The Saturday Review
MAY 18, 1957

THE SCHWEITZER DECLARATION

Introduction

Throngs in Oslo turn out to hear Albert Schweitzer's acceptance of the Nobel Peace Prize in 1953.

THE Saturday Review has the honor of being the only American magazine or newspaper to publish in full the complete text of the "Declaration of Conscience," by Dr. Albert Schweitzer. This statement was issued on April 24 under the auspices of the Nobel Prize Committee in Oslo, Norway, for the consideration of the world's peoples.

Dr. Schweitzer's declaration was concerned with the implications of nuclear warfare and experimentation. Judging by reports received from abroad, the statement has produced a powerful response throughout the world. In the United States, the statement gave new emphasis to a controversy which has involved a number of the nation's leading atomic scientists. In particular, Dr. Willard F. Libby, of the Atomic Energy Commission, wrote a public letter of reassurance to the doctor at his jungle hospital in Africa. The text of Dr. Libby's letter will appear in full in the next issue of *The Saturday Review*. The next issue will also contain a commentary on the Schweitzer and Libby statements by Dr. Harrison Brown, Professor of Geochemistry at the California Institute of Technology, who was associated with the atomic bomb project at Oak Ridge during the war and who is the author of several books concerned with the significance of nuclear energy.

Press comment in the United States about Dr. Schweitzer's declaration has raised a number of questions: Where did Dr. Schweitzer obtain his data? Why did he issue his appeal to the world's peoples instead of to governments? What caused him to decide to inject himself into this particular debate?

It is absurd for anyone to attempt to speak for Dr. Schweitzer. I can, however, report on a discussion with Dr. Schweitzer relating to those questions. Three months ago I visited Dr. Schweitzer at his hospital in Lambarene, French Equatorial Africa. One of the purposes of my visit was to discuss with him the general problem of world tensions in the context of an age which has available to itself the means of unlimited destruction.

I found the doctor in excellent health. He was just entering his eighty-third year but he maintained a daily schedule of work—at his desk, in the hospital, and in physical labor around the place—that would have been beyond the capacity of most men half his age. His mind has lost none of the suppleness or range that have given him distinction in so many fields. There was high purpose in everything he said. There was also a constant vein of wit and good spirits in his manner.

For the first four days of my visit to the hospital I spent little time with the doctor. I was appalled at his daily workload, especially his correspondence, and I was severely reluctant to make any demands on his energy or his time. But he sent for me the afternoon of the fourth day and put me at my ease. For the next week we spent at least two hours each day in discussions relating to a wide variety of subjects—his unfinished literary labors, history, philosophy, music, and the human situation in the world today.

The discussions were conducted in the German language through an interpreter, Mrs. Clara Urquhart, who has been a frequent visitor to the hospital for many years and who enjoys the complete confidence of the doctor. She is also the author of a recent book "With Dr. Schweitzer in Lambarene," published in London.

It was in connection with the discussion relating to the condition of man in today's world that the subject of nuclear energy came up. It became clear that Dr. Schweitzer had been following this subject with profound interest and concern ever since the explosion at Hiroshima. I had brought with me a number of important papers relating to this matter and proceeded to discuss them with the doctor.

One of these papers was a report, of which Dr. Willard F. Libby was a co-author, prepared for the U. S.

Atomic Energy Commission in August 1954. Dr. Libby was reporting on the effect of radioactive fallout on milk resulting from the uranium and plutonium nuclear explosions that had taken place up to that time. Radioactive strontium had also been found in milk produced on a farm near Chicago. The quantities of this radioactive strontium were found at the time to be well under dangerous levels. Even so, Dr. Libby's report showed evidence of growing apprehension, especially in his recommendation that the Federal Government undertake estimates on the cost of decontaminating milk. The decontamination would be effected by removing the calcium from the milk. Calcium has an affinity for radioactive strontium.

Three things were significant about that report. The first was that most of the radioactive fallout resulting from previous nuclear explosions had yet to come to earth at the time the survey was made. The second was that the biggest nuclear explosions were to occur after the report was published in July 1954. The third was that no precise data are available on the tolerance limits of human beings to radioactive strontium.

In other forms of radiation, it is definitely known that there is far less safety than had earlier been supposed. Only ten or fifteen years ago, for example, the public was being assured that it had nothing to fear from regular X-ray examinations. In the last year, however, it was disclosed that the tolerances were astoundingly lower than once had been so confidently claimed. Scientists have yet to perform the same kind of exhaustive researches into the tolerance limits of radioactive strontium that have been made on X-ray radiation. If, through additional research, it develops that the effects of radioactive strontium has been underestimated, as in the case of X-rays, then colossal damage to all living creatures will have been done. And this is the kind of damage that affects everyone and cannot be undone.

Another matter discussed with Dr. Schweitzer concerned the power of the new bombs. One way of visualizing this new power would be to imagine a procession of one million trucks, each of which contained ten tons of TNT. The total tonnage would form a man-made mountain of dynamite several times the height of the Empire State Building. If this mountain were to be detonated it would represent the approximate power in a single twenty-megaton hydrogen bomb that can be carried by a single plane.

NOTHING to me was more striking than Dr. Schweitzer's face as he contemplated and spoke about the situation that confronted people in the world today. There seemed to be an infinity of detail in that face; it seemed as though every event in human history were clearly recorded there. Most of the time he sat forward in his straight chair, his eyes seemingly fixed on a distant object.

He said that over the years he had been collecting materials on the question of nuclear energy, military and non-military. When he visited Europe some months earlier, his concern had been considerably increased as a result of a meeting of Nobel Prize winners in Lindau (Austria). Many of the scientists there spoke with the utmost sense of urgency and gravity about the growing problem. Alongside such a problem, he said, everything else seemed small.

Only a few years ago, he added, the statement that this planet could be made unfit for life seemed absurdly melodramatic. But there was no longer any question that such power now existed. And even without a war, the atmosphere could become dangerously contaminated.

"After our talk yesterday," he said, "I reflected that danger of this magnitude is not easily grasped by the human mind. As day after day passes, and as the sun continues to rise and set, the sheer regularity of nature seems to rule out such terrible thoughts. But what we seem to forget is that, yes, the sun will continue to rise and set and the moon will continue to move across the skies, but mankind can create a situation in which the sun and moon can look down upon an earth that has been stripped of all life.

"We must find some way of bringing about an increased awareness of the danger," he continued. "It is a serious thing that the governments have supplied so little information to their peoples on this subject. There is no reason why people should not know exactly where they stand. Every once in a while, the governments will reassure the people but this only comes after there has been a serious alarm. What is needed is genuine information. Nothing that a government knows about the nature of this new force is improper for its people to know."

I asked Dr. Schweitzer if he did not think that it was important for him to say publicly what he had just said to Clara Urquhart and myself.

His eyes turned from a distant object and he looked at me directly.

"All my life," he said, "I have carefully stayed away from making pronouncements on public matters. Groups would come to me for statements or I would be asked to sign joint letters or the press would ask for my views on certain political questions. And always I would feel forced to say no.

"It was not because I had no interest in world affairs or politics. My interest and my concerns in these things are great. It was just that I felt that my connection with the outside world should grow out of my work or thought in the fields of theology or philosophy or music. I have tried to relate myself to the problems of all humankind rather than to become involved in disputes between this or that group. I wanted to be one man speaking to another man about the lasting problems inside men and between them."

I asked whether the doctor felt that the matter we had been discussing was as much moral as it was scientific or political. I told him I believed there was no living person whose voice on such an issue would be more widely heard or respected.

Dr. Schweitzer thanked me for the compliment but said that this was a problem for scientists. He believed that it would be too easy to attempt to discredit any non-scientist who spoke out on these matters.

I told him that I thought it inconceivable that this would

Spring Is a Looping-Free Time

By Martin Robbins

BOYS like puppets dangling
On the drooping curves of baseballs;
Babies in swings who swoop
To float in chains back to mothers;
Pole-vaulters scooped-up
To poise, prouder than Icarus.

Even the scarring-white trails of jets
Can't splinter the sky's prayer into angles
Or recall winter's prison-square penance.
Not while the sun and a southerly breeze
Are shining and blueing the heavens
Cleaner than Sunday, warmer than leaves.

be true in his case. Moreover, this was not solely a laboratory question. If nuclear power could have the effect of damaging the genes of human beings, then the nature of man himself was involved. Sovereign nations were now in a position to make decisions that were not properly theirs to make.

In saying this, I told him I recognized that the problem could not be considered apart from the larger uncertainty in the world today. Deep apprehension existed in the United States and Western Europe about the basic aims and purposes of the Communist world. The totalitarian record of Stalin, to which the Communist leaders had themselves attested, and recent events of which Hungary was a grave example, made it difficult for the Western world to feel confident in the expressed desire of the Soviet leaders for peace. In short, nuclear experimentation did not exist in an otherwise placid world. This, of course, added to the peril of mankind. For what we had most to fear was not merely the tests themselves, hazardous though they might be, but a saturation of tensions resulting in all-out nuclear war.

Dr. Schweitzer agreed, saying that anything that would be done against nuclear experimentation should not have the effect of putting the West at a disadvantage with respect to Soviet Russia.

He said, however, that the very real challenge of world Communism should not be used as the reason for withholding vital information from the human race concerning the dangers of unlimited nuclear testing. It was possible that an informed and determined world public opinion could serve as a powerful force in bringing about enforceable agreements with respect to arms control and in leading to other long-range measures for peace.

In view of all this, I asked the doctor whether he felt justified in putting aside his reticence about making a public statement.

He said that he would continue to give careful thought to the matter. He was still troubled, he said, about the form a constructive statement might take. How would it be issued? How would one go about drafting a statement that would be outside the context of the ideological struggle in the world today? He re-emphasized that he didn't want people to think that he was admonishing the United States or trying to intrude into domestic concerns. He wanted more time to think about these things.

When we resumed our discussion the next day he said he was still uncertain about the form of a statement or the method of its release.

Meanwhile, he was eager to consider an aspect of the problem that was highly significant. This was the fact that nations which were setting off nuclear explosions in the pursuit of their own security were possibly jeopardizing the health of other peoples.

On the basis of recent visits to Japan, I could report to Dr. Schweitzer that the Japanese government was confronted with a profound dilemma. It did not wish to oppose the American government, nor did it see any way of condemning Soviet Russia at the United Nations without including the United States. But Japan had increasing evidence of soil contamination as the result of the Russian tests, and fish contamination as the result of the American tests. Autopsies had indicated the presence of radioactive strontium in a number of corpses. The American hydrogen bomb explosion called "Operation Castle" had not been under complete control. Japanese fishermen were outside the prohibited area yet had been hit by radioactive ashes. The Japanese government had just issued instructions to its people about precautionary measures in the preparation of leafy vegetables and fish. But decontamination of food was a complicated laboratory process; it was doubtful that even the most careful washing and boiling would be adequate.

As a result, Japanese public opinion was sensitive on the subject and was now becoming articulate and potent. Meanwhile, Communists were exploiting the issue of testing against the United States, making it appear that America was responsible for the failure to arrive at cessation agreements, and saying little about the fact of Soviet nuclear testing.

As we discussed the role of the bystanders with respect to nuclear testing, I could see that Dr. Schweitzer felt that this was a vital issue. As a citizen of a democratic nation, I did not feel that we had any right to take measures that were of possible danger to others without their consent. Indeed, the principal argument against Nazism and more recently against Communism was that they were scornful of the rights of others and did harm to innocent people in their pursuit of military advantage. Is it any less immoral for a democratic nation to jeopardize the health and safety of other peoples through air dispersal of radioactive poisons? If other peoples are involved, then they have a right to participate in the basic decisions involved in testing. There is no more basic tenet in democratic government than that people who are affected by the acts of government have a right to participate in the affairs of that government.

If it is wrong to impose a tax on a man without giving him a voice in government, is it any less wrong to deprive his soil or water of their purity without giving him a chance to be represented and heard?

AT THE time I left Lambarene, Dr. Schweitzer was still struggling with the questions he had posed about the proper way in which a public statement might be made. A few weeks later I received a letter from the doctor saying that he had resolved these questions in his own mind. He would prepare a declaration and then turn it over to the Nobel Prize Committee. Earlier he had been invited by the Nobel committee to speak out on the subject of world peace. In doing so now, he would write a declaration of conscience addressed to no single nation but to the world's peoples. In it he would call for the right to know; he would try to make clear that before anything constructive could be done people had to have full information on the basis of which a moral climate of opinion could be created. He also said in his letter that he would get the fullest information from and check his facts with scientists of worldwide repute.

This is the way the matter was handled. Dr. Schweitzer's statement was read in full over Radio Oslo under the auspices of the Nobel Prize committee. Copies were sent all over the world for simultaneous release. So far as can be ascertained, the United States, Soviet Union, and Communist China were the only major nations which did not broadcast the full text. In checking with American networks, I learned that there had apparently been some confusion about the statement. Indeed, two of the networks claimed hat they had not even heard of the statement prior to the news flash about it from the wire services. In any event, the statement has now been released and millions of people know of its message. This is the statement that appears in full on the next page.

So far as the American people are concerned, it is unfortunate that the subject of nuclear experimentation became a political issue in the last campaign. The result has been that many people have taken fixed positions based on party affiliation. But the question has nothing to do with politics. It has to do with facts of vital concern to our health and the health of the world's peoples. It also has to do with information.

The American people have not been fully informed—under either administration these past twelve years—about the essential facts related to nuclear energy. Part of this is justifiable on military grounds. But it is also true

that much of it has nothing to do with military security; what little the government has released virtually had to be dredged out of it. It was only when a disaster occurred, as in the Pacific tests involving the fishermen, that the public had any inkling of the extent of danger from radioactivity.

Dr. Libby's letter is written with obvious good will, but it is not reassuring. He does not emphasize the special problem represented by internal radiation. He says nothing about the lower tolerances of children to radioactive strontium. He says nothing about the extent of contamination of milk. He makes no reference to his earlier report. He did not tell Dr. Schweitzer that the United States Public Health Service is just now setting up five stations at various points across the United States for the express purpose of testing milk and other foodstuffs for radioactive contamination. He does not make clear that neither this government nor any other government can guarantee its people or other people that there may not be untoward effects which additional research may make known. He does not say what will happen when smaller nations, as will inevitably happen, begin their own nuclear programs. He cannot predict what the future fate of fallout will be, nor where it will take place. Nor does he remind people that X-rays, at a stage of development comparable with present nuclear testing, were considered far less harmful than they turned out to be. Finally, he talks about permissible limits of radioactive strontium in human beings. What he overlooks is that the proper amount of strontium in a human being is no strontium.

THE EDITORS do not question the good faith of our government. We realize that there are circumstances under which men in government may feel justified in withholding vital information. It may be feared that the American people will respond in panic. But this will be as nothing compared to the panic that will occur later if it should be discovered that the tolerance limits have been passed, and that there is no known method of washing the sky clean of the radioactive poisons that were yet to fall. The American Constitution-makers had only to review history to be convinced that it is the natural and inevitable tendency of men in authority to withhold information if it is likely to produce an unwanted result. Because of this, the Constitution-makers contended that the people must be informed about everything that concerns them—not as a matter of privilege, but as a matter of natural right.

It is this natural right that concerns Dr. Schweitzer.

—N. C.

What About 2000 A.D.?

EDITOR'S NOTE: *The following are four excerpts from an important new book, that deals with many of the issues raised by Dr. Schweitzer:* ***"Radiation: What It Is and How It Affects You,"*** *by Jack Schubert and Ralph E. Lapp (Viking, $3.59).*

IT IS probable that the radiostrontium already committed to the stratosphere will not present a *serious* biological hazard to a global population. Whether or not it will present *some* harmful effects to *any* portion of the earth's population is a matter which transcends the bounds of our present knowledge of the biological effects of nuclear radiation. So far as internal emitters are concerned —as, for example, bone-seekers such as strontium—we have insufficient evidence for predicting in a quantitative way how many people might suffer ill effects. All our knowledge rests upon the base supplied by a relatively few (a statistically small sample) cases of radiation injury with radium.

Almost all thinking about radiation hazards has focused upon the occupational MPC (maximum permissible concentration) and its application to a small population—usually a few score, and rarely more than a few hundred, people.

If we define the MPC for such a group as that which will produce only 1 per cent chance of radiation injury, we must recognize that extrapolation of such reasoning, even dividing the occupational MPC by ten, to a large population leaves one with 0.1 per cent incidence of injury. Such a risk is quite acceptable for small groups, but 0.1 per cent of the earth's population is 2.5 million people!

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IT MAY well be that man's ability to cope with the radiation hazards from the split atom will limit his exploitation of this revolutionary new power source. If we project the magnitude of the problems which we know will arise from nuclear-reactor hazards up to the year 2000, the conclusion seems inevitable that our present knowledge is inadequate to deal with these dangers.

EVALUATION of the global risk of continuing tests is a most perplexing enigma. Who makes the evaluation? What is the "acceptable" risk? Quite obviously, an agency like the Atomic Energy Commission, which is charged with responsibility for testing nuclear weapons, should not be asked to assume the onus of appraising their risks to humanity. Such an action puts the plaintiff and judge on the same bench.

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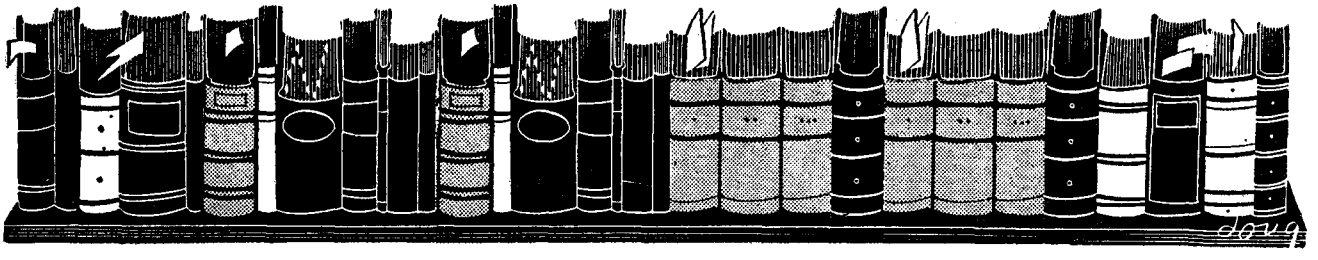
SOME risk must be run for the sake of national security, but where one fixes the limit beyond which risks must not be taken is the all-important question. And we should insist that the calculation of the risk be made in the open, in the light of all available physical and biological data. The authors venture the estimate that annual additions to the stratosphere of approximately three metagons constitute a reasonable risk. This value is so small that a single Bravo (uranium-hydrogen-uranium) bomb exceeds it, and we propose that the nations of the world should focus their efforts on a cooperative plan to cease rather than to limit nuclear tests.



A DECLARATION of CONSCIENCE

By ALBERT SCHWEITZER

SINCE March 1, 1954 hydrogen bombs have been tested by the United States at the Pacific island of Bikini in the Marshall group and by Soviet Russia in Siberia. We know that testing of atomic weapons is something quite different from testing of non-atomic ones. Earlier, when a new type of giant gun had been tested, the matter ended with the detonation. After the explosion of a hydrogen bomb that is not the case. Something remains in the air, namely, an incalculable number of radioactive particles emitting radioactive rays. This was also the case with the uranium bombs dropped on Nagasaki and Hiroshima and those which were subsequently tested. However, because these bombs were of smaller size and less effectiveness compared with the hydrogen bombs, not much attention was given to this fact.

Since radioactive rays of sufficient amount and strength have harmful effects on the human body, it must be considered whether the radiation resulting from the hydrogen explosions that have already taken place represents a danger which would increase with new explosions.

In the course of the three-and-a-half years that have passed since then [the dropping of the first hydrogen bomb in 1954] representatives of the physical and medical sciences have been studying the problem. Observations on the distribution, origin, and nature of radiation have been made. The processes through which the human body is harmfully affected have been analyzed. The material collected, although far 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.

This conclusion has repeatedly been expressed, especially during the last few months. However, it has not, strange to say, influenced public opinion to the extent that one might have expected. Individuals and peoples have not been aroused to give to this danger the attention which it unfortunately deserves. It must be demonstrated and made clear to them.

I raise my voice, together with those of others who have lately felt it their duty to act, through speaking and writing, in warning of the danger. My age and the generous understanding so many people have shown of my work permit me to hope that my appeal may contribute to the preparing of the way for the insights so urgently needed.

My thanks go to the radio station in Oslo, the city of the Nobel Peace Prize, for making it possible for that which I feel I have to say to reach far-off places.

WHAT is radioactivity?

Radioactivity consists of rays differing from those of light in being invisible and in being able to pass not only through glass but also through thin metal discs and through layers of cell tissue in the human and animal bodies. Rays of this kind were first discovered in 1895 by the physicist Wilhelm Röentgen of Munich, and were named after him.

In 1896 the French physicist Henry Becquerel demonstrated that rays of this kind occur in nature. They are emitted from uranium, an element known since 1786.

In 1898 Pierre Curie and his wife discovered in the mineral pitchblende, a uranium ore, the strongly radioactive element radium.

THE joy caused by the fact that such rays were at the disposal of humanity was at first unmixed. It appeared that they influence the relatively rapidly growing and relatively rapidly decaying cells of malignant tumors and sarcomas. If exposed to these rays repeatedly for a longer period, some of the terrible neoplasms can be destroyed.

After a time it was found, however, that the destruction of cancer cells does not always mean the cure of cancer and also, that the normal cells of the body may be seriously damaged if long exposed to radioactivity.

When Mme. Curie, after having handled uranium ore for four years, finally held the first gram of radium in her hand there appeared abrasions in the skin which no treatment could cure. With the years she grew steadily sicker from a disease caused by radioactive rays which damaged her bone marrow and through this her blood. In 1934 death put an end to her suffering.

Even so, for many years we were not aware of the grave risks involved in X-rays to those constantly exposed to them. Through operating X-ray ap-

paratus thousands of doctors and nurses have incurred incurable diseases.

Radioactive rays are material things. Through them the radioactive element constantly and forcefully emits tiny particles of itself. There are three kinds. They are named after the three first letters of the Greek alphabet, *alpha, beta, gamma.* The gamma rays are the hardest ones and have the strongest effect.

THE reason why elements emit radioactive rays is that they are in a continuous state of decaying. The radioactivity is the energy liberated little by little. There are other elements besides uranium and radium which are radioactive. To the radiation from the elements in the earth is added some radiation from space. Fortunately, the air mass 400 kilometers high that surrounds our earth protects us against this radiation. Only a very small fraction of it reaches us.

We are, then, constantly being exposed to radioactive radiation coming from the earth and from space. It is so weak, however, that it does not hurt us. Stronger sources of radiation, as for instance X-ray machines and exposed radium, have, as we know, harmful effects if one is exposed to them for some time.

The radioactive rays are, as I said, invisible. How can we tell that they are there and how strong they are?

Thanks to the German physicist Hans Geiger, who died in 1945 as a victim to X-rays, we have an instrument which makes that possible. This instrument is called the Geiger counter; it consists of a metal tube containing rarefied air. In it are two metal electrodes between which there is a high potential. Radioactive rays from the outside affect the tube and release a discharge between the two electrodes. The stronger the radiation the quicker the discharges follow one another. A small device connected to the tube makes the discharge audible. The Geiger counter performs a veritable drum-roll when the discharges are strong.

There are two kinds of atom bomb —uranium bombs and hydrogen bombs. The effect of an uranium bomb is due to a process which liberates energy through the fission of uranium. In the hydrogen bomb the liberation of energy is the result of the transformation of hydrogen into helium.

It is interesting to note that this latter process is similar to that which takes place in the center of the sun, supplying it with the self-renewing energy which it emits in the form of light and heat.

In principle, the effect of both bombs is the same. But according to various estimates the effect of one of the latest hydrogen bombs is 2,000 times stronger than the one which was dropped on Hiroshima.

To these two bombs has recently been added the cobalt bomb, a kind of super atom-bomb. It is a hydrogen bomb surrounded by a layer of cobalt. The effect of this bomb is estimated to be many times stronger than that of hydrogen bombs that have been made so far.

The explosion of an atom bomb creates an unconceivably large number of exceedingly small particles of radioactive elements which decay like uranium or radium. Some of these particles decay very quickly, others more slowly, and some of them extraordinarily slowly. The strongest of these elements cease to exist only ten seconds after the detonation of the bomb. But in this short time they may have killed a great number of people in a circumference of several miles.

What remains are the less powerful elements. In our time it is with these we have to contend. It is of the danger arising from the radioactive rays emitted by these elements that we must be aware.

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 rain or 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.

When I was a boy I witnessed how dust hurled into the air from the explosion in 1883 of the island Krakatoa in the Sunda group was noticeable for two years afterwards to such an extent that the sunsets were given extraordinary splendor by it.

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.

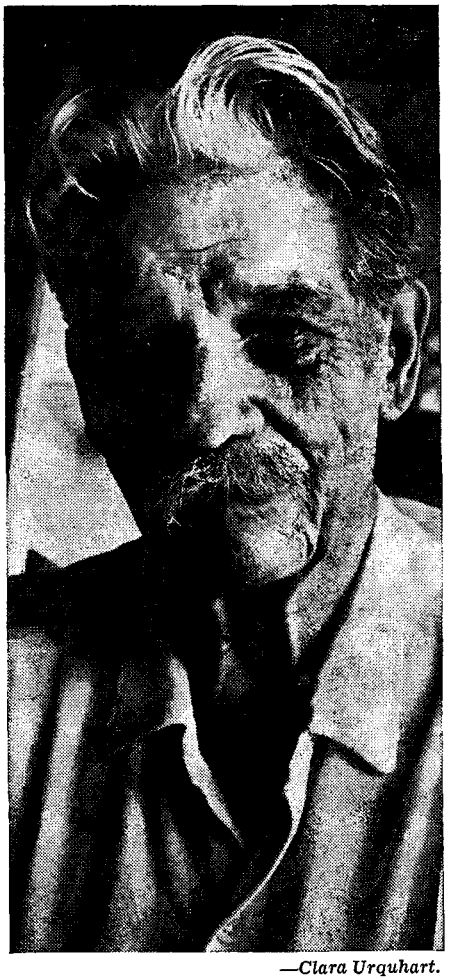
Of what nature are these radioactive elements particles of which were carried up in the air by the explosion of atom bombs and which are now falling down again?

They are strange variants of the usual non-radioactive elements. They have the same chemical properties, but a different atomic weight. Their names are always accompanied by their atomic weights. The same element can occur in several radioactive variants. Besides Iodine 131, which lives for sixteen days only, we have Iodine 129, which lives for 200,000,000 years.

Dangerous elements of this kind are: Phosphorus 32, Calcium 45, Iodine 131, Iron 55, Bismuth 210, Plutonium 239, Cerium 144, Strontium 89, Caesium 137. If the hydrogen bomb is covered by cobalt, Cobalt 60 must be added to the list.

Particularly dangerous are the elements combining long life with a relatively strong efficient radiation. Among them Strontium 90 takes the first place. It is present in very large amounts in the radioactive dust. Cobalt 60 must also be mentioned as particularly dangerous.

The radioactivity in the air, increased through these elements, will not harm us from the outside, not being strong enough to penetrate the skin. It is another matter with respira-



—Clara Urquhart.

Dr. Albert Schweitzer: "Public opinion works . . . just by being there."

tion, through which radioactive elements can enter our bodies. 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 of Bikini and Siberia rain falling over Japan has, from time to time, been so radioactive that the water from it cannot be drunk. Not only that: 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.

WELL-water becomes radioactive to any considerable extent only after longer periods of heavy rainfall.

Wherever radioactive rainwater is found the soil is also radioactive—and in a higher degree. The soil is made 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.

In the case of cows grazing on contaminated soil, the absorption is effected when we drink their milk. In that way small children run an especially dangerous risk of absorbing radioactive elements.

When we eat contaminated cheese and fruits the radioactive elements stored in them are transferred to us.

What this storing of radioactive material implies is clearly demonstrated by the observations made when, on 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 plutonium for atomic bombs and which empty their waste water into the river. 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 plankton 40,000 times higher, that of the fish 15,000 times higher. In young swallows fed on insects caught by 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 issue. Even if we are 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, created by the explosion 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 we absorb of radioactivity is not spread evenly in all cellular tissue. It is deposited in certain parts of our body, particularly in the bone tissue and also in the spleen and in the liver. From those sources the organs which are especially sensitive to it are exposed to radiation. What the radiation lacks in strength is compensated for by time. It works day and night without interruption.

How does radiation affect the cells of an organ?

Through being ionized, that is to say, electrically charged. This change means that the chemical processes which make it possible for the cells to do their job in our body no longer function as they should. They are no longer able to perform the tasks which are of vital importance to us. We must also bear in mind that a great number of the cells of an organ may degenerate or die as a result of radiation.

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. The cells of the red bone marrow, where the red and the white blood corpuscles are formed, are very

Letter from America

By Sydney Kessler

SO, YOU are in Paris
and I am here, attempting to tell what happens
behind locked doors,
from the clicking traffic lights,
by my own pulse beat.

Sometimes, as I read in the late quiet,
my wife turning peacefully in sleep,
the children discovering their real world,
in dreams, I accept, for awhile, my life,
allotted to this city,
these avenues, landmarks I cannot forget;
childhood's narrow streets; corners of school days;
this house of approaching middle age;
each neighborhood an increment of time remembered.
But, then, too often,
I can find no commanding view;
and pace an airless room with sooted windows,
badly lighted, and hemmed-in by time.

Tell me, are there hills there,
stars to count, women who walk toward other than
shop-worn destinations; is there a place to sit;
are there children playing in morning sunlight?

These lines write themselves
on pilfered paper and borrowed time,
and—in the end—simply say, "Do not forget me."

I should have been born everywhere.

Still, in some small sense, I yet know
what happens, living behind my own locked doors;
and make my small attempts to salvage time,
speak to France, and accept that street and landmark
there, as here, shape the same late quiet,
beneath the same, immutable stars.

sensitive to radioactive rays. It is these corpuscles, found in great numbers in the blood, which make it possible for it to play such an important part. 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, frequently, 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.

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. As I have said, the radioactive elements are by preference stored in the bone tissue.

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 which in this case attacks the nucleus to such an extent that it can be seen in the microscope.

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

It consists in stillbirths and in the births of babies with mental or physical defects.

In this context also, we can point to the effects of radiation coming from the outside.

It is a fact—even if the statistical material being published in the press needs checking—that in Nagasaki, during the years following the dropping of the atom bomb, an exceptionally high occurrence of stillbirths and of deformed children was observed.

In order to establish the effect of radioactive radiation on posterity, comparative studies have been made between the descendants of doctors who have been using X-ray apparatus over a period of years and descendants of doctors who have not. The material of this study comprises about 3,000 doctors in each group. A noticeable difference was found. Among the descendants of radiologists a percentage of stillbirths of 1,403 was found, while the percentage among the non-radiologists were 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.

The number of healthy children in the first group was 80.42 per cent; the number in the other was significantly higher, viz. 83.23 per cent.

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.

As the matter stands we cannot at present cite cases of serious damage done by internal radiation. To the extent that such radiation exists it is not sufficiently strong and has not lasted long enough to have caused the damage in question. We can only conclude from the harmful effects known to be caused by external radiation to those we must expect in the future from internal radiation.

If the effect of the latter is not as strong as that of the former, it may become so, through working little by little and without interruption. The final result will be the same in both cases.

Their effects add up.

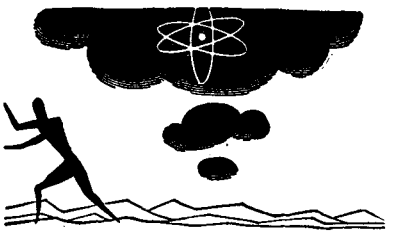
We must also remember that internal radiation does not have to, in contrast to that coming from the outside, penetrate layers of skin, tissues, and muscles to hit the organs. It works at close range and without any weakening of its force.

When we realize under what conditions the internal radiation is working, we cease to underrate it. Even if it is true that, when speaking of the dangers of internal radiation, we can point to no actual case, only express our fear, that fear is so solidly founded on facts that it attains the weight of reality in determining our attitude. 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.

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. We are committing a folly in thoughtlessness. It must not happen that we do not pull ourselves together before it is too late. We must muster the insight, the seriousness, and the courage to leave folly and to face reality.

This is at bottom what the statesmen of the nations producing atomic bombs are thinking, too. Through the reports they are receiving they are sufficiently informed to form their own judgments, and we must also assume that they are alive to their responsibility.

At any rate, America and Soviet Russia and Britain are telling one another again and again that they want nothing more than to reach an agreement to end the testing of atomic weapons. At the same time, however, they declare that they cannot stop the tests as long as there is no such agreement.

Why do they not come to an agreement? The real reason is that in their own countries there is no public opinion asking for it. Nor is there any such public opinion in other countries, with the exception of Japan. This opinion has been forced upon the Japanese people because, little by little, they will be hit in a most terrible way by the evil consequences of all the tests.

AN agreement of this kind presupposes reliability and trust. There must be guarantees preventing the agreement from being signed by anyone intending to win important tactical advantages foreseen only by him.

Public opinion in all nations concerned must inspire and accept the agreement.

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 sunrays of hope which suffering humanity is longing for.

FICTION

Anniversary Translation of a French Classic

"Madame Bovary," by Gustave Flaubert *(translated by Francis Steegmuller. Random House. 396 pp. $3.95), is a new English translation of a nineteenth-century French novel which instigated a famous literary court trial when it first was published exactly one hundred years ago, and which now has long since achieved the stature of a literary classic.*

By Otis Fellows

A CENTURY ago—quite as easily as today—an unknown writer might find himself catapulted to fame overnight if his first published work were fortunate enough to offend the appropriate civil and ecclesiastic authorities. If he were brought to trial with the accusation of outrage against public morals and religion, popular success would be an almost foregone conclusion. And if he later turned out to be an artist of uncommon talent, perhaps a genius, then he and his work would already be well on their way to literary immortality.

In 1857, exactly one hundred years ago, Gustave Flaubert fulfilled these conditions most satisfactorily. For five years he had been toiling over various versions of a manuscript that was to tell a story of life in the French provinces. Driven by some inner compulsion, there were times when he would spend hours or even days on a single page striving to blend stylistic perfection, realistic observation, and psychological truth into a unified whole. The self-discipline involved was cruel and exacting but the result, of course, was that masterpiece of literary conscientiousness, "Madame Bovary." To the public prosecutor under the Second Empire it was something else again—a sordid tale of adultery imbued with a coarse and often shocking realism. Still, the sensational trial ended in Flaubert's acquittal and his complete vindication. In April 1857, the novel again appeared in print, this time entirely unexpurgated.

From our present vantage point it is easy to argue that "Madame Bovary," like "Don Quixote" and "Anna Karenina" for instance, is an important milestone in the history of the novel. This was not a widely accepted view in the nineteenth century. To be sure, popular success—which Flaubert acknowledged with Olympian indifference—was immediate; to the general reader here was a masterwork of wickedness offering into the bargain that peculiar attraction the dissecting room sometimes has for the layman. But critical reaction of the day was inclined to find the book's style objectionable, its contents both immoral and materialistic to the point of offensiveness. Sainte-Beuve, France's most distinguished literary critic, thought it well to write a feminine acquaintance: "I do not advise you to read that novel. It is too raw for the majority of women, and it would offend your feelings."

Slowly, however, an aura of the highest literary respectability began to settle over both Flaubert and "Madame Bovary.' True, certain scenes, clinical in nature—the author's father had long been director of a city hopsital—retained their shock value, and still do. The fact remained that readers on both sides of the Atlantic were becoming used to the fictional likes of provocative, restless Emma who paid so dearly for preferring high romance in the form of a well-to-do roué or an equally caddish lawyer's clerk to her adoring, well-meaning but stupidly dull country doctor of a husband. Upon reflection it was concluded that after all the novel was singularly devoid of the licentious. More valid reasons were now apparent for rereading the book as a whole and specific passages in particular. In the following instance an overwrought Madame Bovary has just poured out her infatuation for Rodolphe:

> Emma was like all his other mistresses; and as the charm of novelty gradually slipped from her like a piece of her clothing, he saw revealed in all its nakedness the eternal monotony of passion, which always assumes the same forms and always speaks the same language. He had no perception—this man of such vast experience—of the dissimilarity of feeling that might underlie similarities of expression. Since he had heard those same words uttered by loose women or prostitutes, he had little belief in their sincerity when he heard them now: the more flowery a person's speech, he thought, the more suspect the feelings, or lack of feelings, it concealed. Whereas the truth is that fulness of soul can sometimes overflow in utter vapidity of language, for none of us can ever express the exact measure of his needs or his thoughts or his sorrows; and human speech is like a cracked kettle on which we tap crude rhythms for bears to dance to, while we long to make music that will melt the stars.

By the turn of the century much had already been written about "Madame Bovary" and such passages as the above now assumed a multiple significance on the way to further appreciation of both novel and writer. First of all, the book no longer bore the stigma of being immoral. On the contrary, it was a highly salutary tale of the wages of sin, and Henry James, while extoling its literary merits, could say that it might be conceived as a Sunday school tract.

"MADAME BOVARY" has proved an enticing challenge to numerous translators wishing to present in English that gamut of ideas, emotions, and nuances already so well expressed in the original French. Few if any, however, have been so well qualified to meet this challenge as Francis Steegmuller. He is an able scholar, talented writer and exceptionally gifted translator. It seems as it should be that Mr. Steegmuller's excellent English version has come to mark the hundredth anniversary of one of the most famous French novels ever written.