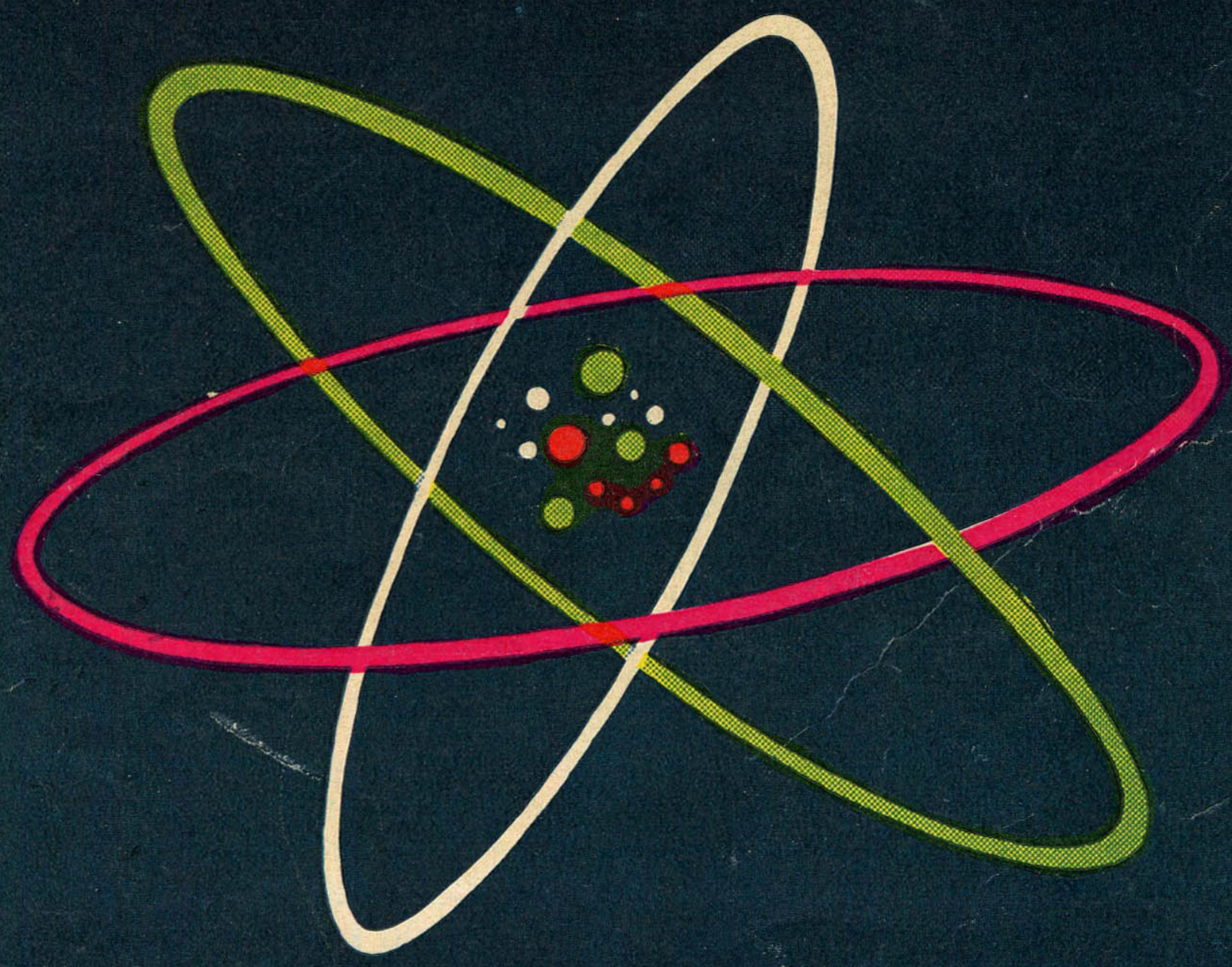
LEARN HOW

DAGWOOD SPLITS the ATOM!



by JOE MUSIAL

Prepared with the Scientific Advice of

Lt. Gen. Leslie R. Groves (Ret.) • Dr. John R. Dunning • Dr. Louis M. Heil

CHIC YOUNG . .
Creator of "BLONDIE"

GEN. GROVES *(Left)* AND JOE MUSIAL
at work on the pages you're about to read.

ORIGINAL STATEMENT BY GEN. GROVES

who headed the great organization which developed the atomic bomb

TRUTH comes from the understanding of facts. Truth comes from knowledge.

By now the whole world accepts the fact of atomic energy. But it has been made fearful by the results of man's ability to turn loose the power within the atom. In the grimmest sort of paradox our nation was forced to dash headlong into the search for the secret of atomic energy, in order to create a weapon which would save civilization—but which at the same time might even threaten man's future existence.

We found the answer, but we found also that we had created vast new problems. The door opened on a new and uncharted era of man's existence—the Atomic Age.

We have hardly stepped beyond the threshold. We now stand in the dim light, peering into darkness. What lies beyond, in this new era, are two paths—one to a benevolent future, the other to a ghastly end. We must choose the path to the benevolent future, we must have light in order to see the way, we must have the light of Knowledge.

No effort is too great for us to make in imparting the facts about atomic energy to the greatest number of our people. Our citizens and our future citizens cannot share properly in shaping the future unless we understand the present, for the raw material of events to come is the knowledge of the present and what we make it.

To those who will read it carefully, this pamphlet will bring a clearer understanding of atomic energy. Many will understand what has formerly confused them. Mere words need not frighten them in the future—words such as fission, isotope, proton, chain reaction and atom bomb. This book will reassure the fearful that the future can be made bright.

It will, I sincerely hope, touch off the spark that will send many on a quest for more knowledge and will help us to guide our leaders in creating an endless peace for all the world.

Leslie R. Groves

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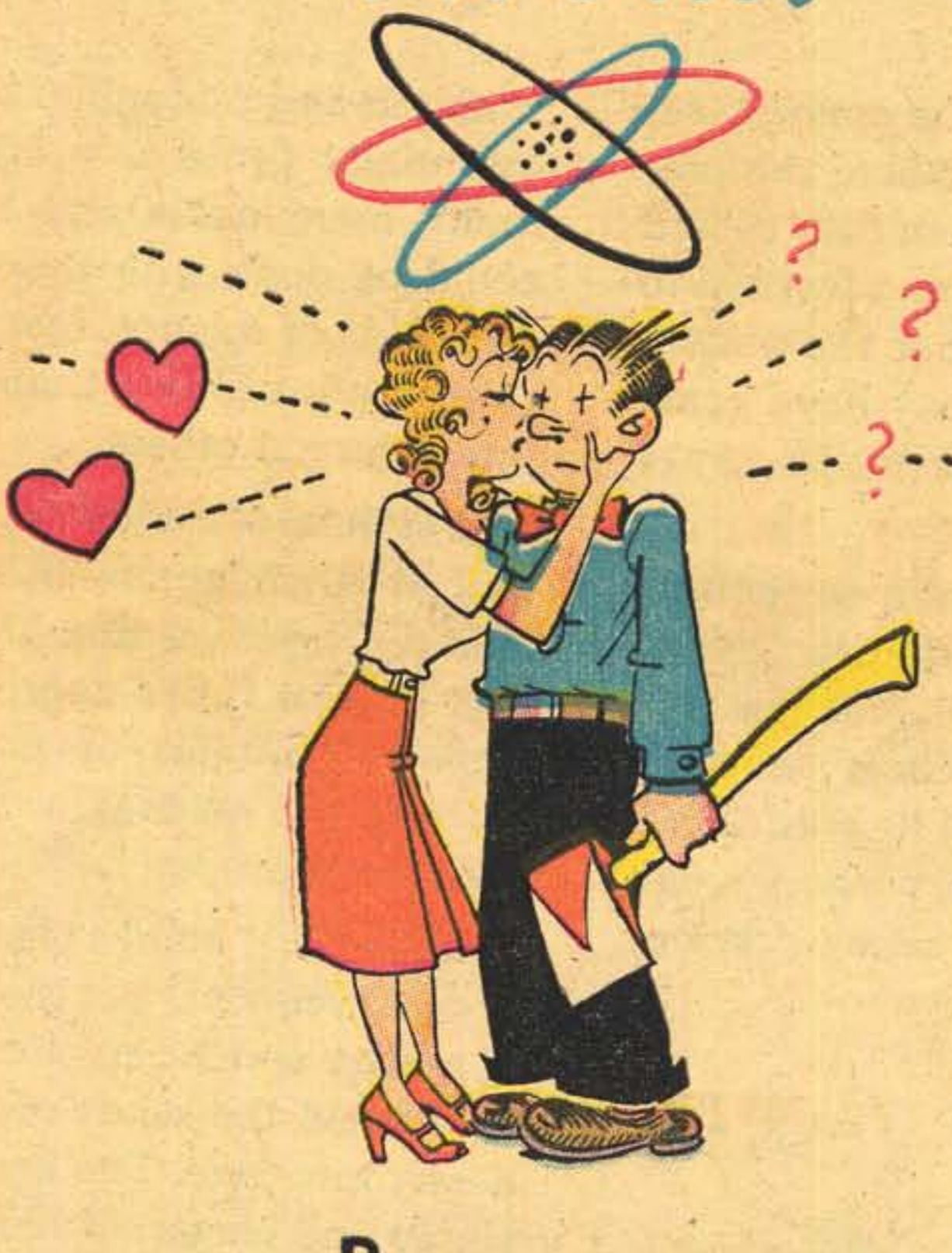

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THE BEGINNING —OR THE END

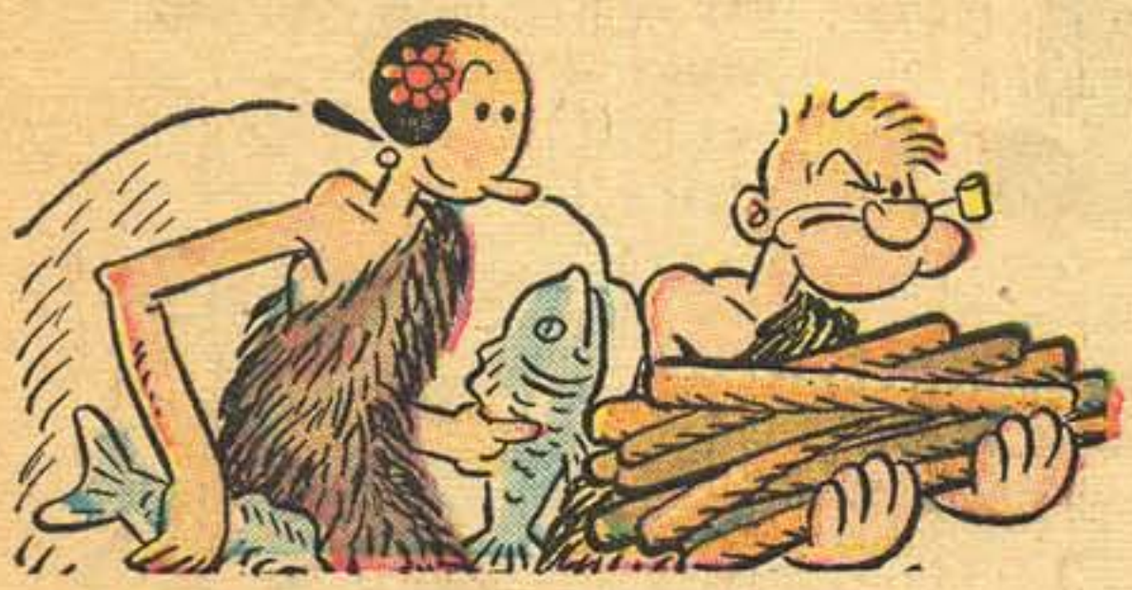
by
BOB CONSIDINE
International News Service
Staff Correspondent

It is difficult for anyone who has not seen an A-bomb explode, or noted the effect of that cataclysm, to understand the power and sense the meaning of atomic energy.

This pamphlet, it seems to me, comes as close to explaining atomic energy, our fantastic new source of power, as anything I have seen in print. It will provide that which all Americans need in this dawn of the Atomic Age: a knowledge of the basic ABC's of atomic energy. It will further provide, I think, a stimulation for the youth of America to learn more about a power which will play such an important role in the future.

Today we, who hold the amazing secret of the atom, stand where the prehistoric savages stood when they ceased running away from Fire and learned to utilize that flame. Without the utilization of Fire we could not have come from caves to build the world as we know it today.

Fire was thought of as a weapon, at the start. Hairy schemers dreamed of lighting sticks and crude torches and applying them to the enemy and his effects. We laugh now at such crudity—just as one day, perhaps, we may laugh at the very notion of wasting precious uranium and plutonium in anything as essentially futile as a bomb, when so many more noble and helpful things could be done with those elements in the fields of science, medicine, agriculture, public utilities, transportation and ten thousand others.



Yet those of us who watched at Bikini, and at Alamogordo, N. M., and Hiroshima, Nagasaki and—lately—Eniwetok, have a fuller appreciation of the topless fountains of power now unleashed and an urgent yearning to see it handled properly.

Those first bombs were the Model T of such weapons. Yet the tiny little chip of matter which exploded in New Mexico turned the sands of the immediate desert into jade. The bombs over Hiroshima and Nagasaki took such hideous toll that a fanatical enemy, prepared to fight the bloodiest campaign in history —defense of the Japanese homeland—

surrendered in dismay. At Bikini great warships went to the bottom, their thick armor crushed as one might crush tin.

We learned at Bikini and elsewhere that the core of an exploding A-bomb develops a heat somewhere between 25,000,000 and 50,000,000 degrees Fahrenheit, produces immediate gales of more than 1,000 mph., brings to life a light like that of a thousand midday suns, sprays huge territories with killing rays.

But we were advised (and it was excellent advice) not to lose sight of the peaceful pursuits of atomic energy. The mushroom clouds over the Pacific each held radium-like particles amounting to perhaps 100,000 pounds, while only about two pounds of this great and beneficial matter had been produced since the Curies discovered it more than 50 years ago. We learned that a single bomb, if exploded slowly, so to speak, could provide as much electric power as the combined electric output of U. S. powerhouses for many months . . . or propel great ships effortlessly around the peaceful seas . . . or combat cancer . . . or enable man to push aside the thick black curtains of the unknown and learn more about his life and the lives of the things that grow around him.

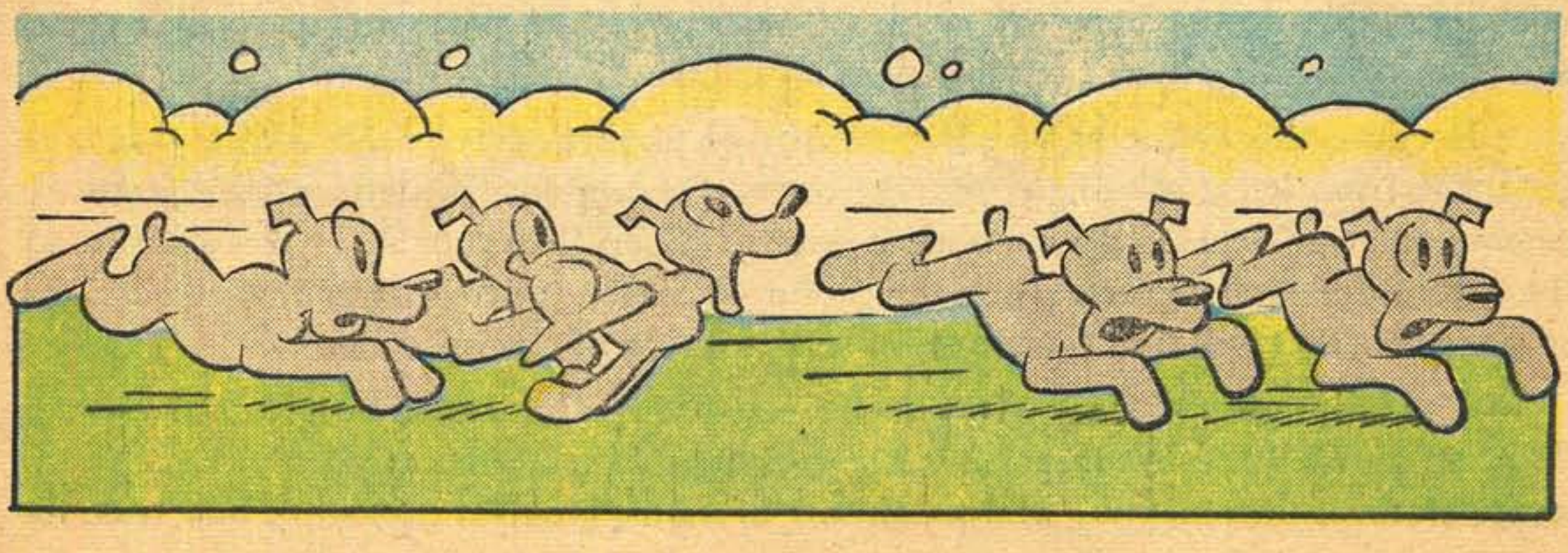
We may not all live to see the day when a miscroscopic portion of the thunderous power which flattened Hiroshima and ended a great war is used to toast our bread, drive our trains and automobiles, give new and safer flight to our planes.

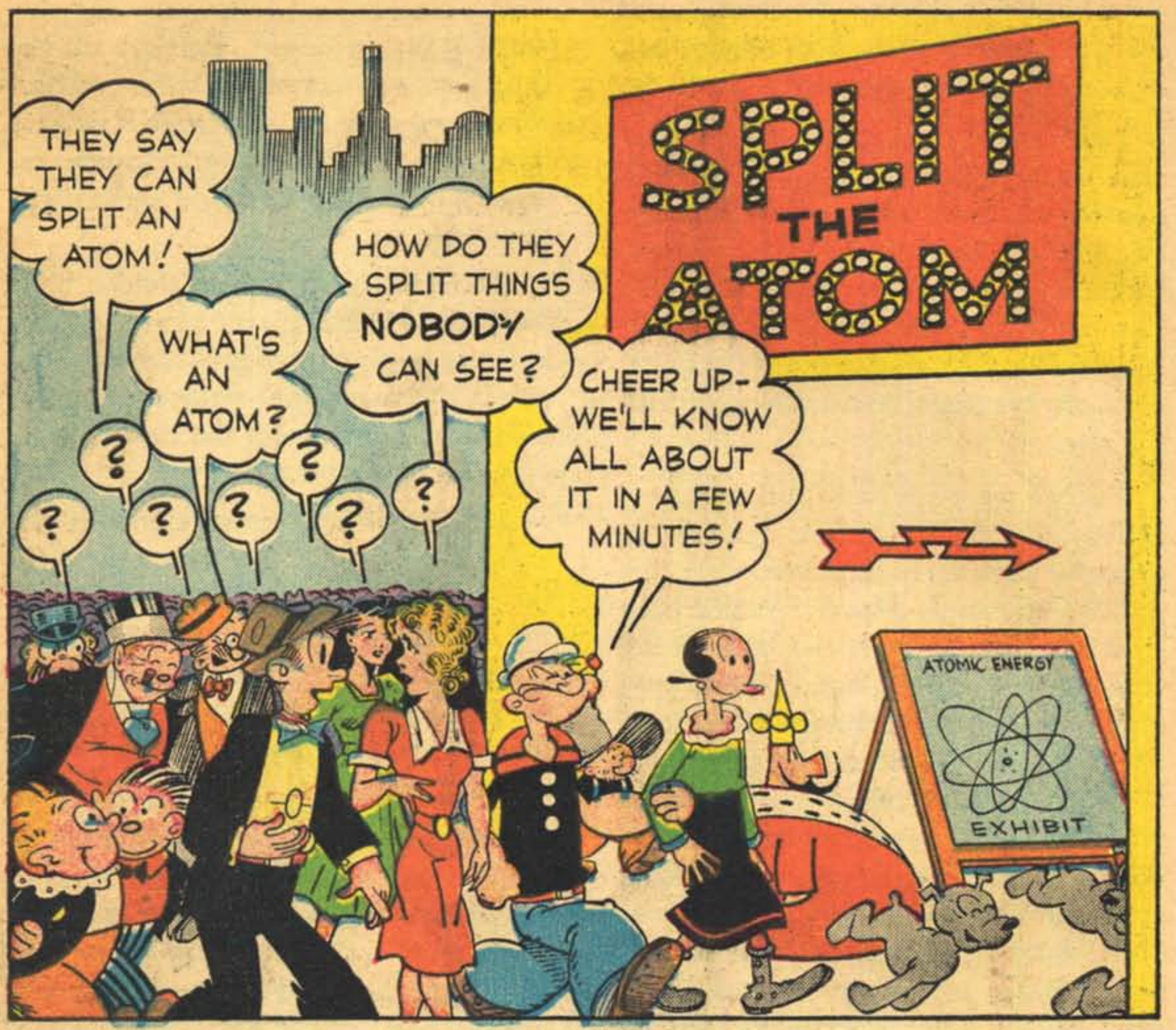
But already enormous strides have been made in the use of atomic energy in these fields and countless others, including remarkable strides made in medical research with the ray-emitting particles of matter.

All of us living today stand on the threshold of a life that can be bountiful. Historians of the distant future may say of this era that it marked the end of the Dark Ages, dismissing most of the earlier achievements of civilization through the past five centuries.

If I were young, and possessed of such experience as I hold, there would not be the slightest question in my mind as to the choice of my study and career. I would look to atomic energy as a many-faceted field with a future so vast and full of imagery that not even Einstein, in all his glory, can see the horizon.

(NOTE: Bob Considine covered the A-bomb tests at Bikini in 1946 and is the author of the motion picture "The Beginning or the End" and other works on atomic energy.)



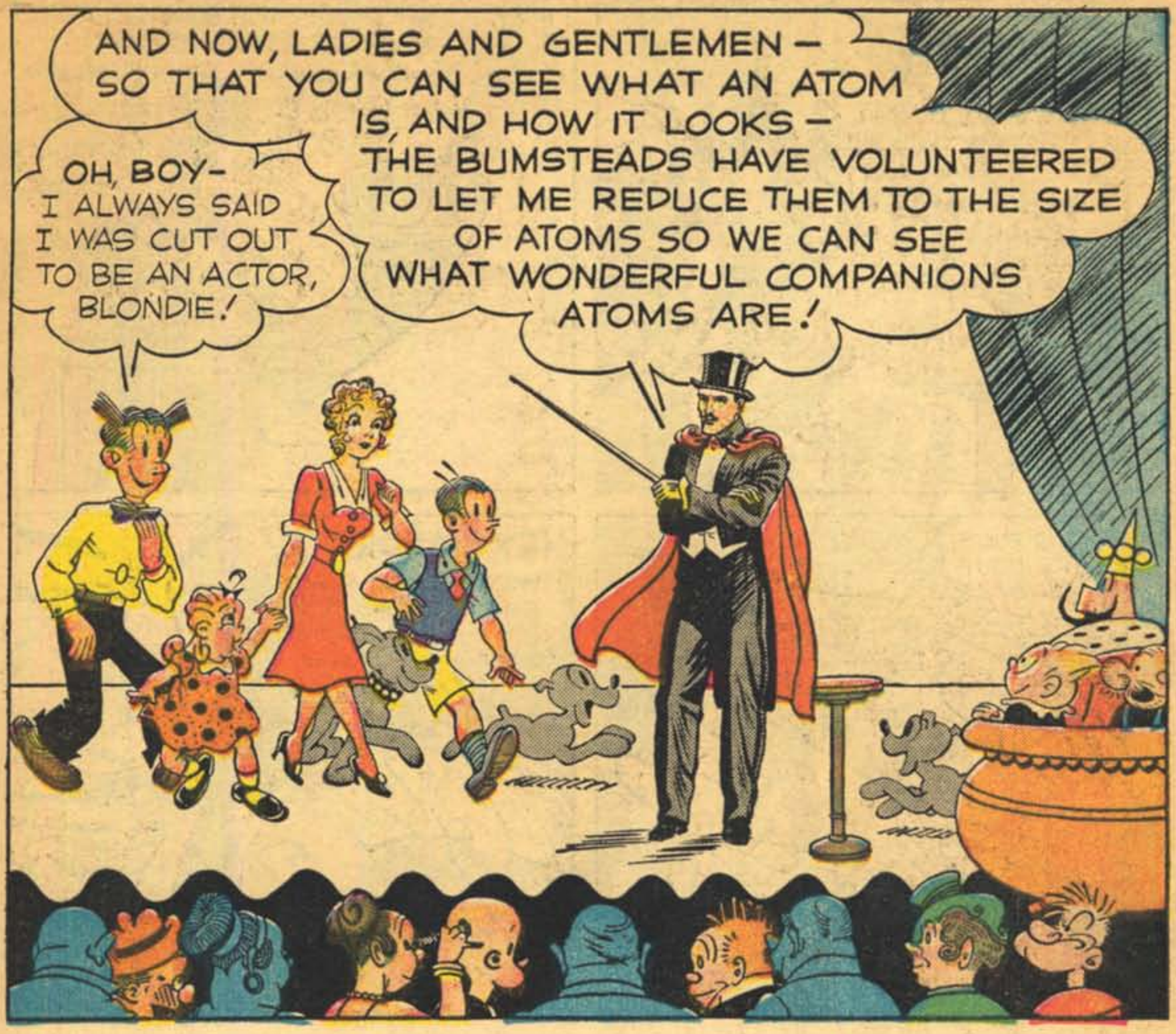


THIS BOOK TELLS what an atom is, how it can be split and what happens when it is split.

Here, therefore, is a comic book that is different from any you have ever seen. On these pages Blondie and Dagwood get inside an atom and witness amazing things. An explanation of certain interesting facts which Dagwood discovers in each picture can be found in the text below the picture. Then, at the end, questions are asked, and on another page the answers are supplied, so that you can answer, first, and then test yourself on how well you have answered.

Because this comic book is different from any you have read before, you will get most from it by reading it several times. First, glance rapidly at the pictures, getting an over-all idea about atomic energy. Then begin again at the start, read the text under each picture, study the picture. Finally, try to answer those questions on page 28. You will find the answers on the inside of the back cover.

The fundamental ideas of atomic energy are really not difficult to understand. You can grasp these fundamentals by studying each picture carefully. Bit by bit, as the pictures unfold, your understanding of man's greatest discovery will become



clear and you will glimpse the stupendous possibilities, the almost incredible opportunities that are offered by atomic power as a force and as a field of study and work.

As you read and study these pages, remember how important it is that young people like yourself should understand atomic energy. There are two reasons for this. First, the use of atomic energy for GOOD purposes depends upon the future citizens of our country. Young people should learn NOW about atomic energy, so they will be prepared to meet one of their most important responsibilities as citizens. Second, the opportunities for young people to make some phase of atomic energy their life work seem to be almost without limit and are steadily growing. The atomic energy problems which are now being studied—problems that affect every human interest—are already many times greater than those which followed any discovery ever known before; and their number and importance are increasing every day.

Atomic energy is truly a subject which *young* people must master.

To them—our youth—this book is dedicated.

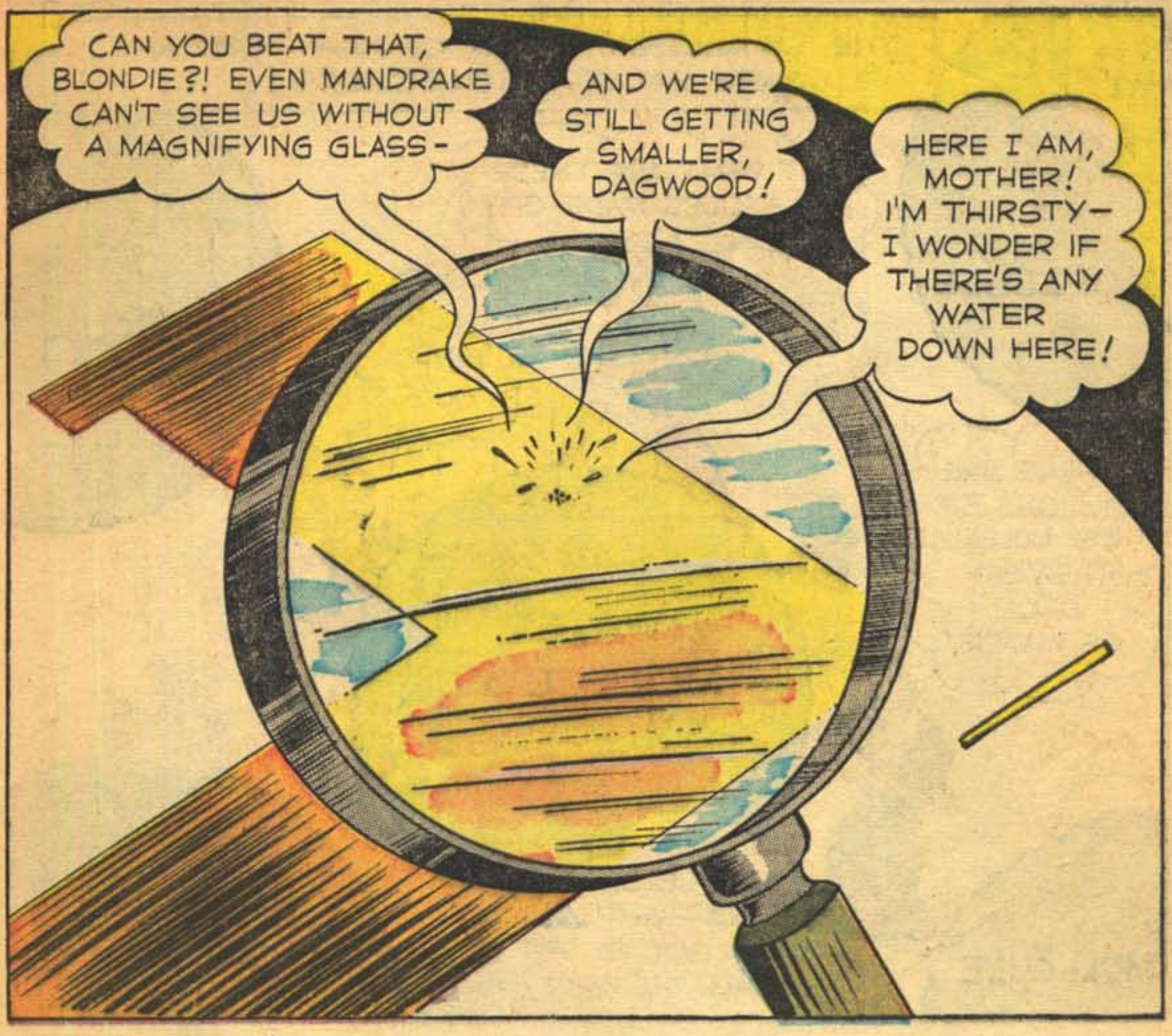
Joe Musial

WHAT IS A MOLECULE AND HOW SMALL IS IT?

A city is made up of buildings. Each building has rooms, some alike, some different. A drop of water is like a city in which the buildings are all alike. The molecules in the drop of water are like the buildings in the city. The atoms which make up the molecules are like the rooms which make up the buildings.

Molecules, like buildings, are of different sizes and shapes. The smallest molecule consists of two atoms of hydrogen. It is like a two-room building in which the rooms are alike. No one really knows how big the largest molecule could be, because scientists are learning more every day about how to build molecules from atoms. Scientists do know that the molecule of ordinary laundry starch consists of several thousand atoms. But even this molecule is so small that it cannot be seen with our most powerful microscopes.

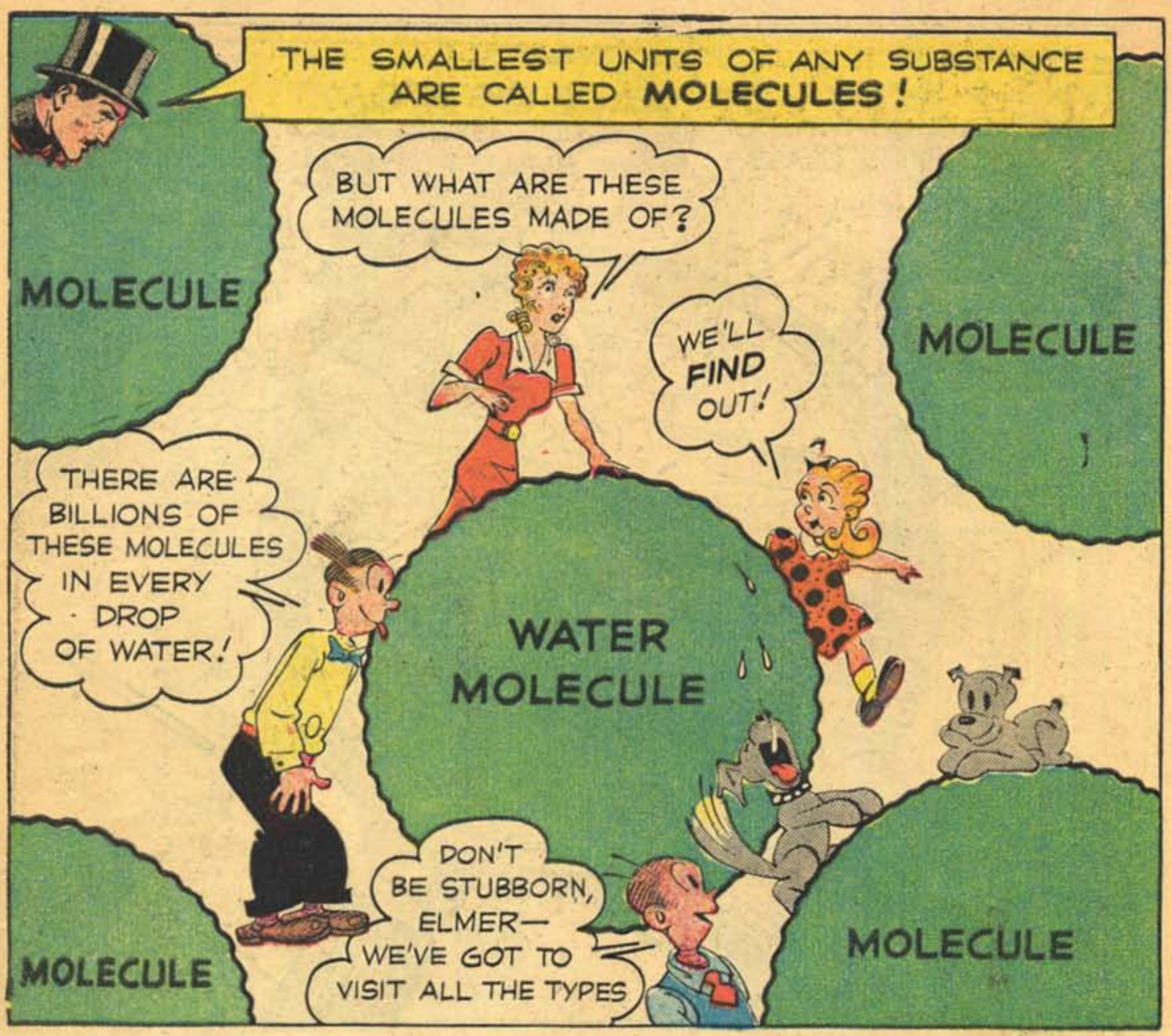
Mandrake would have to shrink Dagwood many millions of times to make Dagwood as small as a water molecule, which is about one hundred-millionth of an inch in diameter. Or, if Mandrake were to make Dagwood and the water molecule larger at the same rate, Dagwod would be so big he could touch the sun 93,000,000 miles away when the molecule became as large as Dagwood was at first.



HOW MOLECULES ARE MEASURED

About twenty-five years ago Dr. Irving Langmuir, a Nobel Prize winner, performed an experiment to measure the diameter and length of the molecules of certain oils, which scientists at that time thought to be long and slender. His experiment, known as the oil film experiment, has become famous among scientists. Dr. Langmuir and other scientists knew that the molecules of these oils were of such nature that one end of the molecule was strongly attracted to water. He proved that if a small amount of this oil were poured on the surface of water, the molecules of the oil would stand on end with their "feet" in the water, so to speak. Then, knowing how much oil he had poured on the water and how many oil molecules were present, he was able not only to compute the distance across each molecule but also to compute its length. His experiments confirmed the scientists' idea that the oil molecules were long and slender.

Since Dr. Langmuir performed his experiment, scientists have devised many other ways of measuring the size of molecules and determining their shape.



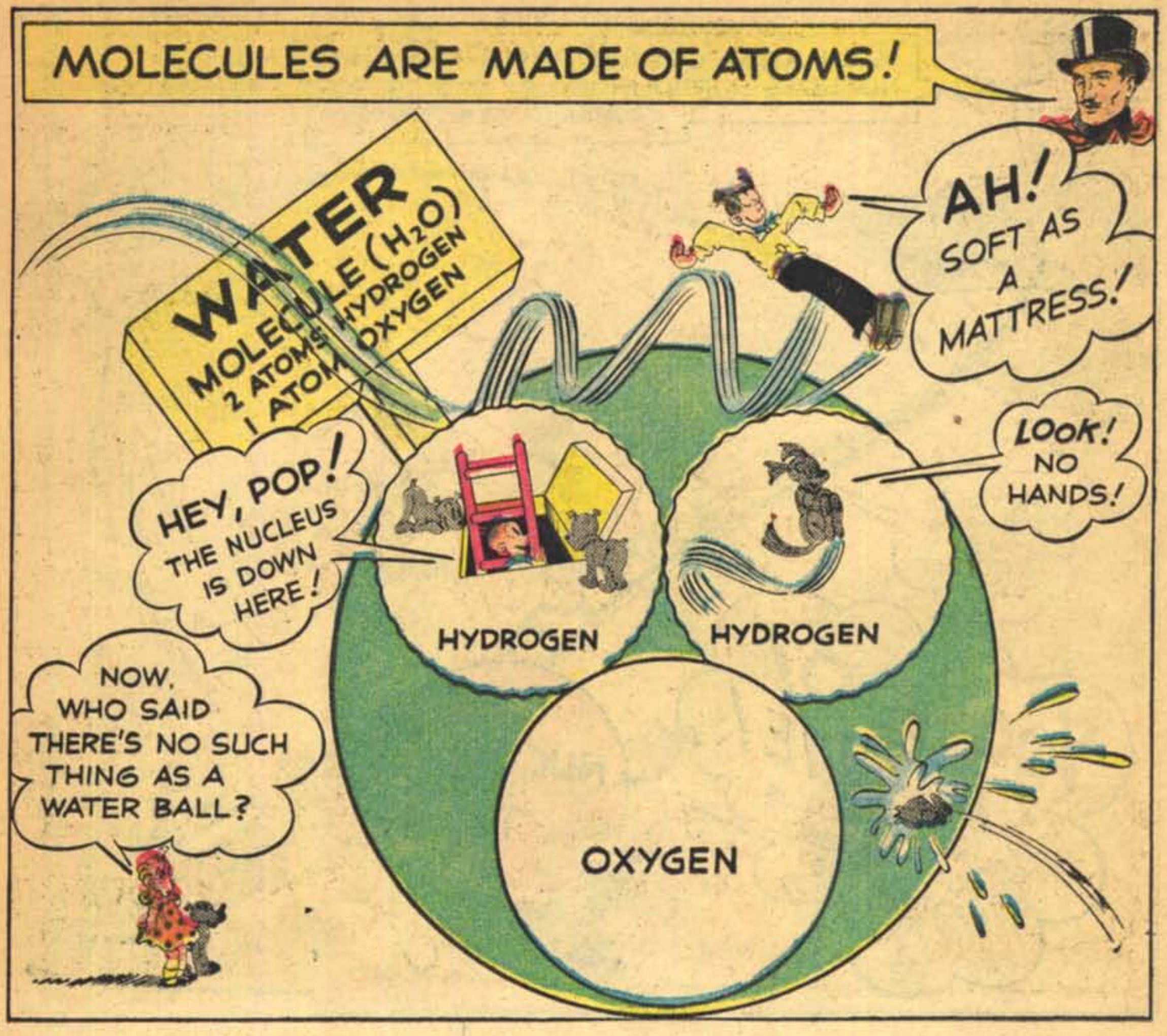
MOLECULES ARE ALWAYS IN MOTION

If Dagwood and Blondie were really exploring the water molecule, they would be riding along with it just as people are carried along by the earth on its surface as it moves through space. The molecules of any substance are in constant motion. The rate of motion depends on the temperature of the substance. For instance, the molecules of very hot steam move faster than those of cool steam.

Actually, then, Dagwood and Blondie would be riding while they were exploring. And what a ride! The molecule would be moving at a speed of more than one thousand miles per hour—faster than the fastest jet airplane.

But Dagwood and Blondie would not have smooth sailing through space. Many billions of other molecules, like the one they were on, would also be moving with equal speed and in all directions. Their molecule would have many collisions with other molecules. The scene would be like that in a speeded-up movie of the turmoil and confusion in a crowd leaving a big football game.

The scientist knows that molecules are in motion when he studies a substance like smoke. Smoke really consists of tiny pieces of carbon. Seen through a microscope, these tiny pieces of carbon are found to be moving slightly back and forth and to and fro. The scientist tells us that this zigzag motion is caused by speeding air molecules bombarding the tiny pieces of carbon. The scientist cannot see the air molecules but he sees the particles of carbon being jostled by them.



WHY DOES DAGWOOD SAY THE ATOM IS SOFT?

When a person combs his hair in cool, dry weather, it becomes light and fluffy and won't stay down. Each one of the hairs is electrified by the combing. The electrified hairs repel one another because all are charged alike, and thus they stand apart.

The outer parts of all molecules are electrically negative. Therefore, when one molecule comes close to another, the outer parts repel each other just as the individual hairs are repelled.

How does the scientist know that water is two parts of hydrogen and one of oxygen? The scientist puts two wires from a battery into water in which a small amount of acid has been added. Bubbles of hydrogen then gather around one wire in the water and bubbles of oxygen around the other wire. The scientist measures the exact amount of hydrogen and oxygen which has gathered around the wires, and finds that there is just half as much oxygen as there is hydrogen. This experiment is called the electrolysis of water—the splitting of water by electricity.