1. Copy for L. Jamieson
2. Pollution file

Ecology is the "in" thing today. Everyone is talking about it; a few know what they are talking about, but talk won't solve problems. Industry is actually doing something about "saving our environment." Unfortunately industry is handicapped; we don't talk unless we have facts. Unfortunately, too, much of the headlined publicity by anti-industrial spokesmen is full of imagination and lacking in factual information. Take the recent flurry of excitement over disposable plastics as an example.

Disposable plastics are found for the most part in such short life items as packaging materials, toys, and the like. Packaging alone accounts for about 20 per cent of all plastics produced. With increasing amounts of plastics finding their way into refuse collection trucks, incinerators, and land fill operations, people have rightly been voicing increasing concern about what these plastics will do to the environment. Too often, concerned, but ill-informed, people have stated that plastics will interfere with operation of incinerators, damage the furnace parts, and increase air pollution.

The Society of the Plastics Industry in early 1970 contracted for a series of full-scale tests to establish the facts on incineration of plastics—to determine whether all these problems indeed existed. Professors E. R. Kaiser and A. A. Carotti of New York University's Department of Chemical Engineering consented to make the tests. The town of Babylon, New York, officials made available an incinerator plant. Plastics manufacturers and processors supplied 7,000 pounds each of polyethylene, polystyrene, polyurethane, and polyvinyl chloride in the form of film, sheet, bottles, foam, and manufacturing scrap.

The incinerator used was an all-refractory, continuous-feed, 200-ton per day unit with oscillating grates—a typical modern municipal incinerator. Normal municipal solid wastes containing on the average two to three per cent plastic were "enriched" by adding two or four per cent of one of the plastics under test. Thus, the highest level of plastics in the refuse was at least six per cent—a level not expected to be reached in normal refuse before the 1980's. Moreover, additions represented considerably more than a three-fold increase in any of the four specific plastics evaluated.

Professors Kaiser and Carotti reached the following conclusions:

- Additional heat released during burning of plastics caused no problems during normal operation of the incinerator. As a matter of fact, the heat expedited burnout of refuse on the grate and the combustion of wet refuse.
- No significant increase in smoke occurred during burning of the plastics.
- There was no evidence of molten plastic dripping through the grate or causing abnormal clogging of grate openings.
- HCl is generated from burning paper, salt in food, grass, wood, leather, etc., in normal refuse without plastics. Specific tests to determine chemical attack on grate metal showed slight chloride attack only when polyvinyl chloride was burned directly on the grate in high concentrations.
- Flue gas analyses showed no correlation between the amount or type of plastic added and the concentration of sulfur dioxide, cyanide radical, and organic acids. Nitric oxide concentration stayed in the low range of 53-103 parts per million (ppm). An increase to the high part of the range, noted when plastics were burned whether or not they contained nitrogen, is believed caused by the slightly higher fuel bed temperatures. Polyethylene and polystyrene had no effect on chloride concentration; flue gas composition held at an average of 551 ppm. Polyurethane raised chloride concentrations to 689 ppm for the two per cent addition, 751 ppm when four per cent was added. Polyvinyl chloride raised chloride to 1990 ppm for the two per cent addition, 3030 ppm for the four per cent addition.

Since the incinerator used did not incorporate any currently available anti-air pollution devices, a laboratory size water scrubber was used for additional testing. The data indicate that reasonably effective commercial scrubbers will remove more than 85 per cent of the chlorides in the flue gases. Since scrubbers and fly ash collectors will be required on new incinerators whether plastics are present or not, no problems are expected with combustion of plastics at even higher levels than used in these tests.

If you'd like a summary of the Kaiser-Carotti report, just let us know.

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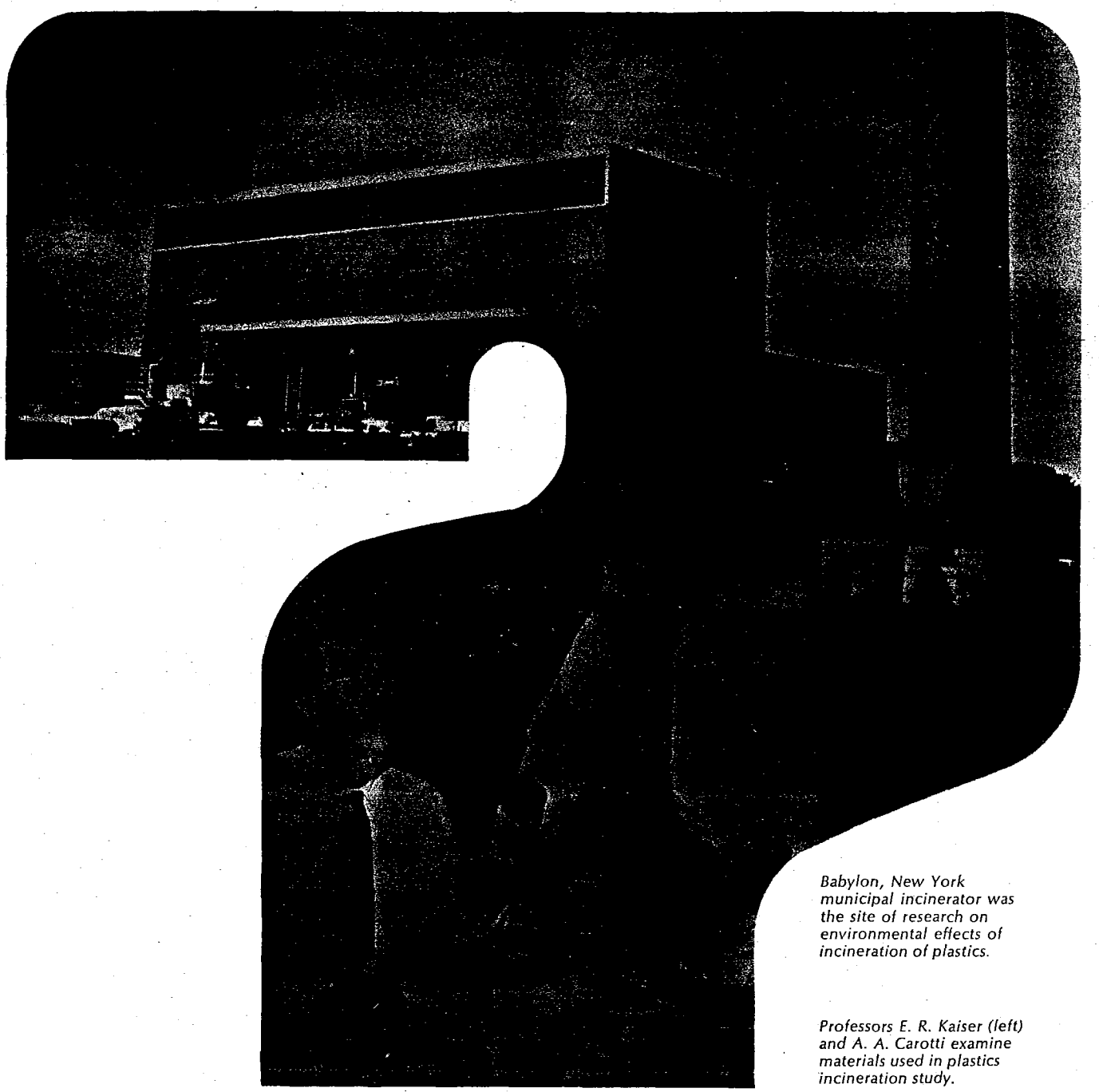

Babylon, New York municipal incinerator was the site of research on environmental effects of incineration of plastics.

Professors E. R. Kaiser (left) and A. A. Carotti examine materials used in plastics incineration study.

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Professor E. R. Kaiser uses Orsat apparatus to analyze gases emitted during incineration of municipal refuse.

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