represent contributions to improved therapy. All increase the range of choice for physicians; many represent new alternatives and some represent breakthrough discoveries into areas where no effective products had been available previously.

The benefits of the new drugs cannot easily be measured, since most drugs provide symptomatic relief rather than cures. While the reduced hospitalization and shortened durations of incapacity may be quantifiable, within limits, the great reductions in suffering can only be recognized in general. We do know the preventive and curative drugs have greatly reduced the incidence of certain illnesses. Influenza, tuberculosis, pneumonia, and syphilis no longer are the severe killers they once were. The childhood diseases of measles, meningococcal infections, whooping cough, gastritis, duodenitics, colitis, and enteritis have been brought under control. Poliomyelitis is no longer the great crippler it had been. Steroid hormones have greatly reduced the pain and crippling effects of inflammatory diseases, particularly arthritis. Tranquilizers and other drugs have done much to reduce the seriousness and the hopelessness of mental illness.

Indeed success over illness has become an expectation by the public, and this expectation has been considerably met by the industry. These contributions by the drug firms in the form of new products warrant the industry's pride in its accomplishments and its recognition by society. Added to this record is the rapid expansion in the industry's productive capacity and output, which has made both new and older products available in increasing quantity.

Yet, while the achievements in research and development effort, new product introduction, and expansion in output have been impressive, certain criticisms of both the magnitude and quality of these activities must be noted.

It is apparent that the industry exaggerates its research and development effort, perhaps to convey an impression of extreme risk, or competitiveness, or exceptional enterprise, with the purpose of justifying high profits. The industry, when speaking of its research and development activities to stockholders or to the public, defines them very broadly, being far more inclusive than the Internal Revenue Service or National Science Foundation. For example, industry spokesmen appearing before the Kefauver Committee put the 1959 research and development outlay at $198 million; the NSF figure for that year was $154 million, or 22 percent lower.[9]

Not only does the industry over-estimate the quantity of this activity, but many critics, including a large number within the medical profession, have questioned its nature and direction. There are serious allegations that much research activity is not related to product improvement but is imitative in nature, so as to generate specialties that are not really needed, or is directed toward the acquisition of patent protection. Furthermore, it is contended that the great profit potential awaiting new products induces their introduction before there is sufficient knowledge of their limitations and dangers.

These allegations have been at least partially substantiated. It has been shown above that duplicates, new dosage forms, and mixtures represent the large majority of the products being introduced, and the therapeutic advances they represent may not be very great. Many of the new single chemicals, it has been claimed, represent no significant progress in drug therapy. It would seem, then, that only a few "new products" represent real progress. Further, if research outlays in certain ways are excessive, in others they may be inadequate. When the Food and Drug Administration raised the standards for testing of new drugs as a response to the Thalidomide experience, the number of new drug applications and of approved new products declined sharply.

Certainly the behavioral patterns and motives that are alleged to lie behind these criticisms of the industry are compatible with the structural and other features of the industry noted earlier. These are important criticisms of the industry's product performance and must be taken seriously.

It thus seems likely that the industry's product performance is not as great as claimed, nor is it as great as it might be with a re-direction of its research and development effort. Despite these qualifications, the available data support the conclusion that the industry has contributed greatly to people's lives and indirectly to the economy. For these contributions the industry deserves great credit, whatever the flaws that exist in its structure and operation.

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[9] *Research and Development in American Industry, 1962,* Washington, D.C.: U.S. Government Printing Office, 1963, p. 9.