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II

The following extracts from the *National Academy of Sciences* are the findings and opinions of 145 leading scientists who met for the purpose of studying this problem, under a financial grant from the Rockefeller Foundation:

"The problems of radiation fall naturally into two main classes: (1) the effects on human beings; (2) the various ways in which radiation can reach human beings through the environment.

The inheritance mechanism is by far the most sensitive to radiation of any biological system.

Any radiation which reaches the reproductive cells causes mutations (changes in the material governing heredity) that are passed on to succeeding generations.

Human gene mutations which produce observable effects are believed to be universally harmful.

Everyone is subjected to the natural background radiation which causes an unavoidable quantity of so-called spontaneous mutations. Anything that adds radiation to this naturally occurring background rate causes further mutations, and is genetically harmful.

There is no minimum amount of radiation which must be exceeded before mutations occur. Any amount, however small, that reaches the reproductive cells can cause a correspondingly small number of mutations. The more radiation, the more mutations.

The harm is cumulative. The genetic damage done by radiation builds up as the radiation is received, and depends on the total accumulated gonad dose received by people from their own conception to the conception of their last child.

So far as individuals are concerned, not all mutant genes or combinations of mutant genes are equally harmful. A few may cause very serious handicaps, many others may produce much smaller harm, or even no apparent damage.

MAY TAKE GENERATIONS

But from the point of view of the total and eventual damage to the entire population, every mutation causes roughly the same amount of harm. This is because mutant genes can only disappear

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when the inheritance line in which they are carried dies out. In cases of severe and obvious damage this may happen in the first generation; in other cases it may require hundreds of generations.

Thus, for the general population, and in the long run, a little radiation to a lot of people is as harmful as a lot of radiation to a few, since the total number of mutant genes can be the same in the two cases.

It is difficult to arrive at a figure showing how much genetic harm radiation can do. One measure is the amount of radiation, above the natural background, which would produce as many mutations again as occur spontaneously. It is estimated that this amounts to 30 to 80 Roentgens.

[The roentgen is a unit of radiation. To give an idea of its value, the average dental X-ray deliver five roentgens to the patient's jaw, but only five thousandths of a roentgen of stray radiation to more remote parts of the body such as the gonads.]

It is also estimated that a dose of 10 roentgens to every person in the United States would cause something on the order of 5,000,000 mutant genes, which would then be a part of the population's inheritance pool. This figure is subject to considerable uncertainty.

At present the United States population is exposed to radiation from (1) the natural background, (2) medical and

dental X-rays, (3) fall-out from atomic weapons testing. The 30-year dose to the gonads received by the average person from each of these sources is estimated as follows:

1. Background - about 4.3 roentgens. 2. X-rays and fluoroscopy - about 3 roentgens. 3. Weapons tests - if continued at the rate of the past five years would give a probable 30-year dose of about 0.1 roentgens. This figure may be off by a factor of five, that is, the possible range is from 0.02 to 0.5 roentgens. If tests were conducted at the rate of the two most active years (1953 and 1955) the 30-year dose would be about twice as great as that just stated.

At present test explosions of atomic weapons are the only significant source of radiation in the general environment, above the natural background.

Meteorologists have found no evidence that atomic explosions have changed the weather or climate. Nor do they believe that continued weapon tests, at the same rate and in the same areas as in the past, would have such an effect.

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Radiation from explosions passes into the atmosphere and much of it eventually returns to the ground as "fall-out."

Fall-out divides into three classes: (1) close-in - material that comes down within a few hundred miles of the explosion and within 10 to 20 hours, (2) intermediate - material that descends in a few weeks after the explosion, (3) delayed - material that remains in the air for months or years.

Close-in fall-out from test explosions affects only restricted, uninhabited regions.

Intermediate fall-out would descend very slowly if it were pulled down only by gravity. It is mostly washed out of the air by rain and snow. It spreads over large parts of the earth, but its effect over a small area may be accentuated if there is heavy precipitation while the radio-active cloud is overhead.

Delayed fall-out is stored for long periods in the stratosphere. Meteorologists know very little about the interchange of air between the stratosphere and lower layers, so they cannot predict exactly how long the material will stay up, or where it is likely to descend.

National Academy of Sciences Genetics Committee states:

"The report of the Genetics Committee of the National Academy of Sciences was unanimous and blunt: "Any radiation is genetically undesirable, since any radiation induces harmful mutations [changes]."

This complex chemical compound known as a gene cannot repair itself, and to date we know of no way of repairing it.

The injured gene will handicap some descendant, even though it may skip many generations before it does so. It may cause physical and mental handicaps to a whole line, and it will keep trying until at last it kills off the line.

Thus, the geneticists say cold-bloodedly, from the standpoint of the human race it would be better to have a few thousand humans severely radiated than to have whole populations subjected to minor radiations.

If, as medical evidence overwhelmingly shows, man-made radiation is not good for healthy human beings, the logical questions are: Where and how might you be exposed? What can you do to protect yourself and your family?

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You could be exposed through:

1. Ordinary medical X-rays; 2. Eating food, drinking water or milk or breathing air that has been contaminated by fall-out from the explosion of atomic weapons tested by the United States, England and Russia; 3. Food or water contaminated by radioactive wastes from an atomic installation; . . ."

Dr. W. F. Libby says:

"Last May 2, Dr. W. F. Libby, Commissioner, United States Atomic Energy Commission, presented to the National Academy of Sciences what is probably the most authoritative public report to date on "Radioactive Strontium Fall-out."

Samples of radioactive strontium, Dr. Libby said, were detected in the snow at Admiral Byrd Bay in the Antarctic; in the waters of the Danube, the Mississippi, the Seine and the Moselle Rivers; in alfalfa in the fields of Wisconsin and Iowa, and in soil in various sections of the country.

Dr. Libby concluded his report by observing that the average content of radioactive strontium is increasing in milk supplies all over the world, and therefore more and more human beings are putting more and more radioactive strontium into their bodies.

Since growing children concentrate calcium, they are likely to absorb more of this dangerous relative of calcium into their bones than adults. And any material incorporated into their bodies during childhood will have a longer time to act."

An atomic laboratory worker dies from atomic rays:

"Philadelphia VP) - Exposure to atomic radiation in a government laboratory between 8 and 10 years ago has taken the life of a Philadelphia physician, the city medical examiner said.

Medical Examiner Joseph W. Spelman issued his finding after an inquest into the death last July 24 of Dr. Kenneth A. Koerber, 50, of Philadelphia. Dr. Koerber had worked in the Atomic Energy Commission's Brookhaven National Laboratories, Upton, N. Y., between 1946 and 1948. He inspected laboratories to protect workers from radiation.

"We presume," Dr. Spelman said, that Dr. Koerber somehow got a dose of atomic radiation which now, 10 years later, caused

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his death. We have conclusively proved that he was subject to atomic radiation or to the inhalation or to the eating of atomic compounds. At the present time his bones contain 1,000 times the maximum safe concentration of radiation."

We quote from James Poling, in Better Homes and Gardens, May, 1957. The following is far from comforting, if not alarming.

"An H-bomb explosion at our Bikini test site, March 1st, 1954, blew a scientific concept, as well as an island, into smithereens. Fall-out had previously been regarded as a hazard confined to the immediate vicinity of an atomic explosion. But a recording instrument at Rongelap, 100 miles to the east of Bikini, revealed that this bomb had sprayed alarming quantities of radioactive dust over that atoll. And we learned for the first time that fall-out from a multi-megaton bomb was lethal over an area of several thousand square miles. Now we know the naked horror of the bomb. It poses as a potential threat to all mankind."

The *Miami Herald* prints the following:

DETROIT ATOM PLANT CALLED DANGEROUS

"Washington - In a memo suppressed by Atomic Energy Chairman Lewis Strauss, atomic scientists have warned sternly that the "fast breeder" power reactor he approved for construction outside Detroit may "risk the health and safety of the public."

Last November, a similar but smaller experimental reactor at Arco, Idaho, melted down into a hot radioactive heap that couldn't be touched for six months. Puzzled scientists still haven't found the cause.

Yet Strauss, ignoring the urgent advice of his own safety experts, okayed construction of the same design atomic power plant in Detroit's populous back yard."

The eminent scientist authority upon radioactivity, Dr. Ralph Lapp, upholds our contention that the upper

stratosphere will not send in its full bill for our payment until the late seventies. There is no question but what the stratosphere is accumulating death rays for destruction of earth's oxygen at an increasing rate. The freely expressed belief that "the pull of gravity" will bring

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the fall-out to earth is costly to human survival. A small percentage of the higher potential goes toward earth, but the larger percentage is of a potential which is lighter than the earth pressures. These seek the upper levels and the stratosphere. It is possible that enough has already collected to take toll of millions of lives, or cause millions of defective births, even if we stopped the use of radioactivity now. We print Dr. Lapp's warning in full, as issued by *The Daily Oklahoman* of July 5, 1956 - and other papers:

SCIENTIST SAYS H-TESTS NEAR DANGER LEVEL

"Washington, July 4 (INS) - A leading U. S. scientist warned Wednesday that the world may already have passed the point of safety in testing hydrogen-bomb weapons.

"Dr. Ralph Lapp, citing evidence that the U. S. has exploded four H-bombs in the Pacific this year, said the world is a lot closer to the maximum safe level of radioactivity than was indicated in a recent report by the National Academy of Sciences.

"Lapp said the NAS report, issued June 13, was "misleading" when it indicated that the testing of nuclear weapons could be increased 25 to 30 times above the 1950-55 average without endangering the world's health.

THERE'S SECOND ANGLE

"He said in an interview that the NAS limit was based only on "external" radiation. He declared the safe maximum is far lower for "internal ingestion" of radioactive particles carried into the human system by air, food and water.

"The point I would emphasize," the atomic scientist said, "is that all of us already have measurable quantities of this bomb-generated radioactive material in our system.

"Although the quantities are not as yet dangerous in the cases where measurements have been taken, we now have enough information to determine definitely when the maximum safe level of radioactivity will be reached."

FOURTH BLAST HINTED

"Lapp, who has repeatedly disclosed information about the dangers of radiation which were later verified by the atomic energy

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commission said he believes that three super-bombs probably equal to about 10 million tons of TNT each had been set off in the current Pacific test series before Tuesday.

"The Japanese central meteorological station announced evidence of a fourth super-explosion described as "possibly" an H-bomb Tuesday morning. If the total for the series is equal to 40 million tons of TNT, this would double the average annual rate for tests conducted from 1950 through 1955. "Lapp's warning concerned the effects of radioactive strontium, an element created when uranium atoms split. The element is chemically similar to calcium and tends to cause cancer and other ailments by concentrating in the human skeleton.

CONCLUSION CITED

"Making the much more conservative assumption that test rates would slowly accelerate and would double by 1970," he said, "I concluded that by 1962 there will be enough radioactive strontium committed to the stratosphere to produce a 100 percent 'maximum permissible amount' in every person on the planet.

"Because of a hold-up of the invisible particles in the upper air - the particles fall to earth at a rate of about 10 percent a year - this radioactive strontium would not show up in full amount in the human body until the late 1970s.

"However, by 1962 the die would have been cast irrevocably."

Instead of a slow acceleration, Lapp said, "the upward arc of bomb testing is proceeding out of control." With Russia, the U. S. and Britain conducting H-bomb experiments, he declared, the total exploded by 1960 could exceed the equivalent of one billion tons of TNT.

BATTLE NOT NEW

"Lapp has been conducting a running battle against the AEC's secret policy which prevents announcements concerning most of the tests and, even at the public detonation May 21, withheld the explosion data necessary to calculate the exact amount of radiation.

"Education about the biological effects of nuclear radiation is an absolute prerequisite if the human race is to survive," Lapp said, adding:

"I think advertisement of the probable effects of war-borne rad-

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ioactivity might also prove a valuable deterrent to the unlimited use of nuclear weapons."

Collier's was probably the first prominent magazine to vividly portray the tragic dangers of radioactivity. Two years ago it published an article about the dangers of "ATOMIC GARBAGE" by Robert De Roos, which should awaken every human to this dreadful way of exterminating the human race. We herein print copious extracts from his article. This article is the first one, ever to have been published to our knowledge, which discloses the true facts about plutonium, as being the most deadly of the killer metals. Its greater importance as a killer, lies in the fact that it loses only half of its radioactivity in 23,000 years. Its primal effect upon the human body is in its direct attack upon the bone marrow where human blood corpuscles are formed. Together with strontium, these super calciums could cause more defective skeletal births and agonizing deaths than any plague heretofore known to have hurt mankind.

When you read these extracts have this thought in mind; that radioactivity has hardly begun as yet. This fuel is not intended for temporary use, but for permanent use. Think ahead, therefore, for a hundred years. If conditions are as they now are, after but a few experimental years, what would they be in a hundred years? We believe that there will not be one man on earth in a hundred years even if so few as fifty reactors, such as Hanford and Oak Ridge, are erected.

It cannot be said that the danger to human life is not fully reaped, for the cost of the waste storage tanks is $287,000 each, and the Hanford plant has already purchased $27,000,000 worth of these tanks. The fallacy of this tank plan is that the tanks themselves will disintegrate in a century or two, or become as radioactive as their contents in twenty years, thus fully releasing these deadly rays for many thousands of years of destruction. Many of these tanks have been thrown into the deep sea. We, of this generation, are quite safe from them, but other generations will pay dearly for what we are doing to them. Is not that a dreadful thought?

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The latest idea for waste disposal is to lock it up in glazed bricks. Radioactive metals will destroy bricks as readily as they destroy granite and other rocky formations. It is a slow process but future generations will be the sufferers from it. There is no possible safe way of getting rid of radioactive waste beyond a few years. The deserts of the world offer the only chance. By plowing very deep furrows for hundreds of miles, and distributing all waste and free metals in very small amounts over thousands of such miles in many deserts, it may be possible to save our atmosphere. Otherwise, we will have no atmosphere in time.

One woman of the middle west, who read the following Collier's article, was heard to say: "Every pregnant woman of the future will continually fear that her baby may be a defective." What a horrible thought, especially for women of this generation, to whom such a thought never occurs.

"Far out in the desert wasteland of eastern Washington, at the Atomic Energy Commission's gigantic Hanford plutonium works, radioactive elements surge in vast underground tanks - a pent-up sea of useless energy which is a constant worry to the scientists who unwillingly created it. This deadly broth of fission products is the garbage of the atomic age.

And these highly active liquid wastes are only part of the story. Potentially dangerous atomic garbage comes in all forms: liquids, solids, gases and vapors. The ordinary defenses of man are powerless against all of them. Radioactivity is invisible and silent; it cannot be touched or tasted or smelled. And everything a radioactive element comes in contact with becomes contaminated: a wrench used in atomic installations, steel drums, a bit of wastepaper from a laboratory. Carcasses of experimental animals may contain small amounts of radioactivity; even the laundry water used to wash contaminated garments gets polluted.

The story of radioactive wastes is just being understood by the public. For years it was cloaked in the secrecy which surrounds all dealings with the atom. But the dilemma posed by the wastes has been with us ever since the first self-sustaining atomic pile was activated under the bleachers at Stagg Field in Chicago in 1942, for when the physicists pulled the switch on the atomic age, they

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also created something else: the world's first radioactive rubbish - the inevitable, lethal products of nuclear fission.

Ten years of production, which has seen the world-shaking atom bomb pale before the even more shattering hydrogen bomb, has left the AEC with an accumulation of millions of gallons of liquid radioactive garbage and tons of contaminated solid objects. And there's more every day.

The problem facing the AEC - and a problem which it confidently asserts is being handled with great efficiency and success - is how to keep these new materials out of the environment - out of the air we breathe, out of our drinking water and food supplies. The garbage must be kept tightly under control because unbelievably small - often invisible - amounts can contaminate large areas.

What makes the problem so serious is the fact that this radioactive garbage is bulking up at increasing rates - thousands of gallons every day.

And it's only the beginning. The atomic-energy industry, big as it is, is only an infant now, and today's rubbish can be handled by storing it in remote sections of the country. But under the provisions of new Congressional legislation, private manufacturers will be encouraged to develop the commercial uses of fission material. So in the not-too-distant future, disposal of wastes will become a neighborhood matter.

Some of the best engineering brains in the country are grappling with the serious question, but unless they come up with workable solutions, constantly swelling stores of waste may hamper full development of such peacetime atomic projects as generation of electric power, heating of whole communities from central atomic "furnaces," propulsion of ships and planes, and thousands of undreamed-of new ideas.

At Hanford, where the atomic refuse represents the greatest nonmilitary concentration of radioactive elements ever known to man, the scientists rely on CC to dispose of highly active wastes. The radiation level of the hot stuff is fantastically high: the tanks the trash is buried in contain several million times the radioactivity of the world's entire commercial supply of radium.

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Just one element sloughed off in making plutonium - strontium 90 - is over 60 times as radioactive as radium. How dangerous is that? An engineer of the General Electric Company, which operates Hanford for the AEC, figured out what would happen in the hypothetical event that you threw the element into the Columbia River - which no one would be likely to do. After covering a sheet of paper with computations, he came up with this answer: "It would take over eight hours of the full flow of the Columbia - fifty-three billion gallons - to dilute one gram of pure strontium 90 to the point where the water would be safe enough to drink according to the AEC's permissible limits. Or putting it another way, if you dripped three grams of the element in the Columbia every

day, the water of the sixth-largest river in the U. S. would be unfit to drink." (A gram is 1/28 of an ounce.)

In addition to strontium 90, the chain reaction spews out about 40 other radio-active waste elements with half lives ranging from seconds to millions of years. A half life is the time it takes half of the atoms in a radio-active element to become disintegrated.

Storage of the really hot stuff is very expensive. A recent contract for six 1,000,000-gallon tanks was let for $1,724,000. Hanford has $27,000,000 worth of tanks with a storage capacity of 67,000,000 gallons.

No one claims the tanks provide the solution to atomic rubbish disposal. "We are uncertain about the effects of these radioactive wastes," comments General Electric's Dr. Herbert M. Parker, director of the radiological sciences department at Hanford. "We are starting conservatively while trying to get answers which may modify the present program."

David F. Shaw, the AEC manager at Hanford, adds: "Meanwhile we keep building the tanks." At $287,000 each.

Meanwhile, most of the rubbish is stored. The only highly radioactive wastes being thrown away are those now sent out to sea to be dumped in very deep water beyond the continental shelf. A federally sponsored committee hopes this system may provide the ultimate solution to the waste-disposal problem. On the other hand, oceanographers, sanitary engineers, marine biologists and marine geologists are already concerned about what will happen when large amounts of radioactivity are thrown into the oceans.

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"The sea has the same topography as the land," says Dr. Abel Wolman, of The Johns Hopkins University, a consultant to the AEC and one of the top sanitary engineers in the United States. "Big as it is, it won't accommodate everything we want to throw into it."

How winds, waves and currents will affect the dispersion or concentration of radioactive materials is under very serious study. Dr. Wolman says: "One thing that makes me a little reluctant about using the ocean is the memory of the New York garbage mess - when New York dumped its trash far at sea only to have it drift back to the Jersey beaches. And what about international control of dumping at sea?"

At Oak Ridge, Tennessee, in the vast silences of the Appalachian Mountains, stand the tremendous gaseous diffusion plants where U235 is made by the Carbide and Carbon Chemicals Company, a division of Union Carbide and Carbon Corporation.

Oak Ridge, a 60,000-acre site, also contains the Oak Ridge National Laboratory, which produces most of the country's radioactive isotopes for experimental work.

HOW OAK RIDGE GETS RID OF ITS REFUSE

Although its waste problem does not compare with Hanford's in volume, Oak Ridge still pours 50,000 gallons of highly active refuse into its underground tanks every week. Another 5,000,000 gallons of less active rubbish also must be disposed of.

Because Oak Ridge is located in a remote region, the disposal of less active wastes is not a minor worry; but getting rid of the highly radioactive rubbish is harder. Teams of scientists, headed by Dr. Z. K. Morgan, director of the health physics division of the National Laboratory, believe they have an answer for final disposal of the dangerous, long-lived refuse at Oak Ridge, if not in all other parts of the country.

Two huge pits were bulldozed out of a hillside above White Oak Lake and large amounts of very hot wastes were poured in. The theory was that the radioactive fission products would be trapped by the fine particles of shale underlying the pits; any small amounts of hot stuff that seeped through would be diluted in the waters of the lake.

Test wells were drilled to detect movement of the rubbish

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through the ground. At the end of two months, only one waste element had penetrated through to one well."

McCalls Magazine for January of 1957, had this front cover headline for a story by Pare Lorentz, "RADIOACTIVITY IS POISONING YOUR CHILDREN." We quote parts of his story which is indicative of the fear which is felt throughout the world of this threat to the human race:

"It is no secret today that a hydrogen war, no matter who starts it or who is attacked, will mean the destruction of most of the human race. One of our own high-ranking generals has stated publicly that a hydrogen attack by our forces might take the lives of three or four hundred million people - enemy or ally - "depending on the direction of the winds"!

What is not so well known, but what could be equally disastrous, is a possible slow degeneration of the human race caused by radioactive poisons released during times of peace.

Here is a substance you can neither see, feel, hear, taste nor smell. You may be exposed to it unwittingly; you may inhale it, or absorb it by drinking polluted water or by eating contaminated food. You may not feel any immediate ill effects, yet some materials remain radioactive for years in the body, operating as so many infinitesimal but dangerous X-ray machines.

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1. No amount of man-made radiation, external or internal, is "good" for healthy, living things. Any amount of exposure does some harm, however slight.

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2. Radiation is cumulative and irreversible.

To put it very unscientifically, you have just so much radiation tolerance, and every time you are subjected to X-rays or any other kind of man-made radiation, you have drawn against your total allowance. Some people have more tolerance than others, but, ideally, the quantity of total body radiation to which a human being is exposed during his lifetime should not be greater than that to which he is subjected from the sun, stars and planets and radiation arising from the minerals in the earth's surface.

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3. There is no such thing as a peaceful use of atomic energy, if by 'peaceful" you mean "harmless."

Even the by-products of a peaceful nuclear reactor could be used in one form or another for military purposes. Radiations inside atomic plants are dangerous. Air escaping from the plants can become contaminated. If water is used to shield or to cool the plant, it can become contaminated. The waste materials - the by-products of nuclear fission - are radio-active, some materials remaining highly dangerous for centuries.

4. The more people exposed to radiation, the more damage to generations yet unborn.

For years, many groups of scientists in many parts of the world have issued appeals for a cessation of atomic explosions, on the grounds that the fall-out of radioactive materials gradually is poisoning the earth. Because of the cloud of secrecy surrounding the military facts of atomic energy and because some of these scientific groups are politically suspect, many of these appeals have been reported in the daily press as political rather than scientific discussions.

A careful study of the official reports of our own authorities, however, should convince anyone that sooner or later the atomic powers will have to stop releasing poisonous materials in the atmosphere. If they do not stop,

and stop completely, they will have achieved mutual annihilation just as surely as though they had engaged in actual, all-out hydrogen warfare.

What is more, even if all bomb tests were stopped tomorrow, it is estimated that the main part of the poisonous materials that already have been released into the upper atmosphere will not have fallen on us until 1970, and there will be a continuation of this noxious rain long after that."

The following is quoted from the Christian Science Monitor - as written by its Science editor, Robert C. Cowen:

"A special study group of leading American natural scientists has concluded that there is no radiation danger to human life from the present rate of atomic weapons tests. This cuts the technical ground from under the repeated demands that such tests be

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stopped because of the radioactive materials they release into the atmosphere.

But, at the same time, these experts warn that the full worldwide development of peaceful uses for the atom could produce more of a radiation hazard in the form of radioactive wastes than would an all-out atomic war. In fact, this "hot" waste disposal problem is growing so quickly today that their report urges its immediate and urgent consideration at the international level to determine and set up adequate safeguards.

This report by responsible natural scientists should help to bring more balanced thinking than has been evidenced in the past to bear on the vexing question of whether or not the human race is endangering its own future by releasing atomic radiations into its environment.

The report was based on extensive studies by 145 natural scientists conducted under the auspices of the National Academy of Sciences and financed by a grant from the Rockefeller Foundation. The studies were set up specifically to help resolve the worldwide controversy over radiation hazards and to provide some useful data in a field that is beset with ignorance and uncertainties."

The following is from the Washington Daily News, Monday, September 10, 1956, by Gene Shumate:

WE ARE BREATHING
ATOM-AGE AIR HERE

(It's Radioactive Most of the Time)

The air over Washington has been radioactive more than 70 per cent of the time since 1951, a Naval Research Laboratory report said today.

In 1953, it said, Washingtonians breathed pre-atomic air for only 60 days.

ATOMIC AGE

"We haven't had normal, clean air since before the atomic age - or since we started testing atomic weapons at Yucca Flats, Nev.," Dr. Herbert Friedman of the laboratory's Electron Optics Branch told The News.

Dr. Friedman is one of the authors of the report.

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It said the Navy has studied the air in a series of areas since 1949 - Chicago, Washington, San Diego, San Francisco, Seattle, Memphis, Puerto Rico, Panama, seven scattered Pacific isles, North Africa, and Alaska.

Of all of them, the report said, Washington and Chicago were the most radioactive.

DOSAGE IS SMALL

Dr. Friedman said the average dosage present in the air here is only two-tenths of a roentgen - far from being immediately dangerous - "but we're not sure what the accumulative effect on man will be."

It takes about 500 to 600 roentgens to kill a man outright, he said.

"There's a lot we don't know as yet about what effect breathing even slightly radioactive air over extended periods will have on us," Dr. Friedman said. "We do know that certain isotopes up there are bad actors."

The greatest and most powerful expression of fear from the use of radioactivity which has yet been made by anyone among the higher intellectuals, is the following world-broadcast appeal by Dr. Albert Schweitzer Norwegian Nobel Committee, asking that "public opinion demand an end to nuclear tests."

The New York Times, April 24, 1957.

SCHWEITZER URGES WORLD OPINION TO
DEMAND END OF NUCLEAR TESTS

''

Nobel Winner's Plea Broadcast in 50 Lands Says Alternative
Is Catastrophe for Mankind

''

OSLO, Norway, April 23 - Dr. Albert Schweitzer has appealed to the world to end nuclear tests.

The appeal of the 82-year-old missionary surgeon, philosopher and musician, addressed to the Norwegian Nobel Prize Committee, was broadcast today in about fifty countries, including most of those in Europe. It was broadcast in Swahili from Nairobi and Japanese stations carried it.

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Dr. Schweitzer's message was read in Norwegian by Unnar Jahn, chairman of the Norwegian Nobel Committee, who in 1952 bestowed the Nobel Peace Prize on Dr. Schweitzer. Translations of the text were read in English, German, French and Russian on Norwegian short-wave stations.

The impact of the warning was heightened for Norwegian listeners because the broadcast followed by fifteen minutes a report of a recent radioactive rain over Norway caused by Soviet nuclear explosions.

The initiative for the broadcast came from Dr. Schweitzer himself. The Norwegian state radio planned to send a reporter to his hospital in Lambarene, French Equatorial Africa, where Dr. Schweitzer lives and works, to make a recording of the speech.

Dr. Schweitzer said he was too weak to read the appeal himself. It was, therefore, decided that the message would be read in translation and Dr. Schweitzer expressed the hope that it would reach the whole world.

Dr. Schweitzer said his aim was to awaken public opinion before it was too late. He warned that the human race was heading for a catastrophe if nuclear explosions were continued. This catastrophe must be prevented, he said.

"There can be no question of doing anything else, if only for the reason that we cannot take the responsibility for the consequences it might have for our descendants; they are threatened by the greatest and most terrible danger," Dr. Schweitzer said.

He emphasized that to fail to consider the importance of radioactive elements created by man and their consequences would be a folly "for which humanity would have to pay a terrible price." "We are committing this folly in thoughtlessness," he said.

PUTS IT UP TO PUBLIC

Dr. Schweitzer asked why the United States, the Soviet Union and Britain did not come to agreement to stop the tests. He believed the reason was that there was no public opinion asking for it. Japan, he added, is the only exception.

He accused "official and unofficial sources" of evading the problem when they assured that the increase in radioactivity of the air did not exceed an amount the human body could tolerate without harm.

"Even if we are not directly affected by the radioactive material

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in the air we are indirectly affected through that which has fallen down, is falling down and will fall down," he declared.

He also stressed that not only was the health of the present population threatened by internal radiation but also that of future generations.

"The fact is that the cells of the reproductive organs are particularly vulnerable to radiation," he said.

Dr. Schweitzer concluded his warning by appealing to public opinion in all nations to demand an agreement to stop the tests. "The end of further experiments with atomic bombs would be like the early sunrays of hope which suffering humanity is longing for," he said.

SCHWEITZER'S APPEAL TO END NUCLEAR TESTS

OSLO, Norway, April 23 (Reuters) - Following is the translation of excerpts from a letter issued by Dr. Albert Schweitzer through the Norwegian Nobel Committee, asking that public opinion demand an end to nuclear tests:

Since March 1, 1954, hydrogen bombs have been tested, by the Americans at the Pacific island of Bikini in the Marshall Group and by the Russians in Siberia.

After the explosion of a hydrogen bomb . . . something remained in the air, namely an incalculable number of radioactive particles emitting radioactive rays. This was also the case with the uranium bombs which were dropped on Nagasaki and Hiroshima and those with which subsequent tests were made. However, because these bombs had smaller size and less effect compared with the hydrogen bombs, one hardly paid any attention to this fact.

Since radioactive rays of sufficient amount and strength have harmful effects on the human body, one started discussing if the radiation resulting from the explosions that had already taken place represented a danger which would increase with new explosions.

RACE HELD ENDANGERED

In the course of the three and a half years that have passed since then representatives of the physical and medical sciences have been studying the problem. The material collected, although far

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from complete, allows us to draw the conclusion that radiation resulting from the explosions which have already taken place, represents a danger to the human race, a danger not to be underrated, and that further explosions of atomic bombs will increase this danger to an alarming extent.

I raise my voice, together with those of others who have lately felt it their duty to act, in speaking and writing, as warners of the danger. My age and the sympathy that I have gained for myself through advocating the idea of reverence for life, permit me to hope that my appeal may contribute to the preparing of the way for the insight so urgently needed.

There are two kinds of atom bombs, uranium bombs and hydrogen bombs. To these two bombs has recently been added the cobalt bomb, a kind of super-atom bomb. The effect of this bomb is estimated to be many times stronger than that of hydrogen bombs having been made till now.

The explosion of an atom bomb creates an inconceivably large number of exceedingly small particles of radioactive elements.

PARTICLES HAVE LONG LIFE

Of these elements, some exist for hours, some for weeks, or months, or years, or millions of years, undergoing continuous decay. They float in the higher strata of air as clouds of radioactive dust. The heavy particles fall down first. The lighter ones will stay in the air for a longer time or come down with the rain and the snow. How long it will take before everything carried up in the air by the explosions which have taken place till now has disappeared, no one can say with any certainty. According to some estimates, this will be the case not earlier

than thirty or forty years from now.

What we can state with certainty, however, is that the radioactive clouds will constantly be carried by the winds around the globe and that some of the dust, by its own weight, or by being brought down by rain, snow, mist and dew, little by little, will fall down on the hard surface of the earth, into the rivers and into the oceans.

Particularly dangerous are the elements combining long life with a relatively strong efficiency radiation. Among them strontium-90 takes the first place. It is present in very large amounts in

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the radioactive dust. Cobalt-60 must also be mentioned as particularly dangerous.

WATER MADE RADIOACTIVE

The radioactivity in the air, increased through these elements, will not harm us from the outside, not being strong enough to penetrate the skin. But the danger which has to be stressed above all the others is the one which arises from our drinking radioactive water and our eating radioactive food as a consequence of the increased radioactivity in the air.

Following the explosions on Bikini and Siberia rain falling over Japan was, from time to time, been so radioactive that the water from it cannot be drunk. And not only there: reports of radioactive rainfall are coming from all parts of the world where analyses have recently been made. In several places, the water has proved to be so radioactive that it was unfit for drinking.

Wherever radioactive rainwater is found, the soil is also radioactive - and in a higher degree. The soil is more radioactive not only by the downpour, but also from radioactive dust falling on it. And with the soil the vegetation will also have become radioactive.

The radioactive elements deposited in the soil pass into the plants where they are stored. This is of importance, for as a result of this process it may be the case that we are threatened by a considerable amount of radioactive elements.

The radioactive elements in grass, when eaten by animals whose meat is used for food, will be absorbed and stored in our bodies.

What this storing of radioactive material implies is clearly demonstrated by the observations made when, at one occasion, the radioactivity of the Columbia River in North America was analyzed. The radioactivity was caused by the atomic plants at Hanford, which produce atomic energy for industrial purposes, and which empty their waste water into the river.

FINDS PROBLEM EVADED

The radioactivity of the river water was insignificant. But the radioactivity of the river plankton was 2,000 times higher, that of the ducks eating the plankton 40,000 times higher, that of the fish 150,000 times higher. In young swallows fed on insects caught by

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their parents in the river, the radioactivity was 500,000 times higher and in the egg yolks of water birds more than 1,000,000 times higher.

From official and unofficial sources we have been assured, time and time again, that the increase in radioactivity of the air does not exceed the amount which the human body can tolerate without any harmful effects. This is just evading the problem.

Even if not directly affected by the radioactive material in the air, we are indirectly affected through that which has fallen down, is falling down, and will fall down. We are absorbing this through radioactive drinking water and through animal and vegetable foodstuffs, to the same extent as radioactive elements are stored in the vegetation of the region in which we live. Unfortunately for us, nature hoards what is falling down from the air.

None of the radioactivity of the air, brought into existence by the exploding of atom bombs is so unimportant

that it may not, in the long run, become a danger to us through increasing the amount of radioactivity stored in our bodies.

What are the diseases caused by internal radiation? The same diseases that are known to be caused by external radiation.

They are mainly serious blood diseases. If the cells in the bone marrow are damaged by radiation they will produce too few or abnormal, degenerating blood corpuscles. Both cases lead to blood diseases and, most often, to death. These were the diseases that killed the victims of X-rays and radium rays.

It was one of these diseases that attacked the Japanese fishermen who were surprised in their vessel by radioactive ashes falling down 240 miles from Bikini after the explosion of an hydrogen bomb. With one exception, they were all saved, being strong and relatively mildly affected, through continuous blood transfusions.

DAMAGE TO DESCENDANTS

In the cases cited, the radiation came from the outside. It is unfortunately very probable that internal radiation affecting the bone marrow and lasting for years will have the same effect, particularly since the radiation goes from the bone tissue to the bone marrow.

Not our own health only is threatened by internal radiation, but also that of our descendants. The fact is that the cells of the reproductive organs are particularly vulnerable to radiation. To

the profound damage of these cells corresponds a profound damage to our descendants.

To find out how the existing radioactive radiation has affected posterity, comparative studies have been made between the descendants of doctors who have been using X-ray apparatus for years and those of doctors who have not. Among the descendants of radiologists, a percentage of still births of 1.403 was found, while the percentage among the non-radiologists was 1.222.

In the first group, 6.01 per cent of the children had congenital defects, while only 4.82 per cent in the second.

It must be remembered that even the weakest of internal radiation can have harmful effects on our descendants.

The total effect of the damage done to descendants of ancestors who have been exposed to radioactive rays will not, in accordance with the laws of genetics, be apparent in the generations coming immediately after us. The full effects will appear only 100 or 200 years later.

We are forced to regard every increase in the existing danger through further creation of radioactive elements by atom bomb explosions as a catastrophe for the human race, a catastrophe that must be prevented under every circumstance.

There can be no question of doing anything else, if only for the reason that we cannot take the responsibility for the consequences it might have for our descendants.

They are threatened by the greatest and most terrible danger.

That radioactive elements created by us are found in nature is an astounding event in the history of the earth. And of the human race. To fail to consider its importance and its consequences would be a folly for which humanity would have to pay a terrible price. When public opinion has been created in the countries concerned and among all nations, an opinion informed of the dangers involved in going on with the tests and led by the reason which this information imposes, then the statesmen may reach an agreement to stop the experiments.

A public opinion of this kind stands in no need of plebiscites or of forming of committees to express itself. It works through just being there.

The end of further experiments with atom bombs would be like the early sun-rays of hope which suffering

humanity is longing for.

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New York Times, April 21st. 1957.

EUROPE'S NUCLEAR FEAR

An Analysis of Changed Sentiment Toward Danger of Atomic Warfare

PARIS, April 20 - Europe is growing alarmed about nuclear bombs. The mood today has markedly changed from that of the late decade, when the United States monopoly or predominance in nuclear power was widely regarded as assuring peace and the security of this Continent.

Nuclear weapons are no longer considered a beneficent invention. At the very moment when the United States officially promised nuclear arms to its European allies, eighteen West German physicists joined in declaring they opposed the use of such arms by their country and would do nothing to further nuclear armament. They said current tactical nuclear weapons were as destructive as the original atomic bomb dropped on Hiroshima and that their acquisition by West Germany might increase its danger.

Europeans are becoming convinced that nuclear weapons are a menace even if there never is a nuclear war. A committee of the Atomic Scientists Association in Britain has reported that as a result of the hydrogen bombs exploded so far one person in 50,000 is likely to get cancer in the next few decades from the strontium entering his bones. This is an unproved estimate but represents a scientific judgment based on the assumption that the likelihood of cancer is proportionate to the radioactivity in the bones.

Pending more conclusive evidence and fuller agreement among experts, many Europeans favor suspension of the bomb tests that produce radioactive "fall-out" of greater or lesser malignancy. British statesmen find it more difficult to defend their nuclear bomb tests, which are only beginning.

Soviet bomb tests have led to disturbing atmospheric results in Japan. After measuring the radioactive fall-out this week, Japanese scientists warned of the danger and opinion grew in favor of a ban on all nuclear tests by all nations. An official Japanese protest to Moscow brought the reply that the Soviet Union was willing to suspend the tests if the Western powers agreed.

Thus a new effort was made, in keeping with years of Soviet propaganda, to put the blame on the West.

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Western scientists were the first to develop the atomic bomb. A Western power, the United States, was the first to use it in war. The Western alliance, the North Atlantic Treaty Organization, has based its strategy on the assumption it will use nuclear weapons to meet an aggression. This decision was reasserted on Thursday by Field Marshal Viscount Montgomery, Deputy Commander in Chief of the Atlantic forces in Europe.

Thus the Western powers are faced with a moral and strategic dilemma that troubles the consciences of many in Europe.

If the West foregoes use of nuclear weapons it will be hopelessly inferior on land to the Soviet Union in Europe and to Communist China in Asia. Both these powers have enormous armies that the West cannot match. The West is not even trying to match them but, as the recent British defense decision showed, is reducing armies in favor of nuclear weapons.

THE CONTAMINATION PROBLEM

But if the Western powers adhere to their policy of basing their defense on nuclear weapons in the hope of thus preventing war, they will risk playing into the hands of Soviet propaganda and causing the vast uncommitted Middle East and Far East to believe the West is responsible for a nuclear arms race.

At the same time the Western governments probably will face growing criticism from their own peoples, who fear not only a nuclear war but even the periodic nuclear bomb tests that contaminate the atmosphere that people breathe and the plants and animals they eat.

Western leaders have sought to limit armaments, including nuclear armaments, but have been unable to find any system of inspection to insure enforcement of any agreement. But it is urged in Europe that no such system is needed to drop bomb tests, since all such tests by the Soviet Union are immediately detected and announced in Washington.

Much concern was felt throughout the country last July (1956) by the sensational testimony given by Lieut. General James A. Gavin before the senate subcommittee investigating air power. Lieut. General Gavin was asked by Senator James F. Duff, of Pennsylvania, what in his opinion, would be the effect of hydrogen bombs dropped on Russia.

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Gavin replied that deaths would run into several hundred millions, and, depending on which way the wind blew, would extend well into the Japanese, and perhaps the Philippine Islands areas or well back up into Western Europe.

That testimony brought forth this reply from Senator Mike Mansfield, of Montana: "The horrible conclusion given by Lieut. General Gavin should make us realize that in this difficult era, with the world's scientists running riot, we are faced with an uneasy peace based on the idea of mutual terror.

"It would be my sincere hope that the administrations of the world will take into the most serious and deliberate consideration the dreadful reality of Lieut. General Gavin's reply and explore ways and means through which the peoples of the world can be protected from terrible devastations over which they have no control."

These reports from scientific sources speak fluently regarding the danger to every human being if radioactivity is used. After reading them do you feel assured that you and your children are safe from it? Are you willing that it shall be tried out, knowing as you do, that the human race would be the guinea pig for the most dangerous experiment ever tried by man, and his last one, if he is wrong?

In reading these statements you probably noticed that the small experimental plant at Arco, Idaho, blew up. It could not even be approached for six months afterwards. Accidents happen to a big plant as well as a small one. Does it make you feel comfortable to think that a plant like the Hanford one, or the one to be built near New York, or Detroit, might blow up?

When you think of the world concern and care given to protect people from the two pounds of radium, which was all the world had twenty years ago, does it make you feel comfortable to know that 8,000 tons of much more deadly uranium salts are produced each year from a present stock pile of 600,000 tons of uranium ore? Also, do you feel that it is quite safe to continue multiplying the effects you have read about for a hundred, two hundred, or three hundred years, which we would have to do if radioactivity is to be the next world fuel? Do you

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realize that the government is spending $2,000,000,000 a year in atomic experiments, and private industry is spending an equal amount, or more, for a dangerous and costly fuel when it could quite easily have a perfectly safe and inexpensive fuel in abundance for not more than $100,000 and a little knowledge of the true nature of electricity?

Before making your own decision whether or no you would vote in favor of radioactivity, read once more what Dr. Ralph Lapp said about the atom bomb tests distribution of strontium in the atmosphere. He said: "That at the present rate of H. bomb tests, if continued and probably accelerated, by 1962 there would be enough radioactive strontium committed to the stratosphere to produce a 100% maximum permissible amount in every person on the planet." Do read his report with great mental concentration. No other report gives much concern to what he calls "hold up." Again we say that our primary danger is in that stratosphere "hold up," and not in the "fall-out." Dr. Lapp estimates that this "hold up" will fall at about 10% a year. If this is true the human race could not survive another ten years of bomb tests such as the United States and Russia are conducting.

We are not in full agreement with Dr. Lapp concerning the 10% fall to earth, for the potential of that "hold up" is lower than the potential of a pressure ten miles up, and it is slowly expanding to still lower potential. The already

too heavy "hold up" will blanket the atmosphere layer and eat into it slowly, but irrevocably and thus thin our life giving and life protecting blue envelope. If Dr. Lapp is right, the human race would already be doomed.

Again we urge everyone to obey the advice given by Dr. Lapp, which we quote from his report as follows: "Education about the biological effects of nuclear radiation is an absolute prerequisite if the human race is to survive."

[Return to Atomic Suicide - the book]