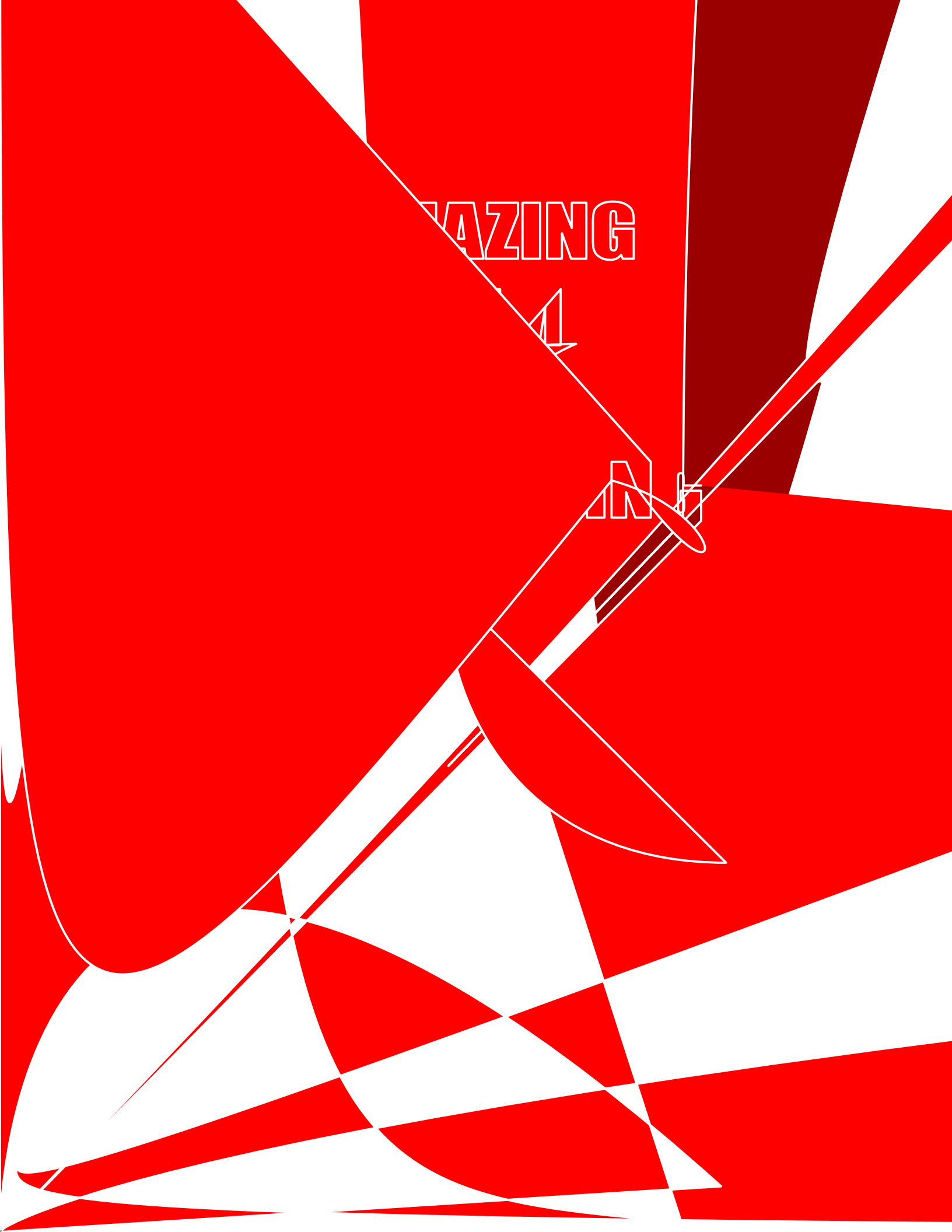
AZING

We use oxygen, which is about 21 percent of our atmosphere, in steel making, copper smelting, metal cutting and welding, and, most importantly, for life support in hospitals.

Distributing and shipping these very cold liquids was, historically, a problem. Chemical engineers developed the vacuum-insulated tank trucks which you see on the roads today, delivering liquefied gases to plants and hospitals.

ENVIRONMENT

A Cleaner World for Us

Chemical engineers are seriously involved in environmental control technology-not only in cleaning up the problems of the past, but in preventing pollution for our future. Chemical engineers believe we can accommodate both economic progress and improved environmental quality.

Car engines with catalytic converters, double-hosed gasoline pumps, and modern jet engines are some examples of our efforts to keep the world cleaner. Scrubbers on smokestacks also help maintain the quality of our air.

Chemical engineers are champions of the reduced use of virgin materials and the increased recycling of useful materials.

You can do your part to help the environment by sorting your garbage for recyclable, such a paper, glass, plastics, steel, and aluminum.

FOOD

A Bountiful Balanced Diet

Food shortages have been a recurring problem in much of today's world. However, it is also true that many people on Earth are better fed than ever before. Crops are healthier and food is fresher. Chemical engineers have made these advances possible.

Chemical engineers have developed compact, economic ammonia plants which efficiently produce large quantities of fertilizer from nitrogen and hydrogen. Large-scale plants are located strategically, for example, in China, India, and Africa, where they can do the most good.

Chemical engineers also produce other helpful fertilizers, like phosphates and urea, and pesticides that enrich and protect our crops. And, they are at the forefront of efforts to improve food processing technology, whether the food is freeze-dried, extruded, or microwaved.

Chemical engineers working in biotechnology believe it promises even greater strides in increasing the productivity of our farms, improving the quality of our food and ending hunger.

Keep Us Healthy

In 1929, Sir Arthur Fleming discovered that penicillin inhibited the growth of staphylococci bacteria which can cause serious infections.

Similarly, in the late 1930s, Dr. Selman Woksman discovered that some chemical compounds destroy harmful bacteria. He called these chemicals "anti-biotics," Latin for "against life." Unfortunately, these antibiotics were difficult and costly to produce, and they could only be made in small quantities.

Enter chemical engineers. They developed ways to mass-produce antibiotic drugs:

- Increasing penicillin yield a thousand times through mutation
- Developing special methods for "brewing" penicillin in huge tanks.

Low-cost, widely available "wonder drugs" were the result. Penicillin, streptomycin, erythromycin-all make our lives better, healthier, and longer.

Antibiotics keep our farm animals and pets healthy, too.

The Clothes We Wear

Human beings have always needed to protect themselves from the cold. Early clothes were made from animal skins, furs,

Chemical engineers played a major role in developing and using isotopes from fission in nuclear medicine as advanced diagnostic and treatment techniques. Clogged blood vessels are quickly located with fissionable isotopes, and body functions and processes are easily and more accurately monitored.

CRUDE OIL

Building Blocks for Things We Need

Petrochemicals, the building blocks for many things, like synthetic fibers and plastic, come from crude oil.

Chemical engineers discovered ways to use crude oil because kerosene was no longer needed for lighting after the introduction of electricity. They built thermal cracking units, called "Burton Stills," in Indiana in 1913 to break down long-chain carbon molecules into smaller ethylene, propylenes, etc. Later, they developed "catalytic cracking," a more efficient way to produce petrochemicals for plastics, fibers, and elastomers.

Ethylene is the largest petrochemical building block. Ethylene glycol is "anti-freeze" for cars. Polyethylene is used for soda bottles and trash bags. Other ethylene derivatives include styrene.

Closer to home, petrochemical derivatives include shampoos, soaps cosmetics, shower curtains, towels, and modern molded bathtubs.

Keeps Us Rolling Along

Modern society runs on rubber. More than twenty billion pounds are produced annually.

- 66 percent of it is synthetic, and that percentage is growing.
- 34 percent is natural rubber, and that percentage is declining.

Chemical engineers were important players on the team that developed synthetic rubber (styrene-butadiene rubber, or SBR) during World War II, when natural rubber was hard to obtain.

Today, SBR will accounts for half of all synthetic rubber produced, but the use of new synthetics is growing.

Synthetic rubber is used in tires for cars, truck, buses and planes, in industry, in equipment like conveyor belts, gaskets and hoses, and in consumer products, such as running shoes.

And, what would we do without rubber bands?

If you'd like more information about chemical engineering, contact the American Institute of Chemical Engineers. Telephone 1-800-242-4363 http://www.aiche.org. The American Institute of Chemical Engineers, an individual member society, was established in 1908 to promote excellence in the development and practice of chemical engineering.