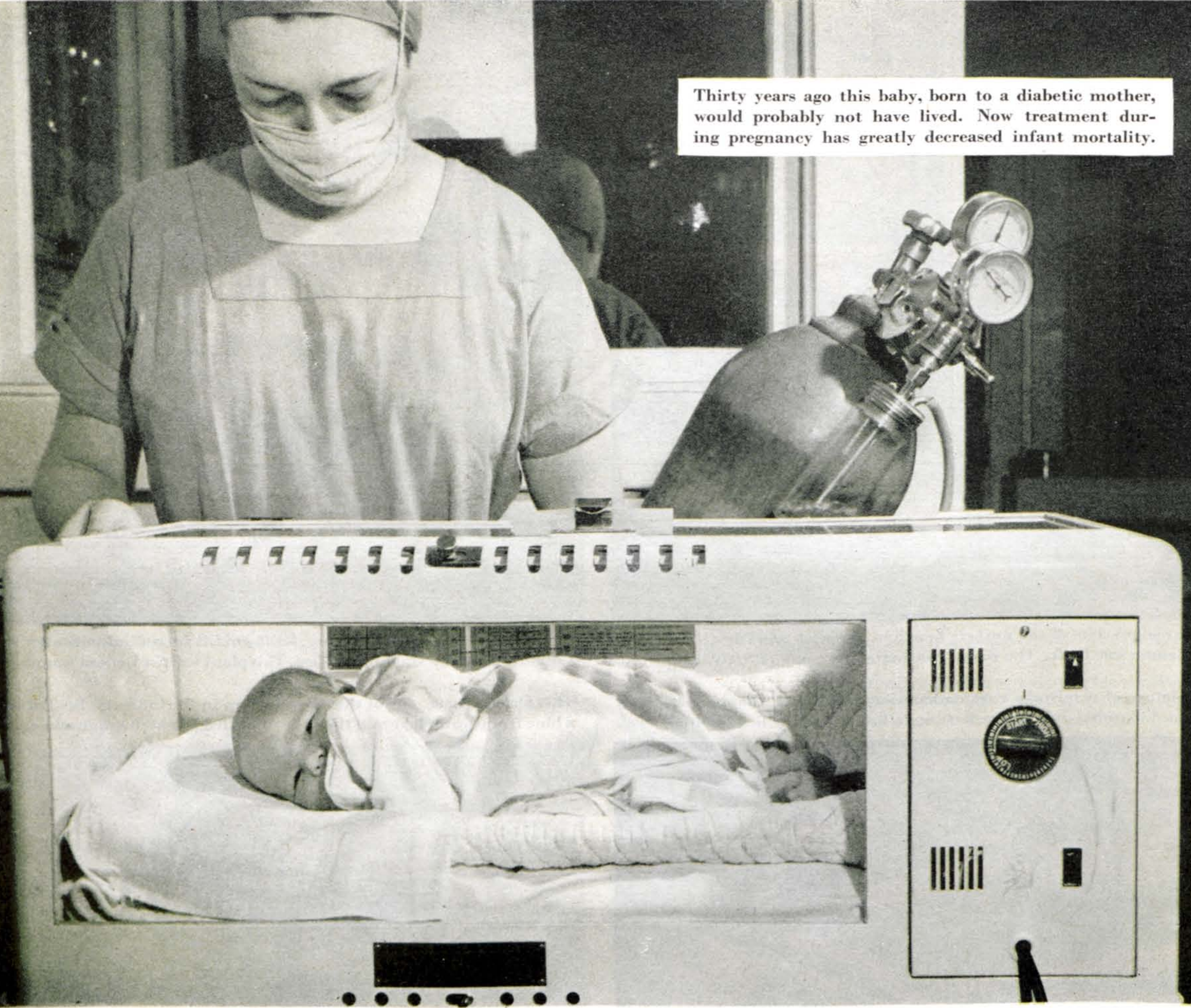


Thirty years ago this baby, born to a diabetic mother, would probably not have lived. Now treatment during pregnancy has greatly decreased infant mortality.



What You Should Know About Diabetes

By *STEVEN M. SPENCER*

There is a brighter future for diabetics, including women, who now have a 30-1 chance of bearing healthy babies. And for the estimated million who have the disease without knowing it, early discovery is vital. Here are the facts.

ARAIL-THIN, gray-haired physician stood before an exhibit at an American Medical Association convention recently, expounding animatedly upon his favorite topic, diabetes. He was discussing a new, inexpensive, five-minute, blood-sugar test. "Here, I'll show you how it works," he said, and picked out at random, from the group around him, a middle-aged, heavily built doctor. The latter grinned, obligingly let his ear lobe be stuck and looked on in professional detachment as a few drops of his blood were drawn, mixed with chemicals, heated and held up to the light to be "read."

Then, as the volunteer subject watched the fluid change color in the test tube, his own face turned several shades paler and he uttered a sharp exclamation of disbelief. For the test had turned out positive. Additional checks, quickly made, confirmed the first finding. He had diabetes. A prominent Midwestern surgeon, used to searching for trouble in others, he had, nevertheless, been com-

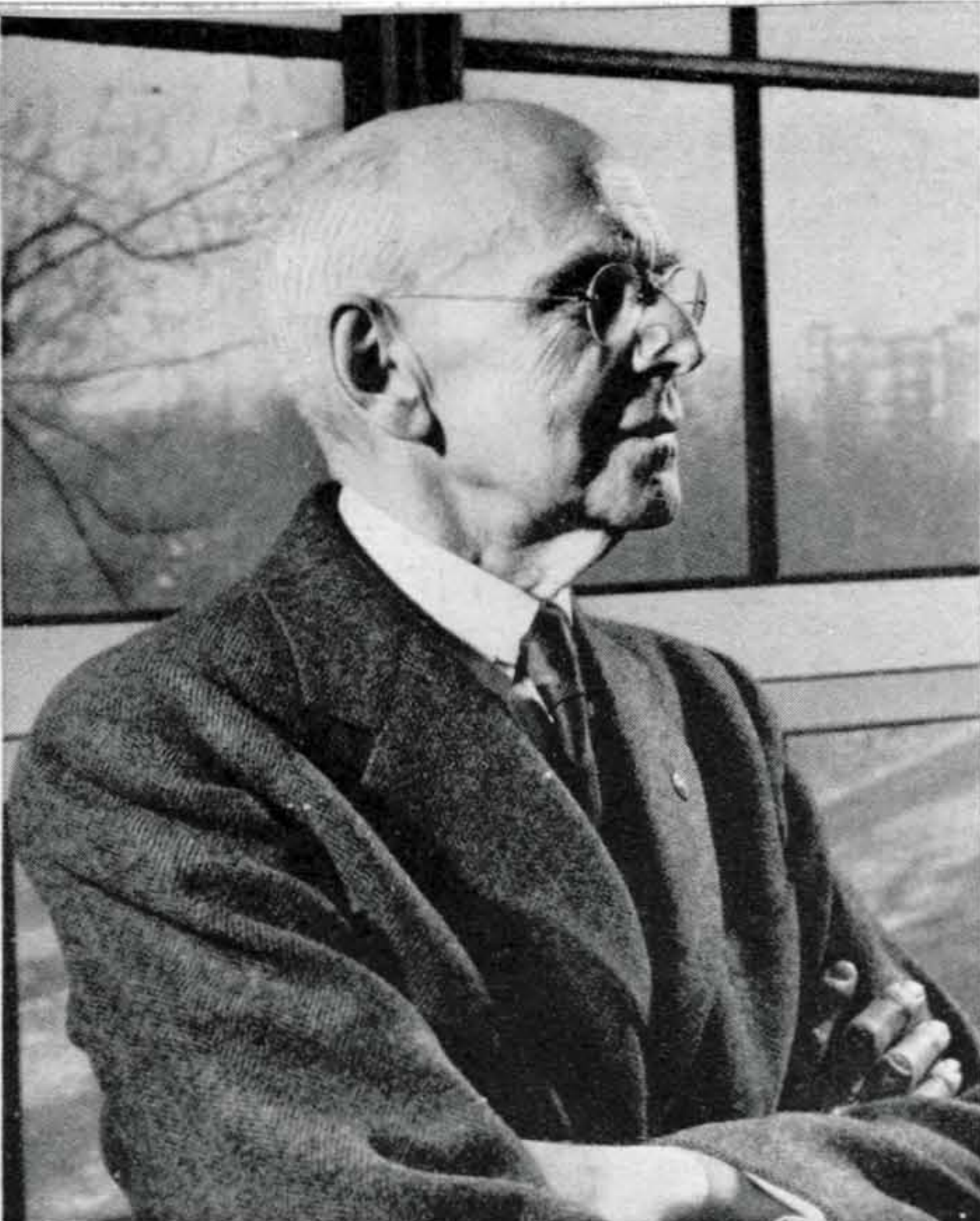
pletely unaware of the condition in himself until that moment.

The disturbing fact is that the surgeon's case is not unique. The diabetes problem, as we enter the second quarter century of the insulin era, suddenly shows itself to be twice as big as the most bearish of all previous estimates had intimated—twice as big, but, paradoxically enough, twice as bright. In addition to the million Americans who have diabetes and are under treatment, there now appears to be another million who, as did the Midwestern doctor mentioned previously, have diabetes and don't know it.

One might be tempted to remark that what the second million don't know won't hurt them—that when the symptoms of diabetes announce the bad news, it should be time enough to call on the magic insulin life line to pull them out of trouble. Nothing could be farther from the truth, although such an attitude has, unfortunately, been all too prevalent; for early ignorance and neglect many a diabetic has later paid a heavy price in suffering.

Actually—and this is where the brightness of the diabetes picture begins to compensate for its bigness—there is no other ailment in which knowledge carries so much power. Knowledge in the hands of doctor and patient has, in every decade of this century, added to the diabetic's life span, until today it stands within fifteen years of the average for the entire population. One of the most recent achievements is a hormone therapy which gives the diabetic woman a 30-to-1 chance of bearing alive and healthy baby, as contrasted to the previous failure of more than half of the diabetic pregnancies. Finally, the diabetes experts now have a growing volume of evidence that diagnosing and treating cases in their early and mild stages—many of the million unrecognized diabetics are almost certainly in this category—may hold the disease in abeyance or stave off the dreaded complications: blindness, kidney trouble, heart attacks, apoplexy and gangrene.

Most of these difficulties are results of premature and severe hardening of the arteries. Thus the dia-



Dr. Elliott P. Joslin, director of the Baker Clinic in Boston, 78-year-old archfoe of diabetes.

betic's battle against arteriosclerosis, which appears to be slowly turning in his favor, may eventually show the whole race how to keep its blood vessels from growing old and brittle.

No one has been more zealous in spreading well-documented hope among the known diabetics and in urging intensive search for the unknown ones than Dr. Elliott P. Joslin, of Boston. Medical director of the George F. Baker Clinic at the New England Deaconess Hospital, Doctor Joslin is widely acknowledged as the dean of the world's diabetes doctors. At seventy-eight he has just rounded a half century of practice and has treated nearly 30,000 diabetics. But he is by no means retired. Doctor Joslin was the slender physician at the AMA exhibit who, by sheer luck or uncanny diagnostic instinct, picked out the Midwestern doctor of the blood-sugar test. Last December he whipped through a severe attack of pneumonia like a pointer going through the underbrush and within a few weeks was back at another AMA convention in Cleveland, pursuing his goal with the vigor of a man half his age. He sets a fast pace for his associates, including his son, Dr. Allen P. Joslin.

It had long been Doctor Joslin's contention that there were many more diabetics than the statisticians had estimated on the basis of mortality tables. In the first place, he argued, diabetics are so improved by treatment that they live to the age where they die of other things, such as cancer, and the death certificate may make no mention of diabetes. In that case, estimating the number of cases by the number of diabetic deaths gives too low a figure. In the second place, most of the early case-finding surveys, which suggested that the number was somewhere around a million, were on a question-and-answer basis. They failed, of course, to include those who were unaware they had diabetes.

The United States Public Health Service decided the best way to obtain a true measure of the problem, which it felt had reached public-health proportions, was to go into a typical American town and carry out blood and urine tests. It would be on a completely voluntary basis, of course. The new diabetics found would benefit by being referred to their doctors for prompt treatment, and the results of the survey would indicate whether it would be worth while to extend such case-finding programs to other parts of the country.

Looking about for a town to fill their requirements, Dr. Hugh L. C. Wilkerson, head of the service's newly created Diabetes Section, and his associates, Dr. Leo P. Krall and Dr. Malcolm J. Ford, picked out Oxford, Massachusetts, fifty miles west of Boston. It had several things to recommend it. The age distribution of its 4983 people fitted the national pattern within

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PHOTOGRAPHY BY GEORGE BURNS



In the past decade Dr. Priscilla White's baby-saving program has had amazing success. She says diabetics "feel a powerful urge to prove they are normal—and, besides, they make excellent parents."



The United States Public Health Service is conducting surveys of entire communities which disclose that a million Americans have diabetes and don't know it. Here they are at work in Brookline, Mass.

WHAT YOU SHOULD KNOW ABOUT DIABETES

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1 per cent. The families, including those of local textile-mill and box-factory employees, fell into a fairly representative economic level. And the doctors were assured of good co-operation. Oxford is Doctor Joslin's home town, and he spends his summers there on a farm. A summer camp for diabetic girls is located at the North Oxford birthplace of Clara Barton, founder of the American Red Cross. The community, therefore, was diabetes conscious.

An educational campaign, in which many of the townspeople assisted, made the purpose of the program clear. The schoolteachers, aided by a poster contest, talked up the project so well in their classrooms that when the nurses and doctors came around to do the testing they got only one squawk out of 900 stuck fingers. Hundreds of adults walked or drove through the worst weather of the 1946-47 winter to temporary laboratories set up for analyzing blood and urine specimens. Unquestionably it was one of the most thoroughgoing surveys ever conducted, and when it was finished, 70 per cent of the town's inhabitants had been tested, forty known cases of diabetes had been seen, and thirty new cases, ranging in age from sixteen to ninety-three, had been discovered. Taking into consideration those who had not appeared for the tests, it was calculated that 1.7 per cent of the population, or eighty-seven individuals in this little town of 5000 had diabetes.

Whether Oxford is a statistically perfect sample of the United States or not—further United States Public Health Service diabetes studies now going on in Brookline, Massachusetts, and Jacksonville, Florida, appear to be reaching similar figures—the survey revealed that the public isn't nearly so well informed as it should be about the symptoms of diabetes.

The classic signs of the disease are excessive thirst and excessive urination—polydipsia and polyuria, as the doctors refer to them. The amount of water a diabetic will drink before the disease is brought under control is sometimes fantastic.

It had been generally assumed that nearly everyone recognized these symptoms as a warning of diabetes, but the survey doctors at Oxford found the assumption incorrect. For among the thirty newly discovered diabetics, fourteen said they had noticed one or the other or both of these two symptoms, but had not realized their dangerous meaning.

Sometimes even a doctor will miss the diagnosis of diabetes. A young Boston woman told how, as a youngster of eight, she had become very ill with abdominal pains, and had been taken to a hospital. "The doctor looked me over and decided I had appendicitis," she said, "but when they operated, the appendix was all right. However, a young student nurse had taken one look at me when I first came in and had remarked, 'Well, here's another little diabetic.' The doctor was angry at her for speaking out of turn and bawled her out. But she had hit it right. It was diabetes."

Diabetes had been overlooked so long in some of the "new" cases at Oxford that nine already had it in severe form and seven in a moderate stage. Nine were classed as mild and five as early, or "probable" diabetes.

One of the early cases was a sixteen-year-old high-school boy—an honor student and an athlete. His blood sugar was barely in the diabetic range, but his grandmother had had diabetes, and because of the hereditary tendency he was anxious to follow the family doctor's orders as a preventive measure.

"You'd better cut out those four or five candy bars you say you've been eating every afternoon," the doctor said. "Go a little lighter on the bread, make a sugar test from time to time, and keep in touch with me." The dietary changes alone put his blood sugar back to a normal level, where it has now remained for a year. He may never develop frank diabetes if he continues to avoid overeating. The American Diabetes Association, composed of doctors, but extending its function to keeping diabetic patients informed, is following the Oxford high-school boy closely. For he may be the type of case in which early discovery plus prompt treatment may prevent serious trouble.

The possibility of preventing diabetes or of bringing about a recovery of the damaged islands of Langerhans in the pancreas, the body's own insulin factories, is based on much more than a hopeful hunch. Several years ago Doctors Francis D. W. Lukens and F. Curtis Dohan, of the Cox Medical Research Institute at the University of Pennsylvania, found they could "cure" experimental diabetes in cats if they started insulin treatment at any time within the first three months of the disease.

Not only in cats but in human beings diabetes has been held in abeyance when vigorous and faithful treatment was started during the first few months of the illness. There was Harry Hawkins—not his real name—a thirty-six-year-old garage mechanic who was diagnosed by an alert family physician. He had called on the doctor because he'd been feeling very weak.

"I've lost a little weight, doc," he said, "and I've been awful thirsty for several weeks. Just can't seem to get enough water."

Harry was referred to the University of Pennsylvania Hospital, where blood-sugar tests confirmed the diagnosis of diabetes. He was immediately placed on insulin. Within a few months, however, his insulin requirements had become smaller and smaller, and soon he was able to get along without it at all and still keep a normal blood sugar. For two years, then, with nothing more than a carefully regulated diet, Harry stayed healthy and strong. Virtually all signs of his diabetes had disappeared. Physicians refuse to speak of "cures" in connection with diabetes. Harry was in what they call a remission, which means the disease was so improved that without insulin the blood sugar remains normal on a diet substantial enough to maintain good weight and strength. Unfortunately, Harry eventually committed the diabetic equivalent of falling off the wagon. That is, he began to eat anything he wanted, grew fat and had to go back to daily shots of insulin.

While recoveries in diabetes are still in the minority, they are frequent enough to represent a goal which may be reached more and more often if cases are caught early. Doctors Lukens and Dohan, who treated Harry, have reported eighteen others. Seventeen of the nineteen had been diagnosed within four months of onset of the diabetes—a date determined by asking about symptoms—and in some cases the remissions have lasted more than ten years. Many other physicians who treat

diabetics can cite similar examples. When relapses do occur they are nearly always associated with "falling off the wagon." Recovery, in other words, is not an absolute thing. The diabetic tendency or weakness remains in the background and the patient must not forget it. It is like living in a house on the edge of a cliff. The hazard is always outside your door. But you're all right if you remember where you are and keep your wits about you.

The lesson of the near-by precipice applies with double emphasis to those who obtain most of their exercise with a knife and fork, and who justify the rotund results by recalling that "everybody loves a fat man." It is admittedly more difficult for some people to keep down the waistline than it is for others. But for those who have diabetes in the family history a few extra pounds may be all that is needed to push them over the edge.

Doctor Joslin, himself blessed with a figure as slim and limber as a hickory switch, conducts a relentless campaign against obesity, no matter where he finds it. When he came to this subject in a lecture recently, he walked over to the side of the stage and returned with a pail of water in each hand. "These weigh a total of thirty-five pounds," he said, letting his shoulders sag and his back bend. "Now why on earth would anyone want to haul this much extra poundage around with him all the time?"

"I feel I am justified in waging war against obesity in the adult, in season and out of season," Doctor Joslin asserts in his *Treatment of Diabetes Mellitus*, the standard text on the subject, "because even if a fat man or woman does not acquire diabetes, the obesity exposes him or her to premature breakdown of the circulatory system, renders them an easy prey to diseases of the biliary tract (gall bladder and bile ducts) and adds an unfavorable factor to surgery." Doctor Joslin even suggests, in effect, that a fat man might profit by living on the edge of the cliff. "So dangerous is obesity," he remarks, "that acquiring diabetes, losing weight and coming under medical supervision actually may prolong the fat man's life."

Fat people are in particular danger if there is diabetes in the family. In the Oxford survey the family history of the disease was reported by 38.7 per cent of the diabetics found. In one family a father of eighty-four years and a son and a daughter in their fifties all had diabetes and none recognized it. Most authorities believe the susceptibility to the disease—perhaps an abnormally small pancreas which is easily overworked—is inherited as a recessive character. In other words, the chances are not great of having diabetic children unless there is a history of it on both sides of the family. But since dietary control may often stave it off, Doctor Joslin urges all known diabetics to get after their fat relatives to reduce and to be examined.

The wartime shortages of food have cut down the rate of diabetes in some parts of the world. Dr. Charles H. Best, codiscoverer of insulin, lecturing in Europe last summer, found that in that land of half-empty stomachs diabetes is not as prevalent as in the prewar days. In America, however, where diabetes is still on the increase, Doctor Joslin indicts industrialization as a contributory cause. We have substituted mechanical horse power for muscular manpower, he points out, but many of us still eat like horses or laborers.

Whether he is fat or lean, the diabetic's chances of a long life and a happy one depend on close "chemical control"—that is, balancing his food and his insulin in such a way that his blood and urine sugar levels are kept in the safe zone. A school of thought has recently arisen, centering chiefly in New York City, which holds that high blood sugar in itself is not necessarily harmful, and that patients can eat pretty much as they please, so long as symptoms do not develop. But Doctor Joslin and other authorities have vigorously denounced such a theory as "not proved" and "dangerous." The policy of "strict control," on the other hand, can be supported by considerable evidence, from the laboratory as well as from patients themselves.

Doctor Lukens and Doctor Dohan recently succeeded in producing diabetes in cats merely by keeping their blood sugar continuously elevated for a period of weeks. It took heroic measures to do this—injections of large amounts of sugar into the abdomen. But the experiment supports the idea that high blood sugar is harmful to the insulin-producing cells of the pancreas, at least under certain conditions.

Letting the blood levels get out of control has been condemned as particularly bad practice for young pa-

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YOU NAME IT

A "throw rug" is what they call it,
And that is a perfect name;
But that isn't what they call it
Just after they're thrown by
same.

—EDWARD A. LAWRENCE.

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tients. Dr. Julian D. Boyd, of the University of Iowa College of Medicine, has reported several instances in which children were put on a good regime of diet and insulin, only to drift away from it when they went home, with disheartening consequences. The mother of one diabetic six-year-old failed to heed the doctor's request to bring the child back periodically for an adjustment of the insulin and diet, to take care of her growth. When the youngster did come back, seven years later at the age of thirteen, she was underdeveloped and about four years short in her height. She had also begun to have an impairment of vision, a frequent complication of diabetes. The mother had simply continued the same insulin dosage which had been prescribed for the child at the age of six, and had let the little girl's ravenous appetite hold sway over her diet.

And there was the story Doris told. An attractive dark-eyed girl of twenty-three, Italian in descent, she had developed diabetes when she was nine. "My mother used to bake lots of cakes and pies and cookies," she said, "but when I got diabetes, she quit that and brought me up to do without candy and between-meal snacks. But another little diabetic girl in my school didn't stick to her diet. She was always eating candy, and both she and her parents tried to coax me to. I refused, and tried, in fact, to persuade her to leave it alone. But she wouldn't." The other little girl died a few years ago, at the age of eighteen, from severe diabetic complications. Doris, except for a slight foot irritation, which all diabetics are taught

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to respect and have treated at once, and which had brought her to the hospital for medication, is in good health and looks forward to a long life.

Most eloquent evidence that dietary virtue brings rich rewards comes from a small group of prize patients studied by Doctor Joslin and his associates at the Baker Clinic. They are sixteen men and women who after twenty years or more of diabetes which they developed in childhood, are still 100 per cent free from arteriosclerosis. All of them had for the most part stayed on the straight path of moderate but adequate diet, proper insulin dosage and regular medical checkups. This does not seem so remarkable until you place it against the dark background of the vast majority of twenty-year cases—more than 85 per cent—who do have blood-vessel damage. And the Baker Clinic doctors found that most of this majority group had strayed from dietary control for several years and had let their blood sugar rise. The lesson seems pretty clear.

One still cannot flatly conclude that careful counting of calories and measuring of insulin will always keep the diabetic's blood vessels young and supple. But the reward is certainly worth trying for. Nothing would do more to assure diabetics a bright future than freedom from this blood-vessel wrecker. It is the condition underlying the grim complications we mentioned earlier—blindness, gangrene, heart trouble. It has been responsible for two thirds of all diabetic deaths in the last three or four years. Paradoxically, the scientists believe that because artery damage does come so early, so swiftly and so destructively in the diabetic—a condensed and intensified version of its occurrence in the population at large—they have a better chance in this group of finding its basic cause and possibly its cure. They hope that clues turned up in the diabetes study may eventually help the rest of us avoid this widespread blood-vessel damage as we grow older.

One of the model patients, a vigorous, handsome man of forty-one, com-

pletely free from hardening of the arteries, consented to appear with Doctor Joslin at a meeting of the Association of Life Insurance Medical Directors last fall. He had had diabetes for twenty-seven years, beginning two years before the advent of insulin.

"To show his physical stamina," remarked Doctor Joslin, giving the man a friendly thump on the back, "I would point out that a year and a half ago he came through a railroad accident with ten broken ribs, a puncture of the lung, four breaks in a shoulder blade, and a fracture that caused his arm bone to protrude at the wrist. And yet his surgeon said he convalesced as rapidly as though he were a nondiabetic."

One of the strongest incentives for the diabetic woman to follow diets faithfully and to seek expert medical attention is her recently improved chance of successful motherhood. Prior to insulin it was almost unheard of for a woman with diabetes to become pregnant at all. Then, with the improvement in treatment of diabetes itself, the reproductive organs began to function more normally. Not completely so, however; for with heartbreaking frequency these women lost their babies. The infant mortality, before or at the time of birth, stood at an appalling figure, about 50 per cent, in spite of all that insulin could do. But within the last decade this has been reduced to 5 or 10 per cent through a brilliantly effective plan of prenatal treatment developed chiefly by a gentle, attractive young woman physician of the Baker Clinic and Tufts Medical School.

Dr. Priscilla White had been particularly disturbed by that previous high death rate. For a number of years she had made the care of diabetic women and children her special assignment, and she knew from her talks with hundreds of prospective mothers how much it meant for them to have babies. "They feel a powerful need to prove they are normal," as she explains it, "and besides, they make excellent parents."

So Priscilla White determined, about ten years ago, to find out just what it was that so often turned their highest hopes

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into bitter disappointment. Studying 300 consecutive diabetic pregnancies, she found, first, that in some cases the mother's pelvic arteries were so calcified and constricted that they could not carry enough nourishing blood to the growing child. The latter, therefore, died. But the most frequent and important harmful factor, it was noted, was an upset in the fine balance of female sex hormones necessary to bring the development and birth processes to successful completion. In those cases where the maternal hormones were in proper balance, there was a 97 per cent survival of the babies. In those where the hormones were out of balance, only 47 per cent survived. The mothers' own survival was not affected; only one woman in this group of 300 died.

This hormonal imbalance had been first observed and analyzed by Dr. George Van S. Smith, professor of gynecology at Harvard Medical School, and his wife Olive, a chemist. They had noticed it in toxemias of pregnancy in nondiabetic women and later in the diabetic mothers. The trouble, they found, was mainly deficiency of two hormones. "Why not, therefore, try to make up these deficiencies," the Smiths and Doctor White reasoned, "and bring the balance to normal in all of the women?" The first step was to ask the prospective mothers to come in once a week for a test of the hormone concentrations in their blood. When they were below normal levels, Doctor White prescribed carefully measured daily doses of hormones by mouth or by hypodermic. And to prevent toxemia of pregnancy, a frequent complication in these women, she kept them on a low-salt-and-high-protein diet.

The baby-saving program was a beautiful success.

"It wasn't exactly pleasant to go without your breakfast bacon and to eat all your vegetables without salt," commented one starry-eyed little mother in Deaconess Hospital, "to say nothing of swallowing twenty-seven pills and taking three or four shots every day." Then she smiled proudly at the sleeping boy baby in her arms. "But it was certainly worth it." And the hospital records for a series of 174 patients who received the hormone therapy show that 90 per cent gave birth to living, healthy babies.

A more mundane inducement to obey the rules of good diet and medical treatment is the recent decision of

forty-six life-insurance companies, notoriously conservative gamblers, to offer life insurance to those diabetics whose doctors testify they have been well controlled for at least two years. The premiums, to be sure, are higher, but until the last few years, life insurance was something the diabetic usually couldn't buy at any price.

Appropriately, the first company to take a chance on diabetics was the Manufacturers Life, of Toronto, the city where Banting and Best made their historic discovery of insulin in the summer of 1921. One of their first insulin patients, Dr. Joe Gilchrist, is still practicing medicine in Toronto, by the way—a reminder that a diabetic can be a good risk, if he works at it.

And work he must. Learning how to ration and regulate his own complex metabolism is a difficult task. He has the help of his physician, but the latter usually hasn't time to give all the necessary instruction and is calling more and more on nurses, dietitians and others. Special classes for diabetics are held in many hospitals. Local diabetic clubs have been formed in seven cities and fifty more are under way. Stimulating this activity is the American Diabetes Association, of which Dr. Edward S. Dillon, of Philadelphia, is president. A new magazine, the A.D.A. Forecast, is helping to spread information and encouragement.

Convincing employers that they are useful, reliable workers and not semi-invalids has been one of the diabetics' toughest problems. They have powerful arguments, however, including a roster of famous fellow diabetics, such as the late Georges Clemenceau, the French premier of World War I; H. G. Wells, the English historian, who helped organize the British Diabetic Association; and Nobel Prize Winner Dr. George R. Minot, co-discoverer of the liver treatment for pernicious anemia. Hundreds of doctors can talk to diabetics as one patient to another. Diabetics are to be found in almost every profession and occupation, including such physically active work as plumbing, farming and auto repairing.

Says Doctor Joslin, who has always insisted they are an intellectually superior group, "Wherever there is a job requiring brains, there is a job for the diabetic." After all, carrying his life in his own hands, as the diabetic does, day after day and year after year, is itself a mental and moral achievement of no small proportions.

THE END