



Craft and magic illuminate sky with glitter

A SOFT POP, a flash, a quick whine through the night air and suddenly the sky erupts in a brilliant cascade of color and glitter, sparkling and shimmering. A loud report close behind vibrates through the earth.

The fireworks have begun. Although no one is certain, one expert theorized that fireworks originated in ancient China or India where saltpeter (nitrate of potash) was used as an agent for curing meat. Particles of the substance, accidentally falling into a campfire, might have mixed with charcoal, the resulting flame setting off the first experiments. Flakes of iron from striking flint would have produced glitter, just as iron filings do today, and the addition of sulfur yielded black powder — good old-fashioned gun powder. Placing this mixture in bamboo tubes was an easy next step, and with the boost of rocketry, the basics of the pyrotechnic industry were launched for centuries to come.

Italy long dominated the fireworks scene in Europe, but in the mid 1700s, Louis XV wooed Italy's famous pyrotechnicians, the "Ruggieri" brothers, to his court where some of history's grandest displays were produced. But the brothers became too good at their trade. One day, in London, a man elaborately dressed for hours that the public entry of a great man was one of a full in large official processions in England that lasted into the 19th century.

IN THE COLONIES: John Adams, besides contributing to many significant events, American history, is said to have fathered the idea that the na-

tion's Fourth of July celebrations should feature fireworks displays. In a letter to his wife Abigail on July 3, 1776, Adams advocated the use of "pomp and parade... bonfires and illuminations... from one end of this continent to the other, from this time forward forevermore."

In time, Independence Day fireworks came to be regarded as such an inalienable right that, when the first "safe and sane" July Fourth campaigns began in the early 1900s, reformers found it necessary to win a good word from national leaders to avoid being considered disloyal and unpatriotic.

Grand displays waned during the Depression years, then sputtered along on a routine but not particularly spectacular course in many sections of the country until the 1970s when, during the bicentennial celebrations, fireworks boomed loudly and dared stylishly.

Fireworks reached another peak along with patriotic sentiment in 1981 when the hostages held in Iran returned home during the January presidential inaugural festivities.

TODAY, FIREWORKS in the United States add up to a \$125 million industry, said John Conkling, executive director of the American Pyrotechnic Association. But leadership in pyrotechnics recently passed to the People's Republic of China, after U.S.-Chinese trade relations were re-established in 1971. More than 50 percent of all fireworks used in the country are shipped from mainland China.

Titanium, a metal used in many high-tech products, is now used to achieve brilliance and stability to the big bang salutes. Other new ingredi-

The area's largest fireworks display, held during the Detroit-Windsor Freedom Festival, will be at 10 p.m. Thursday, June 30, in downtown Detroit. The rain date is Friday, July 1, HG

ents and manufacturing procedures remain much the same as they were 200 years ago. And the nature of ingredients and their possible undesirable interactions continue to demand painstaking hand labor to create a show.

Individual display shell cases are made of paper or cardboard, cut, shaped and packed by hand. Black powder is poured into containers, and other chemicals shaped into tiny pellets called stars, are added. Each of the stars will burn to form one tiny streak of color.

Other chemicals, contained in tin snubbers, or bags, produce the deafening, shudders, and speed effects. How, and when these are placed in relation to the black powder and to each other determine how the performance will appear.

THE LONGEST AVORLED oriental, fine clay, in a stream that explodes with thousands of symmetrical streams of color reflects the precise symmetry

of its packing. More random placement of chemicals, combinations or shells within shells produce colors and designs that pour out with varying speed and intensity. Only the pyrotechnician who designs and builds the shell can predict with certainty the performance and personality of each of these actors. For this, he calls upon a knowledge of physics and of the compatibility of chemicals, as well as a good sense of color and design.

The way shells are constructed, their combinations and ramifications, is what interests the fireworks industry at the moment. "That's what's new," said George Zambelli, president of one of America's largest display manufacturing companies.

"We aren't experimenting with new formulas," he said, although restrictions still govern for a safe and stable substance to produce a strong, bright blue.

ESSENTIALLY, DISPLAY techniques mirror the changing world. Now there are art directors and choreographers involved in the presentations. Split-second timings guided from electronic control panels are keyed to elaborate sequencing. Fireworks are put to music, which may be simultaneously broadcast by local radio stations, and are incorporated into symphony performances. Displays are mixed with light on the horizon from the use of computerized light shows. And more precise timing and more intricate looks.

A range of skills, knowledge, history and psychology goes into producing these explosives with their bursts of playful images. But as twilight ends and the first stars appear, one more essential ingredient becomes apparent — a touch of magic.