

CHEMISTRY

Quick-Molded Plastics

Lenses and prisms were mass-produced during the war for gunsights, range-finders and other optical instruments needed in combat.

► QUICK-MOLDED plastics, not laboriously ground and polished glass, supplied the hundreds of thousands of lenses and prisms needed in artillery sights, range-finders, field glasses and other optical instruments used in combat.

For the first time, mass production methods in these optical parts was brought to a sufficiently high point of precision to permit the older, slow-produced glass parts to be shoved almost entirely aside.

The problem of combat optical instruments was seen as acute even before Pearl Harbor. World War I had caught the United States with no optical-glass production capacity of its own. This situation was remedied shortly after 1918; but although 1940 found us with plenty of good glass, it was evident even before hostilities started that our national capacity to grind and polish it into lenses and prisms could never meet the insatiable wartime demand.

For this reason the National Defense Research Committee set up contracts, principally with Harvard University and the Polaroid Corporation of Cambridge, Mass., to investigate possible moldable plastic materials of optical quality and to design needed new types of instruments. Polymers of 113 organic compounds were tested for such qualities as homogeneity, hardness, toughness, clearness—an even dozen points altogether. Only two scored high enough to be considered worth adoption: polycyclohexyl methacrylate (CHM for short) and the more familiar styrene. Most of the optical parts subsequently molded were made of the CHM polymer.

The molds in which the plastic lenses and prisms were to be cast got the careful grinding and polishing that is usually lavished on glass optical parts. When the molasses-like plastic mass was poured into them and subsequently hardened, it came out as parts with surfaces already optically perfect, ready to be installed in the instruments without further treatment.

This does not mean that all the troubles of optical instrument makers are over. Easily produced though they are, these plastic lenses and prisms are not

the equal of their glass counterparts. Their great advantage for war purposes was that they could be mass-produced fast enough to meet the demand, which was away beyond the possibilities of our glass-grinding industry. Optical plastics are softer than optical glass; they scratch relatively easily and must therefore either be given glass protective coverings or undergo frequent replacement. However, this and other handicaps are being worked on, and it may well be that postwar research will bring notable advances in an entirely new branch of the optical-goods industry.

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PUBLIC HEALTH

A.M.A. Health Plan Called Inadequate

► WHILE SOME members of the American Medical Association undoubtedly are applauding the program for nation-wide voluntary health insurance adopted by the association on Dec. 5, other members remain dissatisfied and critical.

The program is termed a "totally inadequate alternative to President Truman's National Health Insurance plan" by the Physicians Forum in a statement issued by its chairman, Dr. Ernst Boas. The statement follows:

"The Physicians Forum, comprised of doctors who are all members of the American Medical Association, has spent many years of study on the subject and has come to this conclusion: voluntary health insurance is merely an indication of what could be accomplished on a national scale if the President's proposal assuring the health of all Americans is passed by Congress. Until their recent reversal, the American Medical Association strongly opposed even this elementary device for medical care.

"Over 40% of the counties in our country have no satisfactory general hospital, which fact in itself makes it impossible for any voluntary health insurance plan to be adequate for the nation. Furthermore, the lower income groups have three times as much sickness as those in the higher brackets but are

only able to spend one-third as much on medical attention. Since 50% of all the families earn less than \$2,000 a year, it is impossible to expect anything approaching the needed medical care under a purely voluntary system where costs are fixed regardless of income.

"It is therefore obvious that voluntary health insurance, as now proposed by the American Medical Association, will never be adequate to supply sufficient medical care to all the people. The Physicians Forum believes that the proposal made by President Truman for nationwide social security legislation to finance health insurance in proportion to the ability to pay is the only effective method in accord with the American tradition."

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Steps Toward Synthesis Of Penicillin Announced

► STEPS TOWARD synthesis of penicillin, anti-germ chemical which a humble green mold makes apparently with ease, are announced by the Committee on Medical Research, Office of Scientific Research and Development, and the British Medical Research Council in London. (*Science*, Dec. 21).

Efforts of 38 different groups of scientists, 17 in Britain and 21 in the United States, have not yet succeeded in producing a synthetic penicillin, so far as the now published results show.

The several known antibiotics of the penicillin class all have the empirical formula $C_9H_{11}O_4SN_2.R$. The constitution of the R part of the compound is different in each of the penicillins. While the above formula tells the scientists which elements and how much of each are contained in penicillin, the way they are arranged in the penicillin molecule apparently has not yet been determined. This knowledge would be essential to synthetic production of the mold chemical in the laboratory. The two structural formulae to which workers in the field now are giving "the most attention" contain respectively a beta-lactam structure and an azlactone grouping.

Since penicillin is now obtained on a commercially practical scale from the mold and since its chemical nature is so difficult to determine, it seems unlikely that synthetic penicillin will ever be produced outside of scientific laboratories. Efforts to synthesize it, however, will doubtless continue.

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