Monopoly

MEASURING MONOPOLY

A New Approach

CHAMBER OF COMMERCE OF THE UNITED STATES OF AMERICA

A Statement of National Chamber Policy on Concentration of Economic Power

This is the testimony of HERMAN W. STEINKRAUS, President of the Chamber of Commerce of the United States, presented on November 21, 1949, to the House Judiciary Subcommittee studying anti-monopoly legislation.

Excerpts from the subsequent question and answer period begin on Page 19.

Measuring Monopoly

A NEW APPROACH

MR. CHAIRMAN, I want to present to you

1. Our support for competitive enterprise
2. The issue of "bigness"
3. Actual market competition
4. Whether the economy is getting more competitive
5. Freedom of entry and
6. Finally, a proposed yardstick by which the government can measure the presence of monopolistic conditions.

Our Support for Competitive Enterprise

TO EARN public acceptance and, indeed, to survive as private business, American enterprise must remain competitive enterprise. This is the established policy of the Chamber of Commerce of the United States.

At our Annual Meeting last May, without a dissenting voice, the Chamber adopted a policy statement which represents careful thought and firm conviction. I believe your Committee would be interested in examining it. I should like to quote the following excerpt:

> *The Chamber of Commerce of the United States of America is wholeheartedly committed to private enterprise in preference to government enterprise; to free enterprise in preference to controlled enterprise;*
>
> *and to competitive enterprise in preference to monopolistic enterprise* *

I have cited this policy declaration at the outset because I believe the members of this Committee share with us a common desire to foster an atmosphere favorable to continued development of healthy, free and competitive enterprise economy. An essential requirement is the continued freedom of businessmen to compete.

The Question at Issue

AS WE see it, the question at the very heart of this investigation is the concentration of economic power. More specifically, is the public interest adequately safeguarded against the abuse of economic power by any individual business or business combination?

Where in this country do we find any business so free from competition as to have the power to jeopardize or abuse the public interest? Putting it another way, where do we find a business that can jeopardize or abuse the public interest

* See Appendix A for full text of policy declaration quoted.

without at the same time flying squarely in the face of its own self-interest?

This Matter of Bigness

SOME SAY that keeping our economy adequately competitive requires limiting the size of business establishments. Of course, if their diagnosis is correct, then all you have to do is limit size. Certainly mere size is not something sacred in its own right.

On the other hand, if that prescription is based on an unsound diagnosis, prohibiting or reversing the growth of business establishments will certainly do our economy great harm.

The emergence and multiplication of big business establishments has been one aspect of the dynamic expansion of American business. The unrivaled gain in our people's material well-being is another.

These large establishments are the symbols of growth among thousands of suppliers, employing millions of workers. They are symbols of growth among thousands of wholesalers and retailers, employing other millions.

These suppliers and distributors and their millions of workers are like the limbs and leaves of a tree. On the one hand, a tree could not exist without them, and, on the other hand, if the tree is cut down all will die.

While this is no proof that bigger and bigger means better and better, *our country's actual experience has demonstrated that bigger and bigger certainly does not mean worse and worse.*

There is general agreement among judges, legislators, economists, and other students of the problem on one fact. It is that different industries may be much alike in terms of size statistics and be very different so far as intensity of competition is concerned, with very different statistics of size. So the general agreement is that the one factor of size is not a measure of monopoly power.

Yet, the Federal Trade Commission issues a little book full of almost nothing but size statistics and calls it "a study of the extent of concentration of economic power." Critics of big business are hailing this as the first major contribution of its kind since the Temporary National Economic Committee reports of the 1930's. And, misleading as it is, it is the same kind of thing that TNEC did emphasize most at that time.

In such reports much more is at stake than the business community's peace of mind. I can assure you that as laboratories work out new processes and products, and as management sees the possibilities of doing a bigger and better job at lower costs and selling prices, many businessmen pause with uncertainty about expanding in the face of the confusions of government hostility toward growing size itself.

We must remind ourselves that each year we have between one and two million youngsters entering the labor market for the first time. This calls for a net increase in job openings of from 500,000 to 1,000,000 per year. Our studies show that it takes 8 to 9 thousand dollars to create one job. This means a necessary monthly investment in new job-making expansion of over $400 million, or about $5 billion per year.

The point I am making is that dynamic expanding business enterprises are an absolute requisite, just to hold our own against unemployment. Some job-making expansion does and should come from newly created business. But consider the importance of the expansion for which we must look to already established and successful going concerns. It is of vital importance to every community in the United States.

We must do what we can to clear up this business uncertainty, growing out of government hostility toward growing size as such. Otherwise we run an unnecessary risk in this matter of keeping up with the employment needs of our growing labor force. The gravity of the risk speaks for itself.

We seem to lack practical criteria, tests or symptoms of inadequate competition. We can meet this need only by realistically analyzing the actual competitiveness of actual market situations.

Then, so far as the size factor itself is concerned, let the chips fall where they may.

Actual Market Competition

I WANT to talk now about competition—actual market competition. Some people carelessly assume that the only important meaning of "competition" is "competition from companies in the same industry." Nothing could be further from the facts.

I think it is of utmost practical significance in an inquiry of this kind to recognize that the important meaning of competition is *the actual possibility of losing business to somebody else, whether that somebody else is in your own industry or not.*

Let me illustrate. The Aluminum Company of America is in a position to lose business not only to Reynolds or the

Kaiser Company, but to the many makers of various non-aluminum products. Many of its customers have a choice of aluminum, or of a number of steel or other metal alloys, or one of the increasingly popular laminated wood products or plastics.

Take a look at textiles. The range of choice today is almost limitless. At the turn of the century it was very narrow indeed. Today rayon and nylon and many others are competing with silk and cotton and wool.

"But after all," somebody says, "is not what you're talking about rather a minor part of the whole story? It is only a small percentage of the aluminum business that can be lost to other metal or wood products or plastics."

The answer is that the small percentage of business lost may be the difference between profit or loss in operation.

Now this is one of the important points at which sound thinking requires a better understanding of practical realities in the mass-production industries.

The experts talk about break-even points. But to most of us, the essential fact is that, in mass-production industries, total costs of operation will not go down in proportion to losses of business. If a firm loses 10 per cent of its business, for example, its total costs of operation will go down much less than 10 per cent—and sometimes hardly enough to be noticed. Fixed expenses remain about the same.

What does this mean—what does it mean that profits earned when plants are operating at capacity may be annihilated by a 10 or 15 per cent decline in volume? The only reasonable answer is that it threatens misfortune for everyone—the employees, who may be reduced to part-time work or dismissed;

the investors who own the business, and will receive no return on the risk capital they have ventured. It means a small amount of business to be gained or lost to competition is definitely not a minor but a very vital factor to any company, large or small.

In practice, it is not a question of whether a big business may behave like a monopoly and still hold a large part of its volume. The question rather is whether actual customer freedom of choice is great enough to lose such a seller more volume than he could afford to do without and operate profitably.

The customer's freedom, as I have noted, may be more than just the freedom to substitute one seller for another. For at least some of every seller's customers, it is also the freedom to substitute one kind of product for another.

There can be no question about the importance of intelligently measuring monopoly power, whether it be in business or in labor, or perhaps, even in government itself. By the same token, it should be understandable if we are deeply concerned about the dangers of merely measuring size, and calling it monopoly power.

We do not want to be negatively critical and talk only about how monopoly power should not be measured. We also are making some concrete suggestions for your consideration.

The problem is a difficult one. The measurement of size or who has how much of any given market is easy. But it is not the measurement that really counts.

What really counts is embodied in two questions:

1. How much volume of business is the firm in position to lose to its competitors—remem-

bering always the competition which may come from other lines of products, too?

2. Could it afford to lose that volume and stay in business?

You cannot get the answers to these two questions by taking various measurements of size. The answers can never be as precise as statistics of size or of market share. But they do have the all-important virtues of really telling us about the adequacy or inadequacy of actual market competition.

The best answers you can get to these questions form the best practical answers to the basic questions about any business under scrutiny:

"How free is it from competition?"

"Has it been getting less or more competitive?"

Has Our Economy Really Been Getting Less Competitive or More?

ONE OF the basic questions before this Committee is whether there has been a dangerous trend toward greater and greater concentration of economic power. This will require careful examination in terms of customers' freedom of choice and of substitution.

The story of modern transportation illustrates clearly the increasing freedom to substitute one seller for another. It demonstrates the story of our technological progress and increasing freedom to discard one product and substitute another. Distance is no longer an obstacle.

The story of transportation is one of lower and lower cost, greater and greater speed and better and better handling, whether the products are perishable or not.

Local markets have become district markets; district markets have become regional markets; regional markets have become world markets. And all this has obviously had the effect of giving the customer an ever widening choice of suppliers.

Certainly widening the customer's choice does not give sellers the greater freedom from competition which is the essence of monopoly power.

We are well aware of the scope and tempo of technological progress over the years. But are we really aware of its significance in relation to the competitiveness of our economy? In almost any field you find that technological advancement has brought keener and keener competition.

How many different established brands of radios could you buy in 1930 and how many today? How many different kinds of food, or clothing, or housing, or household appliances, or transportation, or communication, or entertainment and recreation can you buy today as against the number of choices you had back in 1930? Everyone knows that newcomers in each of these fields have greatly increased the competition in every one of them in 20 years.

I shall not take your time to read it now but I believe you will find illuminating an appendix which is attached to this statement. In it we have listed some fifty developments of the last few years, each one of which added a choice of materials that did not previously exist. There are hundreds more.

The record of our technological progress cannot be interpreted in any other way than as giving us a wider and wider range of choices in our buying—an opportunity to vote for one product in a field of many, as against the narrower choices that we used to have.

In the face of these facts, how can we reconcile any suspicion of increasing monopoly power with this widening range of alternative choices for the American consumer?

To have monopoly power you must have customers who cannot escape you. Customers who cannot escape are customers for whom there is no substitute for what you sell, no alternative to remaining your customer.

We know the trend has been toward a wider and wider range of customer choice among substitutes and alternatives. That is a trend toward a more and more competitive economy, not one which is less and less so.

Freedom of Entry

I HAVE STRESSED two facts—first, the customer's steadily increasing choice as to how he spends his every dollar; second, the way in which technological progress is constantly widening the range of alternatives and substitutes.

And it is against the backdrop of these actual realities that I want to talk with you now about a basic structural requirement for keeping an economy competitive; it is *freedom of entry into any business.*

Inefficiency, above-normal profit margins, unprogressiveness and general restrictionism are typical monopolistic conditions *whose very appearance is an invitation for new competitors to step into any business with a good chance to make a profit.*

So long as there is freedom of entry, *competitive* policies and practices are the established enterprise's best protection against loss of business not only to existing competitors but also to new ones coming into the field.

Nobody seriously questions the logic of free entry for a competitive economy. Nevertheless, there are some who say that it has nothing to do with the charge that competition is losing out to monopoly.

They ask: "How about trying to set up a new aluminum company?" or "How would you like to try starting another DuPont?"

They are thinking that you just can't do it. But the whole subject is much too important for that kind of treatment.

Most of us can remember a time when these skeptics might just as tellingly have asked: "How about starting a new railroad?" They would not even have been talking about the freedom of entry that actually mattered most.

Suppose they had been asked about the possibility of starting up in trucking or bus transportation. Now we know that that was the freedom of entry that was going to make the difference in railroad competition. Today try to talk about the competitiveness of railroading without talking about trucks and buses, to say nothing of water transport, airlines and, in recent years, transcontinental pipelines. They are the toughest kind of competition.

What I am saying is not intended to lessen our concern about the dangers of monopoly. What I most earnestly want to stress is the danger of being misled by careless thinking.

The question about Alcoa or DuPont is the same kind of question: Are they now, and are they likely to go on being, exposed to the possibility of losing business, not only to other firms already in existence but to new entrants?

The answers run in terms of all the possible alternatives and substitutes in the customer's range of choice, already wide and growing wider every year.

Reynolds and Kaiser entered the aluminum market as such. But more important, over the last few years new alloy metals, new plastics, magnesium and new laminated wood products have come along in an unbroken procession, freely entering the self-same larger market in which Alcoa gets and loses business. Now titanium is entering the picture and in a very few years may be the biggest threat of all.

DuPont is now in competition with literally thousands of firms in the manufacture of chemical and allied products.

That DuPont does only about 8 per cent of all this business, or that its own product leads the field in so few instances—these facts are much less significant to all of us than the fact that 60 per cent of all the products DuPont sold in 1948 had not been made in 1928. They first came on the market during the past 20 years.

As advocates of competitive economy, we recognize the importance of freedom of entry. It cannot be safeguarded and fostered too carefully or too zealously to suit us. But I do believe that much of the alarmist thinking today about monopoly overlooks the realities of the market.

With our kind of all but miraculous technological dynamism, it is the *freedom of entry* into the new fields that actually has been, still is, and promises to continue being of first importance among the safeguards against lessening competition. So long as venture capital is available to vitalize new enterprises, this will be so.

In this connection, the National Chamber has declared in an official policy statement:

> *Our general concern for small and new enterprises . . . can best be shown by reconstructing the tax structure so that risk capital will be forthcoming in greater volume; by continued enforcement of the antitrust laws; and by collection and distribution of useful economic data and information, not otherwise available, in a form suitable for use by the smaller enterprises but available to all.*

The Industry to Suspect

I DO NOT mean to convey the impression that I can testify to the adequate competitiveness of every American industry.

I cannot profess to know the ins and outs of every American industry, nor does any other businessman of my acquaintance. But I recognize that your Committee must get down to cases.

As a practical matter, getting down to cases is first of all a problem of singling out the suspects on whom to concentrate.

I have already indicated that, in my view, it is both careless and misguided to let statistics of size or market share serve as the yardstick of suspicion.

The approach I recommend is one that seems to me implicit in our underlying reason for wanting adequate competition.

We want adequate competition for the public service it renders.

1. We want business to be on its toes to improve its products

and lower its costs. We don't want it to be in position to rest on its oars without jeopardizing its own income. Competition makes the difference.

2. As processes and products are improved, we want the consuming public to benefit by getting more and more of better and better things at lower and lower prices. We don't want the story of our industrial progress to be merely longer and longer profit margins. Competition makes the difference.

3. We want the kind of situation in which the business enterprise will always find its best prospect of profit in producing and selling more. We don't want the kind of situation in which the business enterprise can make its greatest profit by deliberately choosing smaller volume at higher costs and still higher monopolistic prices. Competition makes the difference.

4. We want the kind of situation in which the outstandingly profitable company is operating at high percentage of capacity. We don't want the kind of situation in which the outstandingly profitable company's unused capacity is itself deterring somebody else from adding new capacity. Competition makes the difference.

In other words, to find monopolies we must look for the inadequately competitive spots in business. We shall do best to start off looking for the spots in which competition may seem to be doing the poorest job of giving us what we want of it.

Coming at the problem in this way, our best clues are then to be found in comparative progressiveness, comparative behavior of cost-price relationships, comparative changes in profits and volume, comparative behavior of profits and per cent of capacity utilized.

The spots that look suspicious, when viewed in these terms, deserve to have their competitiveness subjected to thoroughgoing investigation and study. The aim should be to determine what is back of any suspicious appearance of comparative unprogressiveness, widening profit margins, and the other conditions already mentioned.

Whether inadequacy of competition shows up depends on a thorough and truly comprehensive analysis of the actual range of customer alternatives.

As I said before, what really counts may be summed up in two questions that deserve repeating:

1. How much volume of business is the firm in position to lose to its competitors—in its own industry or any other competing one?
2. Could it afford to lose that volume and stay in business?

Here are four criteria for spotting inadequate competition:

Which companies are actually so free from competitive pressure that any one of them operates in such a way:

1. That it has no interest in new and better processes and products;
2. That it shows no disposition to work for lower costs and selling prices;
3. That it can maintain profits without fighting to maintain volume;
4. That it does not bring unused capacity into use whenever sales revenue can be increased enough to cover the cost of doing so?

If and when such cases can be brought to light, the Chamber of Commerce of the United States stands ready to support any properly corrective remedies.

In the present state of our knowledge, however, we are inclined to accept the view of the distinguished authority in this field who has stated:

> *Much has been said about the adequacy of the present antitrust laws to cope with the concentration problem. I find myself in disagreement with those who suggest that the present laws are inadequate.*

As the members of this Committee know, the man I quote is Mr. Herbert A. Bergson, Assistant Attorney General in Charge of the Antitrust Division.

(After Mr. Steinkraus presented this statement, subcommittee members (Chairman Celler (D-N.Y.) and Representatives Bryson (D-S.C.) and Keating (R-N.Y.)) discussed the issues with Mr. Steinkraus for more than two hours.

These are excerpts from that discussion, taken from the official transcript of the hearings.)

MR. BRYSON. Is it your belief that monopolies may exist not only in business but in labor as well?

MR. STEINKRAUS. We believe that monopoly can exist in business or in labor or in government.

We believe there is some monopoly existing in labor right now, and there is a fundamental difference in a monopoly in labor as against a monopoly in business.

MR. BRYSON. Would you care to elaborate on your views with respect to that particular subject?

MR. STEINKRAUS. Well, I would like to say this: Business monopolies, at worst, can only control the output and the prices, and the public always has the power of veto by refusing to buy the product; while labor monopolies have control over the output and the public welfare, and the public has no veto power over the actions of labor leaders at the present time.

On Saturday, we had a Board of Directors' meeting, at which this problem was discussed and at which the following resolution was unanimously approved:

> The Chamber of Commerce believes that recent nation-wide coal and steel strikes did serious damage to our economy. While the steel strike has been settled, the coal strike has only been postponed. Further peril to the national health, safety and economy can only be prevented by amending Federal laws to prohibit monopoly by labor organizations. The right to strike should stop short of the right to make war on the public welfare. Until such law against labor monopoly can be had this great nation can function only at the will and pleasure of powerful labor leaders. This deplorable situation demands immediate correction.
>
> The Chamber of Commerce of the United States therefore strongly urges the Congress to amend the antitrust laws to make them applicable

to labor organizations to the extent necessary to effect a ban on monopolistic practices.

Mr. Keating. I might interpose there, Mr. Steinkraus, and say that no matter what the Congress did along those lines, it would still require action by the administrative end of our Government before any laws relating to labor or anything else could become effective.

The Chairman. I am interested in the fact that Metropolitan Life and some of the others I have mentioned are so big that we have to be concerned about them, and maybe we have to change our statutes concerning them.

Mr. Steinkraus. Well, I think the most serious thing to this country right now, Mr. Chairman and gentlemen, is the attack on business. Business is the very heart and core of our American system. Our Government depends on business; our labor depends on business.

Yet business is being so surrounded and handicapped and criticized that businessmen are getting to be a pretty scared lot. It seems to me that our Government ought to recognize how very essential it is for a growing economy and for taking on these hundreds of thousands of new employees who come into the market every year, that the things that they do for business should be of the constructive nature to help give them guidance and confidence in the future, instead of the fear of being attacked from every angle.

I frankly feel that we have to realize that there are three great elements in our American society: There is labor, and there is management, and there is Government; and for any one or two of them to pitch in against the other is a very dangerous thing; and we have got to recognize what position each of those has in our economy, and try to pull together. I really think we have to learn to pull together.

We have got a great Government; we have got a great labor force; we have got a great management. But, my goodness, we are squabbling among each other instead of getting together and making this the greater country we can make it by cooperation instead of by conflict.

The Chairman. We have to have traffic lights to control the operations of pedestrians and automobiles. That does not mean that every automobile driver is bad because we pass laws with reference to how they shall operate the cars, pass laws and investigate how business shall conduct itself.

It does not mean that all business is bad because we pass those laws. It only means that some—

MR. STEINKRAUS. I believe in a traffic light, but I do not believe in searching everybody who comes by in an automobile, with the thought that he may be a crook.

THE CHAIRMAN. I hope you are not inferring that this committee—

MR. STEINKRAUS. I am not referring to this committee; I am thinking about the over-all picture.

We talk about small business as though we are against small business. We are for small business. We need to encourage small business, but it is an awfully tough job to go into business, for a small businessman to go into business today, because he has got to hire a lawyer, and hire an accountant, and get other things. No matter how you go about it, it is an awfully tough thing to start a small business today. He has got to conform to so many laws.

THE CHAIRMAN. Do you think any of these very large monsters, such as United States Steel—or take another, in another field—

MR. STEINKRAUS. I think that is an unfair term to call a large corporation.

THE CHAIRMAN. I beg pardon?

MR. STEINKRAUS. I think it is unfair to call a large corporation a monster. There is something unpleasant about that word, and I do not think any industry ought to be called by any public official with a name that infers something pretty evil.

MR. STEINKRAUS. Mr. Chairman, I just do not believe that the competitive spirit of this country is such that someone leads with respect to the price, and everybody else takes the price regardless of whether the price is right for the customers or not. I believe that the well-being of this country is, and the high standard of living is, largely due to the very severe and sincere competition there exists in this country for constantly better products at lower and lower prices, and I do not believe that the large companies have stopped that progress.

On the other hand, in the petroleum industry there are 13,475 separate companies in the oil producing business; 400 companies in oil refining, and 650 companies in oil transportation; 20,000 wholesalers, and 250,000 retail selling companies and individuals in the oil business.

It would not seem to me that in such a wide area of distribution of 13,000 producers, and 250,000 retailers, and all of those that go in between, that any one or two or three companies, if they happen to be the largest, control the situation.

Now, you probably saw in this morning's paper a full-page advertisement of the Hudson Motor Car Company. They are not one of the Big Three, but they say that they are invading the lower price field with a great new car.

MR. KEATING. They claim their car is the best one made. They admit it.

MR. STEINKRAUS. They are not one of the Big Three. They are not being stopped from coming out with a low-priced car. It seems to me to be the fact that in any industry you can find two or three who, by having perhaps a better job done than anybody else, get to the top of their heap, and that there is still an awful lot of them struggling along, and the fellow at the top today may be at the bottom tomorrow.

APPENDIX A

American Competitive Enterprise System

(Adopted 1949)

THE CHAMBER OF COMMERCE OF THE UNITED STATES of America is wholeheartedly committed to private enterprise in preference to government enterprise; to free enterprise in preference to controlled enterprise; and to competitive enterprise in preference to monopolistic enterprise.

The freedom of enterprise means more than freedom of private profit-seeking. It means individual freedom of enterprising people, whether as consumers or producers, jobholders or jobmakers, tool users or tool owners. Individual opportunity is an open road for everyone.

In America today enterprise is more solidly in private hands, here it is freer, and here it is more truly competitive, than in other lands. And to this, we believe, is due the superb vitality which has enabled our nation to perform the American miracle of production over the years.

The basis of private enterprise is the right of the citizen, as an individual, or jointly with others, to set up in business for himself—to venture his personal efforts and capital; to own, use, and risk the mechanical means of production. The reward of success is profit, and the penalty of failure is the loss of what has been ventured. Nothing else than this can provide the incentive to that initiative and efficiency upon which economic progress is built. The processes of exploration, research, invention, and experiment are all characteristic of free private enterprise.

And without such economic freedom, without substantial freedom of the individual to seek his living where he can find it, and to venture his means where profit seems likely, and to be obliged to no man for this—without these it is pure delusion to imagine that political freedom, even if it exists, can long endure.

We do not, therefore, accept the necessity of government devoting its resources to or engaging in business enterprise; the resources of government are but the resources of the citizens, and in this area its activity is inherently competitive with theirs.

Government cannot create wealth apart from the wealth of the governed, or provide for the individual needs of its citizens as well as these citizens can themselves provide. Government can best serve by encouraging maximum opportunity for the individual. In the last analysis a reliable basis of security for the individual, commensurate with our American standard of living, can be provided only by the individual enterprise, energy, and productivity of the people themselves.

The Chamber of Commerce of the United States joins with all those who seek to maintain and to foster the American competitive enterprise system's principles of economic self-government, against any and all proposals leading directly or indirectly toward any form of government-control economy.

APPENDIX B

In evidence of the technological changes and substitute materials becoming available, the following items, selected from thousands which might be mentioned, are worth noting:

Older Item	Substitute or Replacement Item
Mica	Teflon polytetrafluoro ethylene. Terratex synthetic inorganic paper.
Shellac	Synthetic phenolic resin varnishes.
Tin bottle caps	Phenolic, polystyrene, polyethylene, and urea closures now supply market.
Steel gears and pinions Steel timing chains	Suitably replaced with silent gears of laminated plastic, e.g., automotive timing gears.

APPENDIX B (Continued)

Older Item	Substitute or Replacement Item
Bronze bearings, Babbitt bearings	Laminated plastic bearings for industrial equipment, e.g., roll neck bearings in steel mills.
Steel—conduits and bushings	Now molded of phenolic plastics where National Electric Code—1947—requires use of insulated bushings.
Porcelain lamp receptacles	Molded of phenolic and given a deadwhite vinyl resin coating to produce a lower cost, but superior product.
Aluminum parting boards and patterns for metal casting	Densified wood parting boards and patterns are considerably lower in cost, produced in a fraction of the time, and much longer-lived.
Metal (steel or aluminum) Truck and trailer floors and walls Airplane flooring	Paper-based laminates more than serve as a replacement. Also, the honeycomb laminated structure will revise construction methods for housing, transportation equipment, and furniture.
Metal toys and playthings	A dominant trend to plastics—polystyrene, vinyls, and polyethylene, among others.
Wire insulation	Vinylite and polyethylene replaced rubber.
Raincoats, shower curtains, etc.	Vinylite film gives improved service over cotton.
Filter cloths	Vinyon fibers.
Linoleum	Vinylite flooring in place of linseed oil.
Protective coatings	Now plastic-base for severe service.
Records	Vinylite in place of shellac.

APPENDIX B (Continued)

Older Item	Substitute or Replacement Item
Automotive accessories—molded and extruded	Vinylite in place of rubber.
Brick for building construction	Aluminum panels and prefab reinforced concrete slabs.
Leather for luggage, shoes, upholstery, etc.	Coated fabrics using pyroxylin, neoprene, vinyl resins, etc.
Naphtha in dry cleaning fluids	Chlorinated hydrocarbons.
Cotton in tire fabric	Cordura rayon.
Cork, asbestos, etc., for thermal insulation	Foamglas and Fiberglas.
Refrigerants such as ammonia, SO_2 and CO_2	Freon.
Metals for cooking utensils and for corrosion resistant industrial piping	Glass such as pyrex.
Natural waxes	Hydrogenated castor oil and polythene waxes.
Lard	Hydrogenated vegetable oils.
Lime-sulphur, pyrethrum, etc.	Insecticides, pesticides, miticides, etc.
Tin plate in cans, such as beer cans	Lacquers.
Quinine	New and better anti-malarials.
Soap	Synthetic detergents.
Opium compounds	Synthetic hypnotics.
Petroleum lubricants for low temperature work	Synthetic lubricants (Esterlubes).
Natural resins in paints and lacquers, and animal glue and casein in adhesives	Synthetic resins.
Natural rubber	Synthetic rubber.

APPENDIX B (Continued)

Older Item	Substitute or Replacement Item
Organic nitrogen such as tankage for fertilizer	Synthetic urea.
Springs, hair, etc., in seat cushions and mattresses	Sponge rubber.
Wax water repellents for fabrics	Zelan waterproofing.
White lead in paints	Titanium pigments.
Glycerin—made from saponification of fats and oils	Now made from propylene gas.
Methanol—from the distillation of wood	Synthesized from carbon monoxide and hydrogen.
Nitric acid—from Chilean nitrate and the ammonia from coal distillation	From oxidation of ammonia, the ammonia being synthesized from nitrogen and hydrogen.
Natural or fermentation alcohol	Synthetic alcohol from ethylene.
Natural indigo and alizarine in dyestuffs	Synthetic indigo and alizarine.
Natural musk as a perfume "fixative"	Synthetic musk.
Vanilla extracted from natural bean	Synthetic vanillin.
Natural rubies and sapphires	Synthetic stones.
Aluminum (for certain uses)	Magnesium, titanium.
Tungsten and other steel-hardening metals	Molybdenum.
Industrial diamonds in drill bits	Tungsten carbide.
Building stone, brick and tile	Reinforced concrete.
Petroleum products	Synthetic liquid fuels from oil shale, coal, gas, lignite (future).
Wood house siding	Lustron enameled steel, and aluminum.
Wood sash and window frames	Steel and aluminum.