

# The Atom Demands a New Answer

by Francis C. Bello

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When my class entered college about 10 years ago we had an idea that our generation might be in for an exciting time. Little did we suspect how exciting. And the end is not yet. If this turns out to be the atomic age (and not merely an atomic minute, as some wag has suggested) the class of 'thirty-nine seems historically justified in calling itself the first class of the new age.

As a paid-up member of this illustrious class I took out one of our Science Survey textbooks the other day to see if we had properly prepared for the role we have been called upon to play. The book was *Energy and Matter*, by Charles B. Bazzoni.

Bazzoni was no square but he just didn't have the word. I quote:

The energy liberated in complete conversion of matter into radiation, in the annihilation of matter, so to speak, is tremendous. . . . It has been a favorite dream of sensational fiction writers that man may ultimately learn how to bring these conversions about.

If our science department dismissed atomic energy as a dream we certainly can't blame the departments of philosophy and economics for certain inadequacies that have since come to light. (Notice that I have omitted the history and literature departments. It is likely that history and literature can probably go on being taught as they always have been, impervious to the tremors of atomic explosions. After all, Shakespeare knew there were many things 'twixt heaven that he had not dreamed of.)

Regardless of the rapid obsolescence of our expensive education - as the man said at graduation: the future was now in our hands. Whereupon the next five or six years were absorbed in straightening out a few errors that had been made in the past. But now it's 1946. The class of 'thirty-nine is pushing thirty. And if we don't get on our horses the future will have been turned over to the class of 1959 while we weren't looking. Lets for the sake of argument assume that the future is still in our hands. We are in the same exciting period of history that we thought our elders were in back in 1919. Why did they make such a botch of things? How can we do better? In 1919 the world was pretty sure that it had fought its last major war.

We're pretty sure that we haven't. We are so anxious not to repeat the old mistakes, so anxious to believe that the worst is yet to come, that we are ignoring a very fundamental proposition, namely, that 1946 bears no more resemblance to 1919 than 1919 did to 1066. It would help us a little if the date could be changed by edict from 1946 to 2546.

Atomic energy came too quickly, too easily -we never appreciate anything that comes without effort. Atomic physics is only 50 years old. If humanity had to wait 500 years instead of 50 years it would contemplate more seriously and with greater awe the spectacle of Oak Ridge, Tennessee. There a magnificent, terrible plant is producing about 6 pounds of uranium-235 every 24 hours. This is enough atomic explosive for one or two bombs a day. How easily the figure's slip off the tongue: 6 pounds - one or two bombs. We should say one or two Nagasakis a day; 100,000 deaths a day; fifteen million deaths since V-J Day, and still going strong. Instead all or buttons fairly pop with pride. Only America - the land of unlimited wealth and skill - could spend two billion dollars and produce an Oak Ridge in three years. And only America could be so blasé about the achievement.

We have split the atom and protest that we are terrified, but we are not too terrified to talk of a third world war. Our imaginations have let us down badly. The scientists who created the bomb are waking up to this fact in amazement and are trying to do for us what our unaided imaginations seem unable to do. The man who said recently that we should drop an atomic bomb on New York City was not a madman - he was a scientist who worked on the bomb. He was a desperate scientist.

He had first suggested that the bomb be dropped on an "obsolete city" instead of obsolete ships 4000 miles from California. He soon realized this would not be enough. Hiroshima and Nagasaki could probably have qualified as a obsolete cities - in any case they are now extinct cities; one city more or less in the U.S. wouldn't make much difference to you or me or Congress or the State Department. So in desperation and this scientist, Dr. Inglis, proposed a bomb on New York, to shake the American people from what he called their "lethargy of thought." " I would rather see the buildings and skyscrapers of New York go up in smoke and all its inhabitants made homeless now," he said, " than see them dead 20 years from now." But distance from the holocaust is important. The noise wouldn't have been heard and the heat wouldn't have been felt in Washington, so Dr. Inglis selected Baltimore as an alternate choice. I don't doubt that many who read the proposal said, " well, come now, you don't really think a few atoms could destroy New York. These Japanese cities were mostly shacks."

The trouble with any fanatic is that the more he talks the less impression he makes. The scientists are in the unusual and unfortunate position of sounding like fanatics. The bomb so far constructed are probably the absolute minimum size they can be made.

So many people don't get the idea at all. U-235 is stuff that when you get a big enough lump of it, it goes off automatically. The mind is simply unable to conceive of the terrific energy they can be realized from a speck of matter. An entire city was flattened and 70,000 people killed when *one thirtieth of an ounce* of mass was wholly transformed into energy. Anyone who thinks nuclear conversions are going to be limited to fractions of anounce is not being realistic. One of our top physicists recently said off the record that a bomb with 100,000 times the power of the Nagasaki bomb is a day-to-day possibility. There's

probably not much incentive to make the bomb more powerful. Just drop two, they're small. No wonder Dr. Urey wrote an article for *Collier's* entitled "I'm a

Frightened Man."

But no one else seems particularly frightened. Dr. Hutchins, chancellor of Chicago University, contemplates the bomb and says in a depressed but hardly frightened tone, "The world has reached at one in the same moment the zenith of its information, technology, and power over nature, and the nadir of its moral and political life." This sort of statement is becoming a platitude. It seems to me that the major difference between science and what might be covered by the term "the humanities" is that science leads its followers into unconventional or radical avenues of thought where they would not dream of straying except that they have no choice: nature leads and scientists can only follow. It is not that scientists are any more thoughtful, imaginative, or even intelligent than philosophers or statesmen, that makes science such a success and our morals and politics such a flop. José Ortega y Gasset observed 20 years ago in the *Revolt of the Masses* that "experimental science has progressed thanks in great part to the work of men astoundingly mediocre, and even less than mediocre.

Scientific training is like a skeleton key to the rooms of an infinitely large house. The scientist selects one tiny room, and turns, and looks around. Anyone could find something in the room, some scientists are more observant than others and occasionally a concealed button moves secret panel: but only a very few scientists can view the whole house and describe the location and function of all the rooms. The discovery of uranium fission itself is a classic example of the reluctance of scientists to accept a radical idea, despite the fact that the devotees are forever extolling their ability to do so. John Steinbeck, in addition to being a pretty fair novelist, has acquired a small reputation as an amateur scientist. His book *Sea of Cortez* describes some biological investigations of sea life in the Gulf of California. Somewhere in the book he tries to describe the scientific method and tells the following story as an example of the difference between lay thinking and scientific thinking.

"the tree frog in the high pool in the mountain cleft, had he been endowed with human reason, on finding a cigarette butt in the water, might have said, 'Here is an impossibility. There is no tobacco hereabouts, nor any paper. There is evidence of fire and there has been no fire. This thing cannot fly nor crawl nor blow in the wind. In fact, this thing cannot be and I will deny it.'"

We are supposed to conclude that scientists know a cigarette butt when they see one - and that most of the rest of us don't. Well, Mr. Steinbeck to the contrary, the men who first split an uranium atom refuse to believe that they had done so.

The story goes back to about 1933 when Irène and Frédéric Joliot in France and Enrico Fermi in Italy first investigated artificial radioactivity which could be produced in almost all elements by bombarding them with neutrons and alpha particles. Fermi shot neutrons at aluminum and sodium and magnesium and some 60 other elements including uranium and found out that frequently an atomic nucleus would capture one of the neutrons and become a radioactive form of the same

element, or in other cases the neutron would chip an alpha particle, or proton, or even another neutron from the target atom. The net result was that you could add one proton or knock two out of the atoms by bombarding them with neutrons, that is, you change the atomic number by one or at most two units; sodium could become magnesium, chlorine could be turned into sulfur, but you never did more than shipped the nucleus, or increase its weight by one unit.

In due course, Otto Hahn, who headed the Kaiser Wilhelm institute for chemistry in Berlin repeated some of the Fermi and Joliot experiments. He bombarded uranium with neutrons and attempted chemically to identify the products of the nuclear reactions that occurred. Hahn and his call worker, Strassman, expected to find either the two elements below uranium on the atomic scale-thorium or protactinium-or else a new element beyond uranium with atomic number 93.

After getting some predictable results, Hahn finely observed a new element that seemed to be an isotope of radium, and alike radium emitted have the alpha particles.

In emitting heavy particles can you add on behave differently from any other artificial radioactive isotope ever produced-normally only light electrons and positrons were given off. If the new element were actually radium and it could be separated by co-precipitation with barium. Then the radium could be separated from the barium. But to his confusion Hahn found that whatever the new radioactive element was, it could not be separated from the barium.

Hahn had found a cigarette butt in his immaculate laboratory and he was as puzzled as Steinbeck's tree frog. If his new atom were really radioactive barium (as it certainly appeared to be) it meant that the uranium atom had been split almost in half - not merely chipped. Fortunately the Nazis did not watch the scientific press as a vigilantly as they did the lay press, for Hahn and Strassman reported their findings on January 6, 1939. They said:" As chemists we must really say that the new bodies do not behave like radium, [but] rather like barium. As nuclear scientists we cannot bring ourselves to take this step so contradictory to all the experience of nuclear physics."

But there is no blinking of fact. It took only a week for other scientists to read the report and to take the contradictory step. Doctors Meitner and Frisch wrote a letter to [Naturwissenschaften](#) from Copenhagen where they were living in exile from Germany, and applied the term "fission" to the process of splitting uranium and guessed that the fission would be accompanied by the release of rather large amounts of energy. Six and a half years later Hiroshima and Nagasaki were cauterized in two atomic blasts that signaled to the end of the Second World War, and, as it is poetically called, "the dawn" of the atomic age.

So this is now the atomic age. Approximately seven months old. The moral equivalent of nuclear fission which can prevent a third world war has not yet appeared. It is easy to see why it won't appear. We are looking for it two steps down, or possibly one step up the scale of political thought. The 1946 efforts to preserve peace do not look remarkably different from the 1919 efforts. A proposal like

Einstein's - which certainly wasn't a revolutionary thinking - is demolished in an exchange of words by Sumner Welles, and is pretty generally ignored by everyone else. Einstein proposed the immediate establishment of a World Government by the U.S., Great Britain, and Russia. "All three of them should commit to this World a Government all of their military strength. " He went on . . . "While persons who take only a step at a time may think they are approaching a world peace, they actually are contributing, by their slow pace, to the coming of war. We have no time to spend in this way. If war is to be averted it must be done quickly. As long as there are sovereign nations possessing great power, war it is inevitable."

In January Atlantic monthly Sumner Welles replied: "To the idealists a fresh start is always preferable to the hard grind." If he does not have absolute faith in the UNO Welles still maintains that the UNO is our only hope. "If we abandon it without a trial we deliberately reject the one instrument which today exists through which [peace among nations] can be secured." Welles concludes by saying that the ultimate objective of the United Nations is the establishment of a federal world government, but at the beginning of his article he criticized Einstein's proposal to form a world government now, because "we have every reason to be confident that unless the Soviet Union could so dominate the proposed world government as to preclude the possibility of any weakening of its own control of Russian foreign and domestic policy, it would not participate in that government. "I think perhaps no one is as to Russia on what terms you would cooperate in the world a government. We cannot bring ourselves to take this step so contradictory to all the experience of - what shall we call it - international diplomacy.

What appears to be lacking even from the Einstein proposal is the unalterable conviction that another war must be avoided *at all costs*. We have to make up our minds on this one point before going any further. Perhaps we are all absolutely sincere when we declare there must never be another war. But if we attach a single condition of qualification to the statement we can be sure are that we will have war, sooner or later. We must clearly understand that the war just ended was the last possible "good" war. *Time* magazine for February 11 reprinted an account of the Hiroshima bombing written by Rev. John A. Siemes, professor of modern philosophy at Tokyo's Catholic University, who witnessed the atomic explosion from a hill overlooking the city, and later participated in the rescue work. He wrote: "The crux of the matter is whether total war in its present form is justifiable, even when it serves a just purpose. Is it not attended by material and spiritual evils which far exceed whatever the good that might result?" He concludes, "When will our moralists give us a clear answer to that question?"

For better or worse the atomic bomb took the answer out of the hands of the moralists. There can be no possible moral justification for an atomic war which professor Einstein suggests might result in the deaths of two-thirds of the people on earth. And the complete extinction of life everywhere as a result of radioactive poisons, though improbable, is not impossible. Science has put us far out on a limb and is unable to tell us how to clamber back to safety. Dr. Inglis wants to blow up

New York City to shake Americans out of their "lethargy of thought." But when he has succeeded in rousing us with his terrific blast - what is he going to tell us to do? What has his program from there? The New York *Times* didn't say.

I don't want to be sitting up front when the class of 1959 asks us why we botched the peace. Why we turned the entire world against us by continuing to produce atomic bombs 24 hours a day after the Second World War has been won? It is my sincere conviction that there is only one course of action which can honorably and absolutely prevent a third world war; only one course of action which would be the moral and political equivalent of the atomic bomb. I would breathe easier about the fate of the class of 1959 if I could read in the morning paper the following proclamation by the President of the United States.

The United States of America renounces the use of force as an instrument of national policy. Approximately 3 hours ago the atomic bomb plants in Tennessee and in the State of Washington were completely demolished on my orders. At the same instant every American warship was sunk in every war plane was destroyed. Every ounce of uranium-235 and plutonium that we possessed was either used up in the demolitions or scattered over the seas. All military research has been halted, and all weapons under construction have been the stride. Only our occupation forces abroad, along with necessary supplies, had been maintained temporarily intact.

While the United States renounces the use of force as a national instrument, I have urgently requested the United Nations Organization to reconvene as soon as possible for the express purpose of creating a World of Police Force, in accordance with the United Nations Charter. I shall recommend that the size of the force be held to the absolute minimum in the light of the new conditions which exist in the world. For the present United States can contribute only manpower, and perhaps it may be found possible to produce the necessary weapons for the World of Police Force in extraterritorial factories under the direct supervision of the United Nations Organization. Atomic weapons shall, of course, be outlawed.

It is my earnest hope that the other nations of the world will follow the example we have set, but we may expect some delay while they verify to their own satisfaction the statements I have made. I have no illusions that all the complex problems of the world will automatically be solved by the dissolution of the U.S. military power. It was simply that the world cannot run the slightest risk of another war. The dreadful instruments of science have no place at the international conference tables where they may be set off - however inadvertently - by the inexcusable, but human errors of the world statesman. This is the ultimate gesture of goodwill toward all men.

Until several hours ago, we had a number of atomic bombs, hundreds of times more powerful than any used against Japan. We were planning tremendous rockets which could carry these bombs halfway around the earth. We had substantial supplies of radioactive poisons and insight into methods of waging bacterial warfare that could have rendered and vast areas of the earth uninhabitable. I became

convinced that no nation, even our own, could be trusted with this power. Within ten or twenty years all the large comparable weapons nations could be expected to be developed. Each became obvious that the policy of unrestricted use of force would have to be completely and irrevocably abandoned by one of the major powers - preferably by one of the strongest - to reverse the suicidal trends of our times before it was too late.

We must remember that no nation on earth threatened us yesterday while we were physically strong. Only a few months ago most of us were fighting side by side against the common aggressor. I cannot believe that our comrades of yesterday will become our enemies of today merely because we no longer have the instruments to destroy them. Gigantic social and economic problems still exist all over the world, but I am sure that the solutions will be made not more, but immeasurably less difficult by our present action. We can now proceed to establish a true brotherhood of man in the absence of suspicion and fear.

This would be my answer to the atomic bomb. This would be the step contradictory to all the experience of history. But that it is contrary to all our experience is no reason for avoiding something radical that gives promise of working. Nothing else ever tried in all history has yet succeeded in preventing wars. No country has ever dared to be the first to lay the pistol down. Why can't America follow up its fantastic achievement in nuclear physics by having the moral courage to take the one great and final step needed to prevent war?

Certainly there is a risk involved - but it's a calculated risk. The moment the announcement reaches Moscow Stalin might load a small task force into a few long range bombers, fly to Washington, and walk into the White House with guns blazing.

But you know this is ridiculous as well as I do. Nations are not bandits. Even Hitler required the most elaborate moral pretexts for every one of his acts of aggression. Stalin has his hands full trying to reconstruct a shattered Russia. He needs nothing from us but peace. If we were to assure him not only peace but at the same time release Russia from the onerous burden of a few tile armaments race, it would be equivalent to an outright gift of perhaps \$100 billion. Look at what it would mean to our own country, and particularly Great Britain which must keep up the pretense of being a major power, though already devastated financially by the war just ended.

For the president to make this proclamation would be for America to assume one of the greatest risks she has ever taken in 170 years of national existence - but look at the unimaginable reward which we may collect. America is supposed to be the land of the calculated risk - how else define capitalism and private enterprise - or freedom of speech, for that matter? I'm not offering you an easy way out. No one can. If there were a foolproof, absolutely safe solution to the problem of world peace, you would have heard it before now. I am offering a calculated risk for the greatest prize on earth.

But understand this: the choice is not between a calculated risk and no risk at all. I'm not proposing a calculated risk for amusement or excitement. The choice, as I see it, is between a comparatively small but substantial risk now, and an incalculably greater risk sometime in the not too distant future. The risk involved in renouncing force now is infinitely less than the risk of folding our hands and waiting for the UNO to be delivered a miracle. While we wait for that to happen we will have created vast unbridgeable chasms of misunderstanding between us and the rest of the world by our blind, headlong search for security through unlimited military preparedness.

In a dozen years it will be too late for the calculated risk. We will all be sitting in fear and trembling waiting for the first atomic bombs to fall. The choices of action then will be as good as no choices at all. When our precious sovereignty is threatened we can choose either war or appeasement. Another war would truly shatter industrial civilization and the world as we know it. Appeasement would leave us a world without honor.

By acting with courage now, by renouncing force while we're still the most powerful nation on earth - and still relatively surrounded by friends - we have the last great opportunity to provide a firm foundation for lasting world peace.