cal entities or standardized commodities about which price competition might develop. It has strengthened and encouraged the high degree of chemical product differentiation which is the primary form taken by technical change within the pharmaceutical industry.

THE ACHIEVEMENT OF MARKET POWER

The growth of effective product differentiation has led to an appreciable increase in industry profits and their maintenance at a relatively high level. In fact, the pharmaceutical industry has become one of the most profitable in the American economy.[26] The high level of market power, of which these profit rates are indicative, has evolved as part of the pattern of inter-relationship among the major firms, and is founded upon the achievement of product differentiation.

The crucial significance of product differentiation is that it provides the primary barrier to entry into the relevant therapeutic markets. Since effective entry normally requires some form of technical advance, the cost and risk of research comprise an important part of this barrier. Joined with research and development, moreover, are the extremely high selling expenditures undertaken by the larger firms.[27] Not only do these outlays accentuate the degree of differentiation among older products, but they also raise considerably the costs associated with launching a new product, and thereby provide a further barrier.

Entry barriers, created in this fashion, have resulted in fairly high levels of concentration within therapeutic markets. In a group of twenty such markets, the proportion of output accounted for by the leading five firms ranged from 56 per cent to 98 per cent.[28] It is within these markets that decisions on prices are made, and given such concentration ratios, we should not expect individual firms to disregard their own impact on market parameters. It is on this basis that market power has been achieved.

In this manner the leading five firms in the industry have maintained control of a large number of markets, and have created conditions within which the rivalry among themselves will proceed on a non-price basis. What is equally important, the achievement of product differentiation has succeeded in impeding the entry into these markets of the large number of smaller firms which would be likely to introduce some measure of price competition. Smaller firms have been forced to rely largely on standardized and non-patented products which are frequently non-competitive with the highly differentiated products which lead in most markets.

To consider further the role played by differentiation, it is instructive to examine the behaviour of the industry in patent licensing. Although pre-emption of the entire demand for a product seems most desirable for the firm, there are a number of factors which have increased the scope of licensing agreements. Not only may smaller firms wish to profit from the distribution facilities of their larger rivals,[29] but cross-licensing agreements may also be required to produce drug combinations and to settle "interference" proceedings.[30] In all of these cases, however, there appears to be a definite reluctance on the part of the major firms in the industry to license their smaller rivals even when licenses are granted to

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[26] See the table compiled by the United States Patent Office of all patents relating to medicine issued during 1961. This table appears in United States Senate, *Drug Industry Antitrust Act*, Hearings before the Subcommittee on Antitrust and Monopoly, 87th Congress, 1st Session, 1961, Part 3, p. 1261. This document will be cited as *Antitrust Act Hearings*.

[27] *Ibid.*, Part 5, p. 2621.

[28] See the statement by George E. Frost, a member of the patent bar, in *Antitrust Act Hearings*, Part 4, p. 2119. Frost maintained with regard specifically to pharmaceutical patents that "the patent applicant is rarely able to anticipate and include all variants of his inventive concept in this document".

[29] The classic example is the case of meprobamate. The patent here is assigned to Carter Products, Inc., which markets the product under the name of Miltown. Within a month after the issue of the original patent, Carter licensed American Home Products Corp., one of the industry's largest firms with extensive selling and distribution facilities, to market the product under its own name, Equanil. Although sales of the latter quickly exceeded their own, Carter benefited through extensive royalties from the expansion of demand stimulated by the larger firm.

[30] An "interference" is declared by the Patent Office when a number of patent applications lay claim to the same invention. While the normal procedures in this case involve the Patent Office in an administrative hearing to determine the true inventor, the private settlement of claims is widely used in the pharmaceutical industry. This commonly results in the withdrawal of all but one of the original applications and the licensing of all parties when the patent is finally issued. See Senate Report, *op. cit.*, pp. 152–54.