mortality of women giving birth to children was cut by more than one-third in the United States during the first three years of this decade, areas with the worst records showing the greatest improvement. Only 20 white mothers per 10,000 live births died in 1943 and 51 colored mothers per 10,000 for the same year.

In 1940 maternal mortality in the white population ranged from a high of 39 per 10,000 live births in the East South Central states, to 27 in the Pacific states, census figures show. The difference between these rates was nearly halved by 1943, when the rate for the East South Central states was 25 per 10,000, while for the Pacific states it was only 18.

Closely associated with the unfavorable record for the East South Central states, point out statisticians of the Metropolitan Life Insurance Company, is the fact that only 43% of the confinements were attended by a physician in a hospital, a percentage smaller than for any other area. In the Pacific states, where the maternal mortality was lowest, 95% of the women gave birth to their babies in a hospital.

For the country as a whole, maternal mortality among the colored was fully 2½ times as high as that for the whites. Whereas 77% of the white births were hospitalized, only 33% of the colored were so cared for. In the East South Central states only 12% of the confinements were hospitalized, as few as 28% had the care of a physician in the home and 60% were attended by a midwife. In contrast to this, in the New England states 88% of the confinements among the colored were in hospitals and 12% had medical attention at home.

Science News Letter, August 25, 1945

PHYSICS

Atom No Longer Unknown

Only a half century ago, it was believed to be minute but solid "chunk" of matter. Complex structure gradually disclosed to physicists.

➤ IF THE atom has seemed a mysterious and theoretical commodity up to now, it is so no longer. It has landed in our thought, literally like a bomb-shell. What is this atom which the physicist splits, and how does he do it?

Until shortly before the year 1900 it was purely an academic question whether matter—a lump of coal or a quantity of air—could be divided and subdivided forever, or whether, eventually, a bit would be found so tiny that to divide it would be to destroy it, or at least to change it into something different. The mind prefers the first theory, for the imagination sees each of the halves of the divided piece looking much like the original. The boundary where this no longer holds true is outside the conditions of our experience.

But chemists, who had been studying the way substances combine, had long believed that they could explain the way combinations take place only by assuming units of each material. If water is always composed of twice as much hydrogen as oxygen, as they found to be true when they weighed the materials, then it seems obvious that, divided small enough, the ultimate drop of water will be reached. This ultimate drop the chemist calls the molecule. He believes it is composed of one atom of oxygen and two atoms of hydrogen. Divide it, and you no longer have water, but only the atoms composing it.

The indivisible atom was enough to explain chemical reactions. There was no need to inquire into its constitution until the turn of the century, when the discoveries of radioactivity and X-rays posed problems that could be answered only by supposing that the light that made the new chemicals shine and the radiations that fogged photographic plates must come from the structure of the atom itself.

The amazing new science of atomic physics grew out of the study of these new and unsuspected properties of matter. As one set of new properties was tagged as belonging to the nucleus of positive electricity which seems to hold the atom structure together, and another as due to the planetary electrons which can be pictured as circling around it, the image of the atom as a miniature solar system developed.

Studying the radioactive elements, radium, uranium, thorium and the similar short-lived ones that exist temporarily as their disintegration products, scientists found them to be giving off three different kinds of rays, which they named for the first three letters of the Greek alphabet. The alpha rays are composed of a stream of nuclei of helium atoms, the first recognized case of one element appearing as a disintegration product of another element. Alpha rays travel with such enormous energy, compared with their size, that they seem usable as a source of useful work. Beta rays are composed of electrons, not matter at all, but units of electricity. Gamma rays are like light waves and X-rays.

Since these rays given off by forces within the atom are among the very few materials in the universe comparable in size to the atom, physicists thought of using them as tools for experimenting with atom structure. In 1919 Sir Ernest Rutherford shot streams of helium nuclei, the alpha rays, through oxygen, nitrogen and other common gases and succeeded in getting some of the particles to collide with the central part of an occasional atom. While he could not see the particles, he could make them take their own pictures of the luminous trails they left behind them.

After the method of observing atom-trails had been worked out, physicists were able to use it and developments of it to learn what happens when atom "bombardment" is tried under various conditions, and how the number of "hits" can be increased. Ways to speed up the bombarding particles were learned. The greater the speed, the more hits there were recorded.

Science News Letter, August 25, 1945

ENGINEERING

Shipping Vegetables in Snow-Ice Keeps Freshness

➤ VEGETABLE produce shipped bedded down in finely granulated ice keeps its freshness, crispness, and vitamin C content over a longer period, researches conducted in 21 colleges throughout the country have shown.

"This method of refrigerating produce with snow-ice is like the protective effect of the late spring snows on vegetation," Charles F. Belshaw, research consultant of the National Association of Ice Industries, said, speaking as guest of Watson Davis, Science Service director, on the CBS program "Adventures in Science."

Researches show that vitamin C retention in foods is essential in the retention of flavor and that keeping vegetables fresh through use of snow-ice will bring food to the dinner table so that it tastes better and is nutritionally better.

Whole blood was shipped successfully across the Pacific in an insulated container in which the bottled blood is placed in racks around a large compartment of cracked ice, Mr. Belshaw said. Although temperatures inside planes in the Pacific often go as high as 130 degrees, this method keeps the blood to be used in treating the wounded at a temperature between 40 and 45 degrees which is necessary to keep it in usable condition.

Science News Letter, August 25, 1945

PHYSICS

Atom Force Due to Brisance

The suddenness of change from solid to gaseous state is responsible for the explosive force which makes the new atomic bomb the most terrible weapon yet devised.

➤ THE EXPLOSIVE force which makes the new atomic bomb the most terrible weapon man has yet devised for his own destruction comes from sudden release of energy. In most explosions energy makes itself known as heat and as shattering of nearby objects, caused by expansion of hot gases. This suddenness in release of power, known to explosives experts as brisance, depends largely on the speed with which the reaction takes place. Nitroglycerin has more brisance than gunpowder because it burns so much faster.

The new bomb is known to be powered with atomic energy. The feature of atomic energy which makes it a promising field for research is that, although the amounts of material available for use in the whole world are very minute, the amount of energy they can release is relatively enormous.

Conventional explosives are chemicals which burn very quickly, forming products which are wholly gases. These gases expand very fast in the heat their burning generates. They do not depend on air for their combustion. They carry in their own formulas the proper kinds and amounts of chemicals to form destructive masses of expanding gas, which push everything out of their way. They have to be mixtures which are relatively safe to handle, but which let go with a bang when set off by a detonator. The detonator supplies the margin of extra energy necessary to start the reaction.

Explosions due to sudden firing of small particles, like the dust and chaff in grain elevators, no less than those caused by explosives of the ammunition type, result in waves of hot gases. When confined in small space, these gases expand in every direction, and any part of their surroundings that can be moved is thrown or shattered violently by the blast. Dust is explosive because the large surface of its fine particles makes contact with plenty of oxygen in the air to burn it. Any chance spark can set it on fire.

Not all explosions result in release of energy. An overheated steam boiler explodes because the pressure of the gas inside has become greater than the walls of the boiler can support. The escaping steam becomes cooler, as contrasted with the hot combustion products of the dust and ammunition types. But whatever the cause, the shattering effect is capable of doing great damage.

Judging from the reports of the experimental explosion in New Mexico, both the brisance and the heat developed by the atomic power bomb are tremendous. If the steel tower which is reported to have disappeared is not found far away in the form of twisted scrap, or a melted puddle of iron at the site where it stood when the experiment started, it must be presumed to have vaporized. This would indicate temperatures hotter than 3,000 degrees Centigrade, or 5,400 degrees Fahrenheit. Astronomers are more familiar with temperatures in this range than are furnace men who work with molten earth materials. At even half that temperature, around the melting point of iron, life would vanish instantly in a puff of smoke.

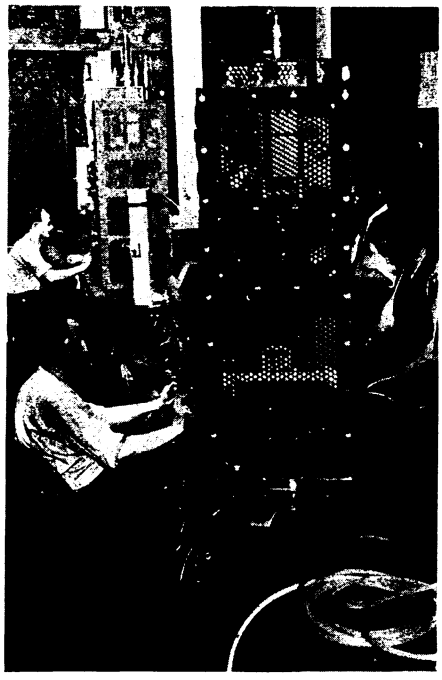
Science News Letter, August 25, 1945

POPULATION

Small Town Girls Likely To Marry in Their Teens

➤ GIRLS living in small southern towns in the United States are most likely to marry before they are 20; those living in large northeastern cities are least likely to marry young.

One-ninth, or 11.1%, of the native white girls between the ages of 15 and 19 were married at the time of the 1940 census, the Metropolitan Life Insurance Company points out in its statistical bulletin. In the South, 18% of the young girls of the region were married before they were 20, and 20.6% of the girls in communities of less than 2,500 inhabitants.



TESTED—The radar transmitter set up for testing in a General Electric plant.

In the larger cities only 6.3% of the girls from the ages of 15 to 19 were married, while in the smaller towns and villages throughout the country 15.1% had been married. The farther west a young girl goes along the northern tier of the country, the better appear to be her chances for early marriage.

Although girls in our small towns and villages may have a better chance for early marriage than those in large cities, figures of the U. S. Bureau of the Census show that the probability of eventual marriage is greatest for those who remain on the farm.

Girls in the West have a better chance of eventual marriage than girls in other sections of the country, irrespective of whether they are living in cities or whether they have remained on the farm.

Science News Letter, August 25, 1945

Frogs croak mostly during the breeding season.

Metallic salts of *quinine,* added in tiny quantities to materials used in artificial teeth, give them fluorescence and make them glow under ultraviolet light similar to natural teeth.