorted Italian physicians and chemists who are

helping Margaret and Flaminio. Soon I must move the typewriter off the colorimeter table, because I think in a few minutes we can start the photoelectric readings on this morning's bloods.

I have little idea what detailed analyses of the Bologna data are going to show, but I do know: (1) the cops here are taller, on the average, than any groups we studied at Naples, (2) they are much like the Neapolitan firemen, heavy workers, and businessmen in fatness (i.e., much like men at home), (3) some have cholesterol values that would be considered very high on the Neapolitan scale, (4) 20 per cent of these men have very pronounced acne and old acne scars on the whole of the back, in spite of the fact that all are scrupulously clean and many are in the 40's and 50's. This is the sort of observation that probably has nothing to do with what we are after but does add the element of surprise that enlivens such explorations. When I called attention to the frequency of acne, the local physicians all chimed, "diet!", and went on to condemn the fatty diet of the region. All I know is that I have not seen this sort of thing before.

Tomorrow we have the last 15 policemen plus 5 prominent local businessmen (to lend our prestige to the idea of such men being "guinea pigs"), and I fear we must come back after dinner (another invitation, of course) tomorrow night and work until the small hours of the morning if we are to pack up the following day. Easter Sunday we shall spend at Ravenna with Dr. Bendandi of the medical department at Modena who is anxious to show us the Byzantine and Gothic glories of his home town. Then for a couple of days I think we shall have no commitments other than to turn up at Genoa in time to put the car on the "Independence" on the 24th.

So it will not be long before we are home again and the midnight oil will burn under the stadium. While we are away, "Yoshka" Brozek has carried the burden as acting director of the Laboratory of Physiological Hygiene. He has done a fine job, but I know he will be most happy to hand over to me again. Henry Taylor, who held down the fort two years ago while we were in the field all year, is now in the hospital in Minneapolis, but I think he will be up and about, though not at work, by the time we are back. Apparently Dr. Kinsella did a fine job of decortication and now we may hope that Henry's troubles will be over.

Thus it goes. The older one gets, the faster time seems to move. And the more sense of urgency I have to do the things I think ought to be done. But now the ball is beginning to roll, I think, and other men of like mind are starting to work along the same lines in various parts of the world. Not that I have any missionary feeling but -- well, you know how it is; the research itch is incurable and whatever the pace, it is too slow in getting the answers.

With all good wishes to you and all in the "Land of the Sky-blue Waters,"

As ever,





The last letter in our series of Notes from a Medical Journey from Dr. Ancel Keys, head of the department of physiological hygiene at the University of Minnesota, to Dr. J. A. Myers and the readers of THE JOURNAL-LANCET was published in July. Dr. Keys returned to the United States for the summer, but is now again in Italy doing further research on cholesterol metabolism and its relationship to nutrition and cardiovascular disease. We are delighted to have the opportunity to present another letter—the first we have received since Dr. Keys returned to Italy in October.

Notes from a Medical Journey

October 21, 1954
Bologna, Italy

Dear Jay:

On Friday in New York there were headlines, "Hazel here at 5 p.m." but that is flight time and hurricanes were not on my agenda. No matter, bend over and push hard walking out to the airplane. Too bad about the lady's hat skittering by in the 50-mile wind. The Constellation needs none of the usual long run before we are flying into the air, leaving behind me what little enthusiasm I have about flying anyway. But in half an hour all is smooth, engines roaring monotonously as we cut a damp tunnel through endless clouds. Strictly routine; it is raining in Shannon -- it always rains in Shannon -- and then holes in the clouds and we are out in the sun over France.

The 'plane cabin gets hot as we wait to take off from Paris. Why the delay? Oh! the young man with the little beard is an Arab prince and the difficulty is where to put all his luggage. A thousand dollars for surplus baggage and he has a retinue of 20, all men. The Arab ladies stay home. I wonder, does he have a harem? Why bring them to Paris? Coals to Newcastle. That is Lake Geneva sparkling below us and the snow on Mont Blanc is pink in the late afternoon sun. Now it is dark again and those sparse lights so far below are little Italian villages. Buona sera! Que piacevole! Can I remember Italian?

We are two hours late at Rome but there are Flaminio Fidanza and his brother, waving under the floodlights on the airport terrace, and then we are dashing along the Appian Way in the little Fiat. No, it is not too late for a proper dinner, and, yes, first leave the bags at the hotel, and Doctor Fidanza Senior is very well and I agree that Swahn's lipoprotein method is not very reliable, OK to use the Bismarck Black stain to find the boundary between the alpha and beta fractions. There is no doubt that vegetable fats in the diet influence the serum cholesterol level but perhaps animal fats have more effect. We must study a population on a high vegetable fat diet. Some place in Puglia, down at the heel of Italy or, better still, the Island of Crete. Too bad they speak Greek

there, but for dinner they have a loaf of bread and a bowl of olive oil. Dip the one in the other, and the Rockefeller Survey got some mortality data on Crete but no mortality rates specific for age and cause. Must get someone to do a clinical survey on Crete; Dr. Paul White knows some Greek cardiologists, but all this will take time in planning.

In the meantime, why not work in Sardinia next April? The diet is even less fat than in Naples and the vital statistics indicate very little heart disease. Dr. Sotgiu, professor of medicine at Bologna, is from Sardinia and Drs. Poppi and Postelli of Bologna are also keen about Sardinia. We could make a better test of ballisto and electrocardiographic age trends. Compare men of Minnesota with men of Sardinia, better than Naples, and we can get more help. How much cholesterol in the beta lipoprotein fraction? That will have more meaning for atherogenesis than cholesterol or any amount of ultracentrifuging and the beauty of it is that we can run the paper electrophoresis easily in the field and do the chemical work on the paper samples months later. Our new micro cholesterol method will handle it beautifully.

And so it is Monday. In between there was exhausted sleep and miles and miles of walk and talk, over all the hills of Rome. Professor Kimura's analysis of 10,000 autopsies in Japan really shows the great rarity of coronary disease there and the diet provides only 8 per cent of the calories from fats and Flaminio is much impressed, as I expected, but there is no good place to sit down on the Palatine. The Janiculum will be better so across the Tiber to Trastevere -- how compact and expressive Italian place names can be! Stop for lunch, table out of doors but under an awning for it is warm. Start with mussels gratine and finish with pears and fresh, sweet Parmesan cheese. Up, up the hill of Janiculum, gardens filled with cypress and junipers trained and pruned to represent all sorts of animals and figures and then to the parapet, a little sweaty and short of breath, to gaze down on the Tiber and across to all of Rome, while we agree that the Italian medical schools can never really reach the first rank until they pay enough to keep full-time professors, and somehow reduce the autocratic authority of the department heads. It is the same in France and worse in Spain. To suggest the Socratic method of teaching here would create a scandal.

All day Monday, at the FAO headquarters of United Nations, is spent in drafting "working papers" for the coming Joint Experts' Committee Meeting at the headquarters of WHO at Geneva. It is a pity to deny the tempting day outside, a golden glow on all of ancient Rome spread out below the window. But my 1951 plea for attention to the influence of nutrition on "degenerative" disease now has a spot on the agenda and I must marshal the facts in concise argument.

Why should WHO and FAO give all attention to problems in "under-developed" countries? What are the real health problems of the U.S.A., Britain, Scandinavia, and so on? Why is there so little coronary disease in Japan and among all peoples who work hard and shun rich, fatty food? They would probably eat it, all right, if they had it, and then they would

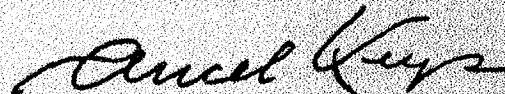
fall heir to our troubles. How long would it take? When the war forced fats from the tables of Europe, less than two years sufficed to bring adult mortality rates tumbling down, the postmortems showing much less atheroma. And then the glorious victory, a world to be rebuilt, back to good living, and the mortality graph switches up again. Now we shall progress, more and more is better and better; more sugar in the blood, more fat in the liver, more cholesterol in the blood, more blubber on the belly. Quick, we need more insulin, more oxygen, more hospital beds, more young widows. Los Angeles has more automobiles than anybody and who cares about the smog? You can't have prosperity without a little flatus.

Italy, also, is more prosperous. Too bad there is quite a lot of unemployment; too bad they don't send Togliatti back to Russia where he belongs; too bad there are so many Italians and no oil or coal or iron in rocky, beautiful old Italy. But the birth rate in Italy is less than in the States and besides Togliatti and his hard core of a hundred thousand real communists, there are millions of Italians who say, "Well, what do we do? We work hard, we are patient and cheerful and clever; we can make anything. You should see our new buildings and our old ones, look at our autos and roads and see what a good diet and good eating we can concoct from the cheapest of foods, and listen to us sing and laugh all the time. But what do we do to make a better life for all of us? Give me a job and give me some tools to work with. If I can only carry things like a donkey, then I can't get more than a donkey's wages." There are millions like this and to go stamping around talking about H-bombs doesn't help.

And here I am in Bologna, seeing about skinfold calipers and plans for research and being stuffed with the rich food of Bologna by my good friends who don't seem to worry about the intimal deposits in my coronary arteries. Tomorrow I shall escape to Rome for the week-end before going on to Geneva. But much has been accomplished and the arrangements for Sardinia are well in hand. Our clinical friends are enthusiastic about a big survey of the kinds of illness in Sardinia and here in Bologna. Two very different diets and we shall see what happens in April.

With all good wishes to all in Minnesota.

As ever,





The following letter from Dr. Auel Keys, head of the department of physiological hygiene at the University of Minnesota, to Dr. J. A. Myers and the readers of THE JOURNAL-LANCET, was delayed many months en route from Europe. Since Dr. Keys' letters always hold so much of interest to our readers, we are glad of the opportunity to present it even though it bears the date of many months ago and Dr. Keys is now home again in Minnesota.

Notes from a Medical Journey

November 2, 1954
Geneva, Switzerland

Dear Jay:

The final report of our Joint FAO/WHO Expert Committee on Nutrition has just been approved and the result, an untidy mass of mimeographed pages, litters the desk. At this stage, as always in such matters, it seems improbable that the outcome of so much debate, mental sweat, and compromise can really be of use to anyone. Obviously paragraph 3, section C, is sheer nonsense, paragraph 2-5, section E, are unintelligible to me, and the whole of section B carefully dodges all the important issues. Perhaps it will all look much better when it gets into print after Dr. Wallace Aykroyd has polished the English and I, like the rest of the committee, have recovered from the post-drafting letdown after seventy hours of unremitting work.

Anyway, it is a relief to look out across the blue reflecting lake to the ridge on ridge of snow-clad mountains ending in Mont Blanc, that sharpest white merging in the distant clouds. Outside the window the autumn leaves are flying and the fall colors, so brilliant a week ago, are fading, though the park of the Palais des Nations below me is still a glory of flower beds and the rich yellows and reds of trees rising from a sea of green lawns. The brightest spot of all is the semicircle of the flags of all the member nations. I spot the stars and stripes, of course, and each of my colleagues picks out his own symbol in the array.

In a few hours we separate -- Rao to Bombay, Bengoa to Venezuela, Terroine to Paris, Darby to Basutoland, Salcedo to Manila, Stiebeling to Washington, Aykroyd to Rome, Platt to England and then to the Gambia, Wright to England, Scrimshaw to Guatemala, Dols to the Hague, and I back to Minnesota. Perhaps we can carry with us some measure of new knowledge, new understanding, new tolerance and we may even hope to impart some of this to our colleagues at home. There is little or no politics in these expert meetings. As long as we stick to concrete questions of nutrition and health, as long as we worry about scientific knowledge and its proper application, we forget about national jealousies, fears, and military aspirations. And we discover how much we can learn from one another.

The committee went on record urging the need for research on the influence of nutrition on the development of coronary and other degenerative

diseases and the value of international epidemiological studies of the experiments of nature as represented in different countries. This, of course, was my meat and I was able to make good use of the example of the World Congress on Cardiology, last September in Washington, where the opening session, organized by Paul D. White and myself, was devoted to this subject and proved to be a huge success. One of the most promising developments here in Geneva was the evidence of awakening of interest of the World Health Organization as shown by the discussions with me about forming a study group to advise WHO what they might appropriately do in this field. I contend that while WHO must give major attention to the job of helping the underdeveloped countries in elementary matters of public health and medical education, the more direct problems of the other countries cannot be totally neglected indefinitely without danger of losing their support. And the biggest of these problems which beset the United States as well as most of the other advanced countries are those of the chronic and degenerative diseases of metabolic origin. Outstanding in this group is coronary heart disease and the most intriguing and hopeful question is why this is so common in some countries and comparatively rare in men of equal age in others. International collaboration in research on this question is essential and the sponsorship of WHO in this problem would be of great moral if not financial aid.

Anyway, at my suggestion WHO has appointed Dr. Arrigo Poppi of Bologna, Italy, as a short-time consultant to spy out the land in this matter and he will shortly make a quick tour around Europe to assemble the opinions of leading cardiologists and public health experts on the atherosclerosis question as a field for WHO. It seems probable that a group of us will be called to Geneva next year as a study group to get more definitely at grips with the problem. The nutrition aspect will be in the fore because it is no longer possible to deny that the diet, particularly its fat content, has much to do with the development of athero and the subsequent coronary heart disease. It is good to see the growing recognition of the significance of our own work on this in Italy, Spain, and England as well as at home. Perhaps the enthusiasm about all this I expressed in my letters to you during the last couple of years was not misplaced after all.

On my way to Geneva I managed to have conferences in Rome and Bologna, as I think I wrote you, and further correspondence along the way make it pretty certain that we shall again be off on field work in February of 1955. We must get more data on the blood picture of Italians living at different levels of fat in the diet, we want to check, personally, the story of the South African Bantu who is reported to be remarkably free from coronary occlusions and who lives on a very low-fat diet, of corn meal, and above all we want to put our method of separating the blood plasma lipoproteins by paper electrophoresis to work on some of these populations.

In Minnesota at least, we now can separate the alpha from the beta lipoproteins in 0.1 cc. of serum on a strip of filter paper moistened with buffer solution with a potential of 185 volts between the two ends applied for 15 hours in a moist chamber, cut the paper between the separated portions, and extract and measure the cholesterol in each portion. Our method has been developed from that of Bengt Swahn, who worked with us last year

in Italy, and is rather similar to a method recently described by Nikkila in Finland. Unlike the other methods of this type, we have taken the trouble to run hundreds of duplicates and to check it by parallel measurements with the method of the late E. J. Cohn in which the various proteins are separated by precipitation by alcohol at minus 5° C. It looks good and has the advantage that it can be done readily, we think! in the field where we may have only primitive laboratory facilities. While I am here in Europe, Dr. J. T. Anderson and others in the Lab. back home are busily engaged in applying both this and the cold alcohol method to the members of the Minneapolis Fire Department and to the coronary patients being rounded up by Dr. Reuben Berman. And my former student, Dr. Flaminio Fidanza is trying it out in Naples.

The point of the fuss over the beta lipoprotein measurement is that it may be even more closely related to the development of atherosclerosis than the total cholesterol. Of course the difference cannot be very great because beta lipoprotein is almost half cholesterol and most of the total cholesterol of the serum is in this fraction. From our preliminary work, in trying to distinguish between patients with coronary disease and healthy controls, the beta lipoprotein cholesterol seems to be a trifle better than the total cholesterol and both of these measurements prove to be better, in our hands, than Gofman's "Sf" analysis with the ultracentrifuge. We still think that none of these methods is much good in attempting to predict the coronary future of the individual patient but they are all certainly valuable in research with groups. Incidentally, Gofman's new "atherogenic index" seems to be nothing but a complicated and very expensive way of estimating the cholesterol in the beta lipoprotein fraction in the serum, or, at least, that is about what it adds up to.

But now I must pack and face the prospect of no sleep for the better part of forty-eight hours while I hurry home, changing planes in London and Boston with a hectic stopover at the Massachusetts General Hospital meeting of the Research Committee of the American Heart Association. There we shall have to select among some 100 applicants for Heart Fellowships to keep our commitment for next year to around \$350,000 in this category. Phooey! to those who think this traveling around is an easy life.

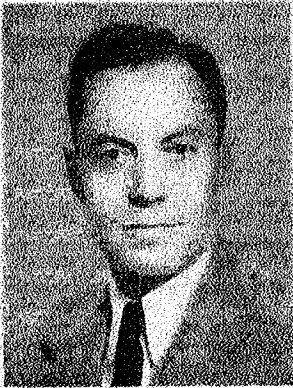
Probably my fatigue and somewhat ill-humor at the moment is heightened by the fact I seem to have picked up a flu "bug" from Guatemala via my friend Dr. Nevin Scrimshaw. I feel far from right, and I have just stopped to check my temperature and find it is 102°. Damn!

Anyway, I am anxious to get home and trust that aspirin and phenobarbital will waft me over to England and across the Atlantic. I hate airplanes but they do wonders in keeping an 11,000-mile itinerary within possible time bounds. By the time I am back in Minnesota, you will still be settling election bets.

With all the best until then to you and our good friends in Minnesota,

As ever,





Notes from a Medical Journey

Entebbe, Uganda, East Africa

Dear Jay:

Since last I wrote I got home from Switzerland, entirely recovered from the 'flu and determined to do six months' work in three so as to get off on the present job with urgent reports and papers written, research data analyzed up-to-date (what a hope!), lectures given at Ames and New York, and all in readiness for the work in South Africa and in Italy. As you can imagine, we took off on this trip more than a little red-eyed from lack of sleep. The South African Council on Scientific Research had invited me to Cape Town where we could at last get on with studying the Bantu, the Cape Coloured and Europeans in collaboration with our good friend Dr. J. F. Brock, professor of medicine.

So here we are, en route, exactly on the equator at Entebbe. Lake Victoria is sparkling in the sun a couple of hundred yards away. From the formal flower beds just outside the window, immaculate lawns sweep down to the water, only occasionally broken by great and strange trees. The Bougainvillea, tumbling down the wall and over the pergola in great masses of crimson, and the hibiscus grown into a 12-ft. hedge by the tennis courts, remind us of Mexico and of La Jolla, California, where our son is presently staying with my parents. That is until one of the big hibiscus flowers flies away. We rub our eyes but we were right the first time; it is a hedge of hibiscus in bloom and one of the flowers was a matching red bird. But the bird is no brighter than the dresses of the native Baganda women here who go swinging along with elegant carriage, their dresses sweeping to the ground in every imaginable color combination of rare harmony and brilliance glowing against their dark faces. The deep green hues of the tropical forest and the rich red of the earth makes a wonderful foil. Usually they are carrying something on their heads, anything from a huge basket of vegetables to a single bar of soap. This is a beautiful and peaceful land, with none of the strife of the Mau Mau not far away in Kenya or the fanatic nationalism of Apartheid of South Africa.

We have been staying a few days with Dr. and Mrs. J. N. P. Davies, professor of pathology at Makerere Medical College, at Kampala, 20 miles from here. Makerere is considered the best medical school in Central Africa and obviously maintains high standards with their small class (next

year they will increase to 20 admissions) of all colors of students who graduate with a University of London degree. "Jack" Davies has been the prime mover in bringing to light the prevalence of endomyocardial fibrosis among the natives here and in a vast region to the south. At home we think this condition is one of the greatest of rarities, but here it accounts for about 20 per cent of all the cardiacs. Yesterday I spent hours going over a hundred or so of the recent hearts from deaths from all causes (they get a very high proportion of posts), as well as a batch of saved-up specials and peculiars. The fibrosis was often the only lesion in the cases of death from heart failure, and this condition also appeared in a good many hearts of patients who never showed a sign of heart disease during life. There were cases where most of the ventricle was filled with a great white fibrous mass and frequently the fibres, apparently proceeding along the trabeculae, had produced valvular incompetence, particularly of the mitral valve. The aortic valve is never involved. Clinically, the picture corresponds to the mechanical situation and, therefore, suggests a rheumatic heart or, sometimes, constrictive pericarditis except in those cases where there is nothing evident but unexplained heart failure. No one knows the cause, but the commonest guess is that it is related to nutrition.

Of course I am here because of my ideas about the diet and the development of atherosclerosis. There is no doubt that the diet of the natives here is very low in fats (as well as in animal proteins) and that coronary atherosclerosis is extremely rare, though renal disease and hypertension are not. It is a startling experience to work down a long table covered six deep with adult hearts, most of which have at least a good part of the aorta attached, and see so little of the common picture at home. The insides of the aortas of men in the 50's and 60's often are like a good grade of grey glove leather (in other words like our children!), instead of the patchy, yellow spotted and lumpy stuff that you and I probably have to offer. I spotted one of the Minnesota Grade 3 and Dr. Davies said, "Probably a butcher." Actually, it proved to be a case of nephro-nephritis aged 50, but later I did find that the local butchers, who naturally have a fair consumption of the leavings of their trade, contribute a substantial proportion of Minnesota-type arteries.

Yesterday I talked with the surgeons who said they have lots of thrombo-embolic complications after surgery in the local Europeans and then they proceeded to count on their fingers the cases among the Baganda they have seen in the past few years. This reminds me of the wartime experience in Norway where postsurgery thrombo-embolic complications decreased even more abruptly than coronaries when the diet fat consumption dropped. It is not possible to put the blame on semistarvation because, though obesity is rare, so is emaciation and general undernutrition.

The diet of the local natives would horrify the nutritionists at home, and it certainly is low in meats and dairy products but it is generally adequate in calories and the classical stigmata of nutritional deficiency are not common among adults. The worst situation is that of the babies at weaning and up to the age of 5 or 6. From breast milk the change is to the adult diet, watered down a bit -- gruel or porridge of cereals containing low-quality proteins, bananas, sweet potatoes, cassava,

tapioca, or manioc and little, if any, milk or dairy products or meats. The result is an appalling frequency of "kwashiorkor" which seems to be mainly, if not entirely, the result of a deficiency of high-quality proteins. The babies often exhibit various types of dermatitis and tend to have down-like hair deficient in pigment so that their heads are covered with a soft reddish or grayish fuzz. More constant, however, is the edema, diarrhea, apathy, and irritability. The liver is big and full of fat, proteins in the blood plasma are very low as is the blood cholesterol. They are usually not emaciated and postmortem seldom reveals much indication of general undernutrition. If not too far gone, they respond well to skimmed milk and dry skim milk powder would save thousands of babies a year if it were available.

To me, perhaps the most significant thing about the recent research on kwashiorkor is the finding that when good proteins are fed the fatty livers rapidly lose their fat and at the same time the blood cholesterol rises greatly, though neither cholesterol nor fat is being fed. This ties in with everything else we know about cholesterol and fat metabolism. Whenever fat has to be transported from one place to another in the body, or mobilized to be combusted, there must be a proportionate amount of cholesterol to form the lipoprotein complex in which the fat is transported. The fat itself, like the cholesterol itself, is not soluble in the blood plasma or any of the rest of the aqueous system of the body, so the water-soluble lipoprotein complex must be formed. The infant with kwashiorkor gets rid of his fatty liver when he has a sufficient supply of protein to make the lipoprotein and, hence, the cholesterol in the blood rises greatly at this stage of high fat transport. When we Americans eat a diet with a high content of fat, we almost always seem to have plenty of the protein to form the lipoproteins needed to carry the fat in the blood and so the cholesterol rises in the blood. The liver almost always can synthesize all the cholesterol wanted for the lipoprotein and so all is well. The one danger is that some of the large concentration of lipoprotein may get "stuck" in the intima arteries and so leave a deposit of cholesterol there to produce atherosclerosis and coronary heart disease.

Doesn't this idea seem to fit all of the facts? We can even see why physical exercise should be beneficial because, first, it speeds up the circulation and so prevents the sluggish condition where deposition is favored, and, second, the increased energy metabolism tends to burn up the excess fat as it becomes available in the blood. This is all greatly simplified, of course, but even in detail it makes good biochemical sense.

But now the tropical night is coming on with a rush and we leave early tomorrow for the nine-hour flight to Victoria Falls and Johannesburg.

With all the best to you, the "U" and all in Minnesota,

As ever,





Notes from a Medical Journey

Cape Town, South Africa

Dear Jay:

A month of feverish activity has gone by here in South Africa and in a few days we shall be back in Italy, joining Henry Taylor, Reuben Berman, and Paul Dudley White for the assault on the Island of Sardinia. Tomorrow we fly to Durban to lecture to the medical school and compress a week's conferences and visits into twenty-five hours. Thence to Johannesburg for over night and to emplane for twenty-four hours of steady flying to Athens to catch a glimpse of the Parthenon, and so to Rome.

From where I sit, the red tiled roofs of the white medical school buildings are at eye level all around me, the big block of the Grootse Schuur Hospital is 200 yards up the slope, and right behind it rises the steep mass of Devil's Peak and Table Mountain. Over my shoulder, Table Bay gleams in the sun a couple of miles away, the waterline curving around to the brilliant white sands of Bloubergstrand where we dined on Sunday evening. The Antarctic whaling fleet is moving into the harbor today, and I wish I could go down to the docks to greet the great "floating factories" on their return from many months beyond the end of the world. It is curious how the feeling persists that Cape Town is the "jumping-off place." Well, look at the map and you will see what I mean. Still, the people here find, as do people everywhere, that the world extends around them in all directions and they are in the center. And certainly nowhere else is the air more soft, the mountains more solid, the sea more blue, or the flowers more abundant. How good it must have seemed to the small band of Dutchmen who landed here just 300 years ago! And it seemed good, too, to the French Huguenots and the English settlers who came in successive waves.

Each lot took up new land and pushed further inland, alternately battling the natives and using them for labor. Incidentally, they contributed to the "colored" (half-caste) population, now numbering 300,000 people who form a transition between 8 or 10 million Bantu and 2½ million "Europeans." Add 100,000 or so Malays, originally brought in as cheap labor and a few Bushmen, who were here before the Bantu, and you have the population of the Union of South Africa.

A colossal problem of assimilation and integration, you would say, but the ruling Nationalist Party here wants none of it. "Apartheid" (complete segregation) is their creed, and to us this seems like trying to turn back the clock. Of course, we in America would rather forget our own history of Indian reservations, Negro segregation, and struggles between the states. But we have made tremendous progress toward our professed goal of equal rights and opportunities for all. Well, it is not for me to comment, though I cannot help but be astonished at the fantastic lengths to which "apartheid" goes and aspires in grim opposition to the general trend of the times in this fast-moving modern world. I suppose that nowhere in the Western World is the road ahead more obscure and beset with more political hazards than here.

Anyway, we go out daily to factory and office, sampling the Bantu, the colored, and the European, checking their diets and bloods, recording electrocardiograms and bodily dimensions. Professor J. F. Brock and Dr. Bronte Stewart organized everything beautifully with a "task force" of 14 people for this intensive research job. So cholesterol measurements and paper electrophoreses go on at top speed in the laboratory. We are running out of acetic anhydride and the slide rules are slippery with sweat as we calculate results. Dr. R. Singer of the anatomy department comes in to say that he finds no difference between Bantu and European in the architecture of their coronary arteries. Dr. B. Kaplan is measuring miles of ECG records, and Dr. Vogelpoel reports that only one myocardial infarction has been seen in a Bantu in thousands of patients in recent years in the hospital.

We have sought information everywhere, and the answer is always the same as Dr. J. Higginson reported recently in Johannesburg: "Bantu on their native diet have very little atherosclerosis and coronary heart disease is extremely rare among them." The colored people, whose diet and manner of life is between the Bantu and the European, are somewhere between the other two groups in the prevalence of coronary disease. And, most important, we find both diets and blood cholesterols correspond. Not only is the total serum cholesterol very low in the Bantu; the proportion of cholesterol in the beta lipoprotein is low. This is not a racial or genetic difference. Bantu who get a bit more fat in their diets have higher cholesterols, and there is a clear rise in Bantu and in colored cholesterol values with rise in income. The few Bantu who manage to approach the dietary habits of the lower stratum of Europeans here tend to have serum cholesterol values which correspond.

Dr. Bronte Stewart is already scribbling away at the first draft of a preliminary technical report on some of the findings, but the full story will take a long time to come. In the meantime, it is perfectly clear that the main findings here conform beautifully to the requirements of the theory that the dietary fat level is a major determinant for the blood cholesterol concentration, and especially that in the beta lipoprotein fraction, and hence for atherogenesis and coronary heart disease. Moreover, the reason for this action of dietary fat is becoming clear. Fats and fatty acids as such are insoluble in water and blood plasma and can only be trans-

ported in solution in the body when they are combined with cholesterol and proteins to form the water-soluble lipoproteins. The liver is always able to make the cholesterol to cover the fats to be transported in the blood and the needed protein moiety, only 5 to 8 per cent of the serum total protein, is readily at hand to complete the lipoprotein manufacture.

Well, more of this later. Now I must prepare a final lecture for the local Chemical Society tonight, and the field team is back with the morning's loot of blood and records. I begged off to write letters and calculate results. On the latter, I can tell the team that we have done very well in matching the ages of our subjects--the mean ages of the 3 groups are all within less than one year of 47. And Margaret can tell them that there are only 7 recent serums to repeat because of poor agreement between duplicates.

In a few hours we must pack. Our bathing suits were never near any of the inviting beaches; we never went fishing; and this letter was barely written. Still, we did climb Table Mountain one Sunday, and on another Sunday we picnicked by an idyllic stream high in the inland mountains. And we have delighted in wild flowers and domestic gardens and magnificent grapes and excellent white wine and the comings and goings of the "table cloth" of cloud on Table Mountain. Everyone has been most kind and friendly, and the scientific data fill our bag of good fortune to overflowing. But I still wish we could sit quietly by the sea for a few days. I'd probably sleep around the clock!

As ever,





Notes from a Medical Journey

Cagliari, Sardinia

Dear Jay:

A week has gone by here in Cagliari and we can account for 91 men studied in detail in the lab while the clinicians, Drs. Paul White, Reuben Berman, and the Italians have surveyed the hospitals. We are doing the dietary work, anthropometry, physical examinations, and paper electrophoresis of the blood serum here but the final cholesterol analyses are being done in Naples and in Minneapolis. Fresh serum goes to Naples by the night boat and the paper strips go by air mail to the Stadium Laboratory so we shall end up with measurements of the total serum cholesterol and the proportions of the cholesterol in the alpha and beta lipoproteins. Henry Taylor, aided by his wife, is running a detailed ballistocardiographic study on all of the subjects. The electrocardiograms are going to Ernst Simonson in Minneapolis for the quantitative analysis.

We have lots of local help so the program here should not be too arduous, but our Sardinian colleagues are so assiduous with their hospitality that our time is filled with feverish activity from 8:00 a.m. until late at night. Mr. M. Aresu, the professor of medicine, is extremely cordial and generous and we are elegantly set up in the brand-new blood bank building which has not yet started regular operation. Across the street is the fine new building of the Medical Clinic (150 beds) and immediately behind us tower the great stone walls of the old fortified city. These ancient walls are, of course, a thousand years younger than the Roman city of Nora across the bay, while Nora, in turn, started nearly two thousand years after the building of the prehistoric "nuragi" -- the huge stone village fortresses of the early Sardinians which are scattered all over the island.

But I should retrace a few items of the last few weeks before I get lost in four thousand years of history. Nobody knows what the early Sardinians ate -- though I suspect the diet was lower in fats than our current diet in the states! Nor does anyone know what their medical problems were. One thing is sure; the men who built the nuragi were a good deal further advanced than the primitive Bantu and Zulu we left behind us in Africa two weeks ago.

The flight from Cape Town to Durban is about as far as from Chicago to New York but the coast of the Indian Ocean below us, with the mountains of the "Hottentots Holland" inland, could not be mistaken for the shores of Lake Michigan. When we landed at dusk it was like a mild Turkish bath after the gentle coolness of the Cape. Dr. Gale, the dean of the Medical School at Durban, met us at the airport and rushed us to the hotel for a hasty bite and a bath before my lecture. There was a good audience, with a reception and tea following, and the local doctors crowded around to tell me how rare coronary heart disease is among the Zulu who, like the Bantu we had studied in Cape Town, live on a very low fat diet.

Visits to laboratories and clinics (Drs. Ted Gilman and Sidney Kark) started early the next morning, but our host had saved the afternoon for an exploratory drive over a fantastically bad road through the Zulu reserve. Dr. Gale learned Zulu before he learned English so we had a fine time, stopping to chat with diviners and witch doctors and to admire a fancy "hair-do" or fine set of anklets on the women passing by. And as we charged up and down the mountain sides of the Valley of a Thousand Hills, we talked about the problem of providing medical services for some 10 million Bantu, Zulu, and Bushmen. At least it appears they need not worry about coronary heart disease nor are peptic ulcer, appendicitis, or thrombo-embolic phenomena common. As the sun sank lower, we stopped time and again to inquire whether the track we were on would eventually bring us out of the reserve onto any road to Durban, but no one knew for sure and by then we were beyond retreat. Anyway, we did catch the night 'plane for Johannesburg, there to change 'planes for the long (over 5,000 miles) flight to Athens by way of Nairobi and Khartoum.

Dr. Theodore Tsaltas, just back after several years at the Rockefeller Institute in New York, met us in Athens and we dashed around furiously, clambering over the Acropolis, drinking thick coffee and the ancient type of Greek wine that tastes of pine needles, all the while discussing future research. Tsaltas is promised a grant from the Williams-Waterman Fund which I am supposed to superintend from afar. The idea is to find out what happens to people who habitually eat a high-fat diet with almost all of the fat coming from olive oil. In parts of Greece, on the Island of Crete, for example, it appears that dinner consists of a piece of bread and a bowl of olive oil with maybe a bit of fish, swimming in olive oil, for Sunday.

Somehow by 2:00 p.m. the next day we were in Rome, agreeing that the new British "Viscount" turbo-prop is about the best 'plane now flying and that the transition of almost 80° of latitude in a day and a night is all too confusing. It is spring here in Italy while at Cape Town, fall was too far advanced for comfortable swimming. Certainly it was hot enough en route at Khartoum for a swim but it was four o'clock in the morning and the 'plane stopped less than an hour, barely time enough for our two Norwegian fellow passengers to have a few rounds at the bar. They were harpooners flying back from the end of the Antarctic whaling season, and they responded to my greeting in Danish by mumbling their pleasure that they were already in Copenhagen and where was the streetcar to the bars and restaurants of Tivoli?

At Rome were Henry and "Cay" Taylor and Dr. Alfonso del Vecchio, a former student of mine, and Dr. Alberto Fidanza, Flaminio's brother, and bad news about a delay in getting the ballistocardiographs through the customs and then we were in Naples happily greeting Dr. Flaminio Fidanza and his mother and father and many old friends with the good news that all the lab equipment was through the customs and quick let us pack up to catch the boat to Sardinia. Just before boat time Dr. Paul White arrived from the States and Dr. David Rutstein, of Harvard, passing through on another job, joined us for lunch together with the Dr. Vittorio Puddu family who had driven Paul down from Rome. So at 4:00 p.m. we sailed off into the sunset, "Mare Nostrum" as calm as our own Lake Owasso, and we relaxed in the knowledge that we were still actually on the schedule planned many months ago with every prospect of getting the data in Sardinia we needed.

Our Bologna colleagues, Drs. Poppi, Postelli, and Franco joined us at Cagliari with the blessings of their chief and our good friend Professor G. Sotgiu and here we are. Margaret is comfortably ensconced as chief of the chemical lab; both of Henry Taylor's ballistos are working well; hordes of assistants rush around fetching and carrying and washing glassware; a steady stream of subjects is ushered in; and the blood flows freely. It is too early to say much about results, but it is clear that the local diet is low in fats and that coronary heart disease is not very common. Paul White, Reuben Berman, and the rest of the clinical team bagged a good case of angina pectoris and a fresh infarct in the first day's "hunting," but since then only 2 more coronaries have been found in some 200 medical patients. All in all, it seems like Naples last year, that is midway between men in Minnesota and the Bantu in regard to both diet fats and the incidence of coronary heart disease. On Monday we start with coal miners at Bacu Abis, an hour's drive from here, and there we may find the diet to be still lower in fats.

Dr. R. Sanna Randaccio has a nice clinic there and is the sole doctor for the community of 5,000 people, most of whom, apparently, he knows by their Christian names. In the last few years he has had only a single case of myocardial infarction and less than half a dozen cases of angina pectoris! But we shall see.

Paul White and I have only a few days left. In the meantime, I have lectures and conferences in Ancona, Rome, Geneva, and Lund, Sweden, so a few more people will be reminded about Minnesota. I expect to be home by the time Margaret, the Taylors, and Dr. del Vecchio start the job of checking the good people of Bologna who gorge on a relatively high fat diet (around 30 per cent of calories from fats) and apparently suffer the consequences in atherosclerosis. But that story, as well as many other interesting questions, including the use of tobacco, will have to wait for another letter.

We all send the best of wishes to you and our good friends back home in Minnesota.

As ever,

