

**[7/10/79-Not Submitted-DF]**

Folder Citation: Collection: Office of Staff Secretary; Series: Presidential Files; Folder: [7/10/79-Not Submitted-DF]; Container 123

To See Complete Finding Aid:

[http://www.jimmycarterlibrary.gov/library/findingaids/Staff\\_Secretary.pdf](http://www.jimmycarterlibrary.gov/library/findingaids/Staff_Secretary.pdf)

ED 792891

THE WHITE HOUSE

WASHINGTON

DATE: 10 JUL 79

FOR ACTION:

*File*

INFO ONLY: STU EIZENSTAT

JACK WATSON

SUBJECT: KILLIAN LETTER RE PROPOSAL FOR COPING WITH OIL CRISIS

+++++

+ RESPONSE DUE TO RICK HUTCHESON STAFF SECRETARY (456-7052) +

+ BY: +

+++++

ACTION REQUESTED: YOUR COMMENTS

STAFF RESPONSE: ( ) I CONCUR. ( ) NO COMMENT. ( ) HOLD.

PLEASE NOTE OTHER COMMENTS BELOW:

THE WHITE HOUSE

WASHINGTON

July 9, 1979

Dear Jim:

This is to acknowledge receipt of your letter to the President, which I have transmitted to him. I know he will find the analogy with the synthetic rubber initiative in World War II very interesting. In view of the key role you played as an adviser to Presidents and in the development of U.S. technology, I am sure he will consider your recommendations seriously.

Yours sincerely,

**SIGNED:**

**FRANK ~~FRANK~~**

Frank Press  
Science and Technology  
Adviser

Dr. James R. Killian, Jr.  
77 Massachusetts Avenue  
Cambridge, Massachusetts 02139

✓ bcc: The President (via Rick Hutcheson)

JAMES R. KILLIAN, JR.

77 MASSACHUSETTS AVENUE  
CAMBRIDGE, MASSACHUSETTS 02139

July 6, 1979

The Honorable Frank Press  
Director  
Office of Science and Technology Policy  
The White House  
Washington, D. C.

Dear Frank:

I enclose the letter that I have addressed to The President on the assumption that you will see that it is brought to his attention on Monday.

I have a call in for him but of course may not reach him; if I do reach him, I will tell him that the letter has gone out.

Yours sincerely,

  
J. R. Killian, Jr.

JRK:ep  
enclosures

JAMES R. KILLIAN, JR.

77 MASSACHUSETTS AVENUE  
CAMBRIDGE, MASSACHUSETTS 02139

July 6, 1979

The President  
The White House  
Washington, D. C.

Dear Mr. President:

I respectfully wish to make to you a personal proposal for action in coping with the oil emergency, prompted in part by the way President Roosevelt dealt with the rubber emergency in World War II. I make these proposals out of an urgent sense that they may be helpful to you as you valiantly seek to find ways for leading and uniting the entire nation to go forward together in support of a successful program to meet the shortages we face and in surmounting our helplessness in the face of damaging OPEC actions.

It is only proper that I identify myself. I am the retired President of the Massachusetts Institute of Technology. In 1942, President Roosevelt appointed a special inquiry committee to study our rubber emergency and to recommend action. The committee consisted of Bernard M. Baruch, Dr. James B. Conant, President of Harvard University, and Dr. Karl Taylor Compton, President of M.I.T. At that time I was Assistant to President Compton of M.I.T. and had an opportunity to observe the way the Baruch Committee went about its work.

In 1957, when the Soviets launched their Sputniks, President Eisenhower asked me to come down as his full-time science adviser as a part of his program to reassure the nation that the Soviets had not achieved technological and military superiority over the United States, to advise on expediting our missile program, and to formulate a sound space program.

The essence of my proposal is that the United States undertake an emergency program for the production of synthetic oil, with primary emphasis on the exploitation of our shale oil resources, and in addition, the liquefaction of coal. I understand that recent discussions and studies by competent technologists have produced important new ideas about the utilization of shale in a way that it could produce oil at a cost similar to present world prices while at the same time doing this in a way that would minimize any adverse environmental effects. These are profoundly important prospects that warrant consideration.

By undertaking these programs, we might well justify drawing on our great reserves, particularly the reserves under the direction of the Department of Defense, knowing that the new synthetic production programs we are undertaking would justify our drawing down these reserves with the thought that they could be replaced in the future.

I include a copy of the summary of the Baruch Committee report, which in many extraordinary ways is relevant to the problems now faced by the nation in meeting the shortage of fuel and our dangerous reliance on foreign sources.

You will note that the report deals with problems of rationing, of administering a great technological effort, and a firm program of conservation and of asking the public to make sacrifices.

As a result of the recommendations of the Baruch Committee, the nation brought into existence a synthetic rubber plant program in a little over two years, creating an entirely new chemical industry which in peacetime would have taken, in accordance with the best estimates, at least fifteen years to develop.

The synthetic rubber plant which was developed was valued at three quarters of a billion dollars and demonstrated how a technological nation, supplemented by every ounce of effort by its technologists and through tough conservation, enabled us to meet our rubber needs.

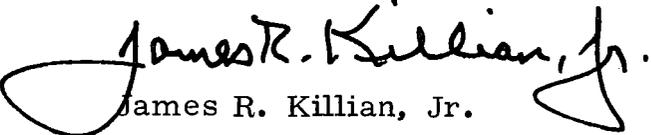
Under the recommendations made by the Baruch Committee, "gargantuan new plants for the manufacture of synthetic rubber or its components" were started from scratch. There was not time "to test processes and pilot plants prior to construction or to go through many other of the conventional preliminaries." The resourcefulness of the chemical and engineering industries and of the universities of the nation provided the technological and administrative skills to overcome problems as they arose and as fast as they arose.

As the report noted, "Our need for rubber quickly is too great to wait upon perfection, and if this Committee were to advise the newly appointed rubber administrator, it would say, 'bull the present program through.'" Then there was a stirring conclusion to the Committee's summary report, "For Victory--Unity! In drawing up these recommendations the Committee has sought to find a basis upon which the entire nation can go forward together, uniting our energies against the enemy instead of dissipating them in domestic wrangling. It appreciates that it is asking the public to make sacrifices because of mistakes that have been made and for which the people are not to blame. But wrong things done in the past cannot be cited as a defense for making mistakes in the future. The war demands that we do these things. Victory can be won in no other way."

Mr. President, the Baruch Committee in effect supported your plea that we deal with our fuel shortage in a way equivalent to the 'moral equivalent of war.'

The various administrative arrangements that were proposed by the Committee and accepted by the Congress permitted the program to be bulled through, and I have confidence that the nation's technological and administrative skills are adequate to do this again in our present emergency. In addition, I have great confidence in your leadership in mobilizing the nation for such a program.

Respectfully yours,

  
James R. Killian, Jr.

conversion program to yield 100,000 short tons of butadiene in addition to that now planned; (4) the immediate adjustment in the rates of construction of present styrene and polymerization plants in order to obtain the maximum production of Buna S in 1943; (5) the construction of an additional plant for the production of 20,000 tons of Neoprene per year; (6) the erection of a 27,000-ton butadiene plant from grain and an associated polymerization plant to produce 30,000 tons of Buna S, both to be located near the center of grain production, the construction to be started six months hence unless the Rubber Administrator determines otherwise; the process to be employed to be determined in the light of the information then available; (7) the immediate erection of alcohol plants to produce 100 million gallons per year, using recently developed apparatus, the plants to be erected on sites near the grain producing states and located on water transportation.

7. <i>Priorities</i> .....	48
If the synthetic rubber program is to succeed <i>on time</i> , assured arrangements for construction materials are urgent.	
8. <i>Administration</i> .....	50
The Committee finds that consistency, cooperation between governmental agencies, and adequate management have been lacking. It therefore recommends appointment, by the Chairman of WPB, of a Rubber Administrator, to whom he shall delegate full responsibility and authority for all aspects of the rubber program (except for specific limitations where aviation gasoline and toluene for explosives are concerned).	
9. <i>Agricultural Program</i> .....	54
Action within a month is necessary to remove legal restrictions on acreage and to provide certain farm equipment in order to avoid a whole year's delay in expanding the planting of guayule, which can become a major source of new crude rubber within a few years.	
10. <i>Rubber Goods Manufacturing Capacity</i> .....	56
The Committee recommends immediate steps to increase by 20 percent the country's capacity to reclaim rubber from rubber scrap. It also recommends a nationwide survey of rubber milling, mixing and tire building capacity, to be carried out on or about March 1, 1943, in the light of the mixing, milling, compounding, tire building, and vulcanizing arts which then exist for the processing of synthetic rubbers, and that steps then be taken to provide whatever additional manufacturing facilities are found to be necessary to handle the full volume of synthetic rubber production expected in 1944.	
11. <i>Scrap Collection</i> .....	59
The Committee finds the present scrap stock piles plus current receipts sufficient to feed the reclaim rubber plants at full capacity for the next 18 months. In the meantime, normal scrap collection should be continued and plans laid for a second intensive drive for scrap, probably about a year hence. It is important that measures be taken for further protection of existing scrap rubber stockpiles.	
12. <i>Technical Suggestions for the Rubber Administrator</i> .....	60
APPENDIX I. President's Message on Senate 2600 .....	63
APPENDIX II. Chemistry of Synthetic Rubber .....	68

# PART I

## *Letter of Transmittal and Introduction to Report*

Mr. President:

Herewith is presented a digest and full report of the Committee you appointed on August 6, with instructions that the survey "include not only facts with respect to existing supplies and estimates as to future needs, but also the question of the best method to be followed for obtaining an adequate supply of rubber for our military and essential civilian requirements. \* \* \* to recommend such action as will best produce the synthetic rubber necessary for our total war effort, including essential civilian use, with the minimum interference with the production of other weapons of war."

We find the existing situation to be so dangerous that unless corrective measures are taken immediately this country will face both a military and a civilian collapse. The naked facts present a warning that dare not be ignored. We present herewith the significant figures:

---

*Crude rubber position of the United States (July 1, 1942 to January 1, 1944)  
in long tons:*

On hand July 1, 1942 (Stockpile) .....	578,000 Tons
Estimated imports July 1, 1942 to January 1, 1944 .....	53,000 Tons
<i>Total crude rubber</i> .....	<u>631,000 Tons</u>
Estimated military and other essential demands July 1, 1942 to January 1, 1944 with no allowance for tires for passenger automobiles .....	<u>842,000 Tons</u>
<i>Deficit that must be met by production of synthetic rubber before January 1, 1944</i> .....	211,000 Tons

---

Unless adequate new supplies (natural or artificial) can be obtained in time, the total military and export requirements alone will exhaust our crude stocks before the end of next summer.

Tires on civilian cars are wearing down at a rate eight times greater than they are being replaced. If this rate continues, by far the larger number of cars will be off the road next year and in 1944 there will be an all but complete collapse of the 27,000,000 passenger cars in America.

We are faced with certainties as to demands; with grave insecurity as to supply. Therefore this Committee conceives its first duty to be the maintenance of a rubber reserve that will keep our armed forces fighting and

our essential civilian wheels turning. This can best be done by "bulling through" the present gigantic synthetic program and by safeguarding jealously every ounce of rubber in the country.

At the same time we find that rubber for necessitous civilian use has been insufficiently allocated. More must be allowed for tire replacement and recapping. That is part of the conservation program we submit. More rubber use to those who need it; less to those who don't!

Let there be no doubt that only actual needs, not fancied wants, can, or should, be satisfied. To dissipate our stocks of rubber is to destroy one of our chief weapons of war. We have the choice!

Discomfort or defeat. There is no middle course.

Therefore, we recommend:

That no speed above 35 miles an hour be permitted for passenger cars and trucks. (In this way the life of tires will be prolonged by nearly 40 percent.)

That the annual average mileage per car now estimated as 6,700 miles be held down to 5,000, a reduction of 25 percent. (This does not mean that each has a right to 5,000 miles a year; it applies to necessary driving.)

That more rubber than now is given to the public be released to fully maintain, by recapping or new tires, necessary civilian driving.

That a new rationing system of gasoline be devised, based on this 5,000 miles a year to save tires.

That the restrictions as to gasoline and mileage be national in their application.

• That compulsory periodic tire inspection be instituted.

That a voluntary tire conservation program be put into effect until gasoline rationing can be established.

Gas rationing is the only way of saving rubber. Every way of avoiding this method was explored, but it was found to be inescapable. This must be kept in mind: The limitation on the use of gasoline is not due to shortage of that commodity—it is wholly a measure of rubber saving. That is why the restriction is to be nationwide. Any localized measure would be unfair and futile.

This note of optimism is permissible: If the synthetic program herein outlined will fulfill reasonable expectancy, it will be possible to lessen this curtailment before the end of 1943. But until then, any relaxation is a service to the enemy.

In answering the questions of how much rubber do we have and where are we going to get more, the country is dependent, finally, upon the pro-

duction of synthetic rubber, which, it is hoped, will reach its full swing in 1944.

Why not earlier? Why so late? The answers to these queries lie in the past. These errors, growing out of procrastinations, indecisions, conflict of authority, clashes of personalities, lack of understanding, delays, and early non-use of known alcohol processes, are not to be recounted by us, nor shall we go into the failure to build a greater stockpile of crude rubber. We are concerned with the past record only insofar as it has seemed to us to cast light on problems of future administration.

To prevent a recurrence of these mistakes, this Committee asks an immediate reorganization in present method and the creation of a Rubber Administrator. This official will have authority over the policies governing the priceless stock of rubber now on our automobiles, the drivers of which are trustees of our national safety. He will direct the course of the technical and industrial development—wholly new to America—of the synthetic rubber production.

If our hopes are realized, the production of Buna S and Neoprene (the two synthetic materials on which we now rely most to replace crude rubber) will total 425,000 tons by the end of 1943. But, on the other hand, the figure might easily fall to less than half that amount if delays occur—delays of as little as 120 days. "Bugs" may be found in plant construction or in operations at any one of the three stages in the manufacture of Buna S—the making of butadiene, the making of styrene, and the polymerization, or mixing, of the two.

With 425,000 tons we should have a margin of safety, a slight one, to be sure, perhaps 100,000 tons above necessary inventories for ourselves and our allies—for the Front. With only 200,000 tons of Buna S produced, our supplies would be exhausted. The successful operation of our mechanized army would be jeopardized.

We cannot afford to take a chance. It is better to be safe than to be sorry. We dare not depend upon unbuilt plants; upon increasing the reclamation of scrap; upon bringing the tire manufacturing capacity up to equal a theoretical synthetic production; upon other unproven factors.

The members of this Committee have full faith in the ability of American industry to lick all these problems, but there is grave uncertainty as to time. Whatever our hopes, or even our reasonable estimates, until the synthetic rubber plants are operating at capacity, we cannot take unnecessary risks. We cannot base military offensives on rubber we do not have. All our lives and freedoms are at stake in this war.

Until synthetics come fully to hand, we recommend that sufficient reclaimed rubber, a small amount of crude, and an increased supply of Thiokol, or other substitutes, be made available for the tire replacement and recapping program which we urge shall go into effect at once.

Perhaps this should be said: Few believed that 90 percent of our normal supply of crude rubber would be cut off when Pearl Harbor was attacked December 7. And only a few evaluated the situation correctly after that date!

There are almost as many estimates of future supplies—the rubber we do not have—as there are persons and agencies concerned in this problem. It is important to bear in mind that these are only estimates—based upon great intangibles.

How much rubber we shall get from South America, for example, depends on the shifting of nearly half a million natives into the Amazon valley—it would be one of the great population movements of history—and on how many of them succumb to sickness and disease. It depends, too, on how successful we are in combating the menace of Hitler's underseas raiders.

No one can estimate with certainty the amount of scrap rubber in the United States. About 400,000 tons of scrap rubber were collected in the drive inaugurated by the President last June. This gathered scrap will yield about 300,000 tons of reclaimed rubber. It is true that nowhere near all of the scrap in the country has been collected. However, there already is on hand more than enough scrap to keep the entire reclaiming industry operating at capacity for many months. The Committee is recommending measures to step up reclaiming operations to the fullest capacity and also a 20 percent expansion of existing reclaiming facilities. Until that is done, the accumulation of huge scrap piles is an unnecessary fire and sabotage hazard which gives the Committee much concern.

Roughly, a year will be required to increase reclaiming capacity appreciably. Too, reclaimed rubber is inferior to natural rubber, and its use as a substitute for crude is limited. So, again, we find that in the final analysis we are basically dependent upon synthetic rubber.

Failure of the responsible officials to request the aid of Russia in setting up our synthetic system is a neglect for which we have not had a satisfactory explanation. The Soviet Republics have been first or second in the production of synthetic rubber, and we are asking that their "know how" be obtained. The Soviet has expressed a willingness always to be cooperative. Russia has lost, through the German advance, between 50,000 and 60,000 tons of its annual rubber-making capacity.

Among other points to which the Committee directs attention are:

**Faulty flow of critical materials may block or delay plant construction.**

**No new synthetic processes are to be substituted for those approved.**

**That the present program must be expanded to roughly 1,100,000 tons of all synthetics.**

**That the road rubber (rubber actually in tires now used on passenger cars and trucks) totals 1,000,000 tons.**

**In rubber, the United States must be listed as a "have not" Nation.**

Once we are secure in our position, we shall be freed from a source of worry that affects the high military and other governmental figures. We shall gain that position through sacrifices. There is no royal road to victory.

Herewith follows the digest of our findings and recommendations and, as a separate document, the full report.

Respectfully submitted,

JAMES B. CONANT  
KARL T. COMPTON  
BERNARD M. BARUCH, *Chairman*  
*September 10, 1942*

# PART II

## *Digest of Committee's Report*

### *Giving Civilians More Rubber*

All of the many witnesses who appeared before the Committee urged the need for conserving the rubber now on automobiles. There was disagreement only on methods. The Committee, however, has been concerned not only with reducing the use of rubber but with seeing that enough rubber is provided to maintain a minimum of necessary civilian driving. The Committee does not believe in the doctrine of sacrifice for sacrifice's sake nor that workers should be expected to live in tents and farmers trudge miles to market unless our situation is so desperate that there is no alternative.

Our analysis of supplies on hand and expected shows that at best only enough rubber can be made available for civilian use to maintain the average mileage of vehicles at 5,000 miles a year. At present the annual average is estimated at about 6,700 miles, which would mean that a further reduction of roughly 25 percent in mileage is necessary.

The 6,700-mile figure, in itself, is a reduction from the pre-war national average of about 9,000 miles a year. In good measure this voluntary conservation on the part of motorists is a reflection of the fear that when present tires are worn down no new tires will be available. Should this apprehension be relieved by an enlarged tire replacement program, without any other restriction, the Committee fears that voluntary conservation would largely disappear, and the average mileage would shoot up.

It then would take 250,000 tons of crude rubber a year to supply all cars with all the rubber they need. If additional rubber is to be made available to civilians, there must be a sure control over rubber mileage. After analyzing every possible method, the Committee finds the quickest, surest, and most convenient check is through the nationwide rationing of the use of gasoline.

*Therefore, the Committee recommends this five-point program of rubber rationing:*

1. A reduction of the average mileage to a total not to exceed 5,000 miles per year by nationwide rationing of gasoline.
2. Enlargement of the present tire replacement program to provide sufficient recaps and new tires for the maintenance of this minimum of essential driving, and to prolong to the utmost the useful life of tires now on the road.

3. Prompt and strict enforcement of a nationwide speed limit not exceeding a maximum of 35 miles per hour for all passenger cars and trucks. Voluntary reduction to 30 miles will give substantially further mileage.

4. Compulsory periodic tire inspection.

5. An interim program of voluntary tire conservation until the rationing and inspection programs can be put into operation.

### *Rationing Must Be Nationwide*

It must be kept in mind that we are not restricting the use of gasoline as such; we are rationing gasoline as the only effective measure to hold down tire use. To make the restriction other than nationwide would be unfair and futile.

*As part of this program, the Committee recommends that sufficient reclaimed rubber, a small amount of crude, and an increased supply of Thiokol or other substitutes be made available immediately for making new tires and retreads for civilian use.*

Thiokol is a rubber-like material which can be used to make retreads with an average life of about 5,000 miles. At present, the production of 24,000 tons a year is planned. *The Committee recommends the expansion to 60,000 tons a year.*

With prompt action, this capacity can be provided by early 1943, and more than 50,000 tons produced next year. Thiokol retreads are serviceable only when driven at speeds under 40 miles an hour, which makes a rigid speed limit all the more imperative.

### *Conservation Essential*

It must be clear that this program is not intended to give every citizen the right to drive 5,000 miles. This figure is an average which obviously means that the mileage allowed less essential drivers must be cut considerably below that amount to permit greater mileage for more essential drivers. The proper distribution of mileage to various drivers is a matter to be worked out by the responsible governmental agencies.

It also should be stated that, in the Committee's judgment, even this indicated curtailment of driving will be insufficient to meet the situation unless there is an intensification of such conservation measures as car pooling and sharing of rides, and the purchase by the Government of extra tires

and spares from persons who do not need them for resale to war workers, farmers, and others who do need them.

### *Protecting Necessary Driving*

The Committee has given careful consideration to the objections against the use of nationwide gasoline rationing to conserve rubber. It realizes that real hardships will be caused many persons, and that some industries, communities, and business pursuits will be particularly hard-hit. However, the disadvantages are outweighed by the necessities for a sure, effective method for seeing that essential driving is maintained.

### *We Are a "Have Not" Nation*

Each time a motorist turns a wheel in unnecessary driving, he must realize that it is a turn of the wheel against our soldiers and in favor of Hitler.

The rubber rationing program proposed here should be considered as providing only a minimum of conservation and not as eliminating the need or value of the voluntary conservation measures now being practiced by many motorists.

The Committee is confident that the American people, once acquainted with the uncertainties of our rubber supply, will gladly accept whatever conservation measures are necessary. If our supply situation is eased—and the expansion of the synthetic program that the Committee is recommending holds out that hope—these conservation measures can later be relaxed somewhat. But until the soundness of the synthetic program has been fully demonstrated, and sufficient capacity is in actual production to meet all our military requirements, it is not safe to borrow from the rubber we have for any but the most essential of civilian needs.

When it comes to rubber, we are a "have not" nation. If we are to err, it must be on the side of sterner curtailment and conservation to anticipate the worst dangers that the war may bring.

### *Program Unduly Delayed*

While the Committee has not sought to recount the mistakes of the past, it is concerned with the question of whether the present administrative organization is such as to insure the effective carrying through of the program. It is not.

The Committee finds a number of different Government agencies with overlapping and confusing authority over the synthetic rubber program. The conflict between the Rubber Reserve Company, a subsidiary of the Reconstruction Finance Corporation, and the Office of Petroleum Coordi-

nator has delayed and complicated the bringing in of new facilities for the production of butadiene from oil.

To make Buna S rubber, the synthetic around which the Government's program has been built primarily, three separate kinds of plants must be erected, for producing styrene, for producing butadiene, and for combining the two—polymerization is the technical term. At present the butadiene part of the program is lagging behind the styrene and polymerization capacity. Thus, any delay in getting the greatest possible butadiene production directly reduces the amount of synthetic rubber that will be produced.

The production of synthetic rubber represents an investment exceeding \$600,000,000 and is one of the most complicated technical projects ever undertaken in this country. Yet, in none of the Government agencies has there been a clearly recognized group of independent experts to make the technical decisions. Reliance has been placed on one part-time technical adviser aided by committees drawn from industry.

This technical adviser has testified that on more than one occasion he requested the appointment of an adequate technical staff in vain. The Committee has found many evidences of procedures bordering on the chaotic in which nontechnical men have made decisions without consulting with subordinates nominally in the positions of responsibility.

There have been many adjustments and readjustments in the synthetic rubber program. Some of these were inevitable. Some appear to be the result of bad administration.

### *Russian Help Not Asked*

One example of inexplicable administration that we can mention is the failure to obtain detailed technical information concerning the experience of Soviet Russia in making synthetic rubber. Russia has been manufacturing synthetic rubber successfully for more than 10 years. Had the offer of the Soviet Government made in February to exchange full information been accepted, it is conceivable that plants for producing synthetic rubber by the Russian processes might well be on the way to completion. To date we have no detailed information as to the Russian experience, nor analyses of Russian tires. *We feel this information should still be obtained.*

### *Restrictive Secrecy*

One of the more critical technical battles that must be won is in the compounding of synthetic rubber. Synthetic rubber requires more time and effort to fabricate into tires—about a one-third loss in efficiency is reported. While tires for light passenger cars can be made entirely out of

Buna S rubber, thus far in the manufacture of combat and heavy duty tires, which represent about 70 percent of the Army's requirements, a good percentage of crude natural rubber must still be used. As long as crude rubber must be mixed with Buna S, we do not dare cut too deeply into our stocks of crude rubber—a minimum carry-over into 1944 of 100,000 tons is vital.

However, the dissemination of technical information on the compounding of Buna S to all rubber companies has become an accomplished fact only in the last few days. On July 3 of this year an agreement was entered into between the Rubber Reserve Company and four large rubber companies, by which Rubber Reserve alone was permitted to give out information on compounding to other companies. It took six weeks of repeated effort for the Rubber Branch of the War Production Board, desiring to launch a program of education throughout the industry, to get this vital information released by the Rubber Reserve.

### *New Administration*

*We recommend a complete reorganization and consolidation of the governmental agencies concerned with the rubber program.*

These changes should include:

- (1) A directive by the President ordering the Rubber Reserve Company and all other Government agencies to act in all matters relative to the rubber program as directed by the Chairman of the War Production Board.
- (2) The appointment by the Chairman of the War Production Board of a Rubber Administrator, delegating to him full and complete authority in all matters related to rubber, including research, development, construction, and operation of plants. The Chairman of the WPB should divest himself of all direct concern with these matters.
- (3) Establishment of an adequate technical staff, properly staffed under the immediate supervision of the Rubber Administrator; funds to be provided for these purposes.

### *Centralize Oil Operations*

(4) That the Petroleum Coordinator be directed by Presidential Order to act on specific directives from the Rubber Administrator to explore all methods for the production of butadiene from petroleum and natural gas products and to recommend new proposals to the Rubber Administrator for consideration and action. However, to make certain there are no construction delays because of conflicting

authority, the construction of all plants and equipment concerned with the production and purification of butadiene from oil shall be under the direction of the Rubber Administrator. The Petroleum Coordinator shall supervise the operation of these plants, after construction, but he shall not change the presently authorized program (or plans for operation) except as approved by the Rubber Administrator.

In delegating this added responsibility to the Petroleum Coordinator, the Committee has sought to secure complete coordination of the butadiene-from-oil program with other petroleum and natural gas requirements, especially for aviation gasoline and for toluene for explosives.

As the situation develops it may be desirable that the funds required for the rubber program be put directly at the disposal of the Chairman of the War Production Board for the purposes of the Rubber Administrator instead of, as at present, indirectly through the Federal Loan Agency.

The most important feature of these administrative changes is the type of man who is appointed as administrator. He should be a man of unusual capacity, a thoroughly competent operating and manufacturing executive, preferably with experience in the rubber industry. No plan of organization can bolster up a weak man sufficiently to meet the difficult problems he must face.

### *No Changes in Processes Now*

The Committee has investigated, with the aid of its experts, the status of the present Government program for the production of synthetic rubber and believes that every one of the processes is technically sound and ultimately will work. The Committee has also investigated many other processes not now in the Government schedule. In its opinion a number of these processes have promise, but it does not believe that any one of them gives sufficient certainty of producing more rubber quickly enough to warrant substituting it for processes already in the program.

In war one cannot wait upon perfection. Any weapon on the battlefield is better than the best weapon on a blueprint.

*The Committee recommends that the present program be pushed forward with the greatest possible speed, without further change, except that if new projects are adopted they be made additions to the present program.*

### *Delays Not Unlikely*

The Committee has examined the present status of the Government's schedules and estimates that if the present construction program can be met

on the dates specified and technical difficulties in reaching full production are overcome, there will be produced during 1943:

400,000 tons of Buna S;  
30,000 tons of Neoprene (in part from private sources);  
62,000 tons of Butyl rubber; and  
24,000 tons of Thiokol (from private sources).

Only Buna S and Neoprene can be used for combat and heavy duty tires. These two synthetics and a portion of the Butyl rubber could offset the likely deficit of crude rubber which the country faces during the critical year of 1943. Under present priorities and allocations, however, there is grave danger that the construction of the synthetic program may be delayed by as much as four months. If this occurs, the production of Buna S in 1943 will fall below 200,000 tons, and our supplies of rubber will be inadequate for military needs.

### *Critical Materials*

Much has been said of shortages in critical materials. There are two kinds of shortages: The first, where there is not enough to go around for all essential purposes; the second type of shortage is where enough of the material exists, but is not available when and where it is urgently required. There are a few materials short in the first sense; but many have been short in the second sense of failing to be where needed when needed.

In large part, this has been due to permitting materials to be used for purposes not essential to the conduct of the war; to the lack of vigorous policy in conservation, inventory control, and the finding of substitutes; and, most of all, to the changing, complicated, and ineffective methods that have been used to distribute materials and to control priorities. Shortages have been accentuated by superimposing upon the heavy military demands and the delayed conversion of civilian industry to war purposes a vast war construction program approximating 17 billion dollars. This program will be near completion by the end of this year—about 70 to 80 percent is to be finished in January—and all of it about July 1, 1943. Then, large amounts of construction materials should be released.

After this, the question of critical materials will be eased, provided vigorous measures are taken to increase supplies, to find substitutes, to press research work, to complete conversion, to effect the utmost in conservation, inventory control, standardization, and simplification, and, above all, to perfect a simple workable system of priorities for the distribution of materials.

Too often an attitude of complacency has been assumed, and there has been a failure to take those vigorous measures necessary to increase

supplies, working closely with the industries concerned. There has been some disposition to accept the "impossible" instead of trying to overcome it.

The military men must decide what things come first in war production; but it is the duty of this Committee to point out that, *unless the flow of materials for the construction of these synthetic rubber plants is insured, there will be no rubber in the fourth quarter of 1943 with which to equip a modern mechanized army.*

### *Expand for Safety*

The year 1943 is so critical for the rubber situation that the production of 100,000 or 200,000 tons of Buna S may be the determining factor in the success of our military program. *To add a greater margin of safety to the program the committee recommends these additions:*

(1) An increase in the production of butadiene by 100,000 tons, to be obtained from a refinery conversion program, more commonly known as "quick butadiene." This process utilizes refinery equipment made idle by the lessened demand for gasoline and which can be brought into production in six months. Since butadiene output is lagging behind styrene and polymerization capacity, if this additional butadiene can be made available quickly enough an additional 40,000 to 50,000 tons of synthetic rubber could be produced in the critical year of 1943. This extra butadiene, too, would furnish insurance against possible difficulties with other plants and be a standby-capacity as a reserve for the future. To be of greatest value this butadiene should be brought into production by next spring. Delay on the part of the Government can turn this "quick butadiene" into slow butadiene.

The Committee is concerned by the efforts on the part of many persons to substitute this so-called "quick butadiene" process for the regular butadiene plants scheduled in the Government's program. The first thought that occurs to the Committee is "Why now? Why not months ago? Why the sudden activity? And, above all, why substitute at this late date?" *The Committee recommends the quick butadiene program as an addition to, not a substitution for, the present program.*

### *A Second Process From Grain*

(2) In addition to the increase provided for through the refinery conversion program, the committee recommends another increase of 30,000 tons of Buna S. This should come from a plant to be erected during the latter part of 1943 to come into operation early in 1944.

There are two advantages in delaying construction until this time. There is good reason to believe that with the completion of the present huge

war construction program the present tightness of critical materials will be less acute and facilities for fabrication and for chemical equipment more readily available. Second, within the next six months it will be possible to judge better as to the relative merits of two processes for making butadiene from grain which are not now in the Government program—the so-called Polish process from alcohol and the butylene glycol process from grain.

### *Plants in Grain Areas*

(3) The plants for the production of this additional 30,000 tons of Buna S by a grain-using process should be located near the grain area. Such units should preferably be operated under the control of a local group.

### *More Alcohol*

The estimates of alcohol supplies and needs given us by different agencies vary considerably. If no additional alcohol is provided for the expanded rubber program we have recommended, there is a possibility that at some time in the future the production of smokeless powder and other munitions may soar and alcohol be diverted from the making of rubber.

(4) We recommend that facilities for the production of 100,000,000 gallons of alcohol be erected on sites near the grain-producing areas and accessible to water transportation. This would make it possible for molasses to be brought to the plants by barges after the war in the event that the manufacture of alcohol from grain proves uneconomical.

In recommending this addition to our alcohol facilities, the Committee wants to make clear that it is providing only enough additional alcohol to meet the increased demands of the expanded synthetic rubber program. The Committee is not saying that that is all the extra alcohol that may be needed for all war purposes. By the use of newly developed apparatus, these alcohol plants can be constructed with but little expenditure of critical materials.

### *No Food Shortage*

The Secretary of Agriculture has assured the Committee that no concern need be felt that an expansion of the alcohol and butadiene from grain will interfere with our food supply. After all food requirements that can be anticipated now are met, there still will be upwards of 1,250,000,000 bushels of wheat left on this continent.

### *Relaxing Restrictions*

If by the end of 1943 the actual production of synthetic rubber measures up to schedule and if synthetic rubber can be used readily, or if military or export needs for rubber prove less than now anticipated, it should be possible to relax the restrictions somewhat on civilian driving. Before that can be done, however, there must be an assurance that between 100,000 and 150,000 tons of Buna S rubber a year will be available, in excess of military needs, for civilian purposes.

Under the rubber rationing program recommended by the Committee, civilians will continue cutting into their capital—the rubber on their tires—although at a much lesser rate than now. By 1944 a further expansion of tire replacement for civilians to repay this “borrowed rubber” will be necessary. One of the impelling reasons for the Committee’s recommendation that the synthetic rubber program be expanded is because we desire to see the rubber turned out that will keep America on wheels.

### *More Neoprene*

(5) As a margin of safety on the military side, we recommend the construction of 20,000 tons a year of additional Neoprene capacity. Neoprene is the one synthetic rubber which has been shown to be the full equivalent in quality of natural rubber for combat and heavy duty tires. It also holds promise of being used in place of crude rubber in association with Buna S. The relative high cost of Neoprene in terms of critical materials and electric power needs are offset by the fact that it is an insurance against the possibility that our imports of natural rubber, already reduced, may be cut off or that the production of Buna S in 1943 be delayed, forcing us to cut too deeply into our crude stockpile.

### *The New Program*

(6) The War Production Board has fixed the total annual output of Buna S rubber at 705,000 tons for the United States. The Committee recommends that this ceiling be raised by 140,000 tons to 845,000 tons. Additional styrene and polymerization capacity should be built, as necessary, to take care of the increased production of butadiene. This expansion should be directed to produce the maximum possible amount of Buna S before January 1, 1944.

In addition to Buna S, the expanded program recommended by the Committee calls for a total of 69,000 tons of Neoprene, 60,000 tons of Thiokol, 132,000 tons of Butyl, with other synthetics like Flexon being added to the program if they can be brought in during 1943 after being adequately tested.

## *Standardizing Polymerization*

At present four of the large companies have designed their own polymerization facilities, each differing somewhat from the others. Each type of facility represents the best efforts of a group of keen technical men. Last May, Rubber Reserve decided to standardize all the polymerization plants to be constructed chiefly to save critical materials. In essence, this means standardizing the operation.

The design now ready is a compromise of the ideas of four separate technical groups. It may or may not incorporate the best ideas of each; on this point there are grave reasons for doubt. At all events, no one has ever operated such a standardized plant. The Committee does not wish to criticize the decision, but does recognize the need for the immediate construction of one such standard plant so that experience with its operation can be obtained at the earliest moment. *We recommend the swift construction of such a plant.*

## *More Protection*

Sampling inspections were made of a number of crude and scrap rubber stockpiles and of the methods being used for their protection. While the situation in general is satisfactory, a number of spots were found where protection from fire is definitely inadequate. The Committee suggests the advisability of more adequate protection. These stockpiles constitute some of the most critical possessions of the Nation.

## *Plant Capacities*

A most important consideration in connection with the synthetic rubber program has to do with the capacity of the country to manufacture rubber goods out of the natural and synthetic rubbers which will be available. It would be obviously foolish to carry through a program of plant construction for the manufacture of synthetic rubbers only to discover too late that the fabricating facilities were insufficient to handle the rubber.

The Committee has made a survey of these facilities and finds that, as matters now stand, there will not be sufficient factory capacity to deal with the quantities of synthetic rubber that will be produced in 1944. One important limiting factor is that, at present, it takes about a third more time to fabricate synthetic than natural rubber. While this would indicate that the capacity of the industry should be increased, the technical developments in the art of processing are proceeding very rapidly and the time required to manufacture synthetic goods certainly will be reduced. It follows that output will be increased. The Committee has been informed that the decision on whether to expand capacity can safely be deferred to

April 1943 and therefore *recommends that the Rubber Administrator review the problem early next year.*

The Committee's finding and recommendations on plant capacity are given in greater detail in the full body of the report, which in addition contains other detailed recommendations and findings.

## *Free Competition*

In concluding this digest of findings and recommendations, the Committee wishes to point out that never before has this country embarked on an undertaking comparable to the development of the synthetic rubber program. It is not only an ambitious technical project that must be rushed to completion at breakneck speed but in large measure it is a new political and economic undertaking. It seems to us of vital importance that this program be managed in a spirit of the fullest competition and interchange of information among all groups. On the one hand there should be the most complete interchange of information and, on the other, as much competition in research, development, and operation as possible. Such, after all, are the conditions in the field of laboratory science where during the last hundred years such tremendous strides have been made—cooperation and competition going hand in hand.

Nor is the Committee unaware that the production of synthetic rubber is potentially a large new post-war industry and that different groups will be contesting for a share in this post-war industry. This struggle should not be allowed to obscure the basic facts of our situation as regards the war and rubber. No matter what processes were provided in the program there would be the same uncertainties as to the future, the same huge requirements, the same threat to our essential civilian economy, and the same necessity for conserving the rubber we have until our new rubber comes in.

The Committee recognizes that there still is room for reasonable scientific disagreement over many of the processes for making rubber that are being developed. It is quite possible, even likely, that, before much of the synthetic rubber now planned is produced, better processes will have proven themselves. In any new industry the processes of today are outmoded by the processes of tomorrow and tomorrow's by those of the next day. However, our need for rubber quickly is too great to wait upon perfection and if this Committee were to advise the newly-appointed rubber administrator it would say, "Bull the present program through."

## *For Victory—Unity!*

In drawing up these recommendations the Committee has sought to find a basis upon which the entire nation can go forward together, uniting our energies against the enemy instead of dissipating them in domestic

wrangling. It appreciates that it is asking the public to make sacrifices because of mistakes that have been made and for which the people are not to blame. But wrong things done in the past cannot be cited as a defense for making mistakes in the future. The war demands that we do these things. Victory can be won in no other way.

The Committee:

JAMES B. CONANT,  
KARL T. COMPTON,  
BERNARD M. BARUCH, *Chairman*  
*September 10, 1942*

## PART III

### *Full Report of the Committee*

#### 1. *Statement of the Problem*

Of all critical and strategic materials, rubber is the one which presents the greatest threat to the safety of our nation and the success of the Allied cause. Production of steel, copper, aluminum, alloys, or aviation gasoline may be inadequate to prosecute the war as rapidly and effectively as we could wish, but at the worst we still are assured of sufficient supplies of these items to operate our armed forces on a very powerful scale. But if we fail to secure quickly a large new rubber supply our war effort and our domestic economy both will collapse. Thus the rubber situation gives rise to our most critical problem.

Our position with respect to this vital commodity may be briefly outlined as follows:

The demands now placed upon us are enormous. Without any allowance whatsoever for civilian passenger car tires, the estimated requirements for the year 1943 are 574,000 tons. This contrasts with the total average over-all consumption in the United States before the war of about 600,000 tons.

We must supply not only the needs of our own armed forces but much of those of the military machines of our Allies as well. We must equip our buses and trucks and other commercial vehicles and provide on a large scale specialty items for such purposes as factory belting, surgical, hospital and health supplies. And in addition to all these we *must* maintain the tires on *at least* a substantial portion of our 27,000,000 civilian passenger automobiles. Otherwise an economy geared to rubber-borne motor transport to an extent not approached elsewhere in the world will break down.

To meet these demands we may look to four main sources of supply:

*First*, our present stockpile of natural rubber and such additions as may come to it from natural rubber imports from Latin America, Africa, and other rubber-producing lands. These are comparatively small.

*Second*, our present stockpile of scrap rubber, estimated as sufficiently large with yearly additions to operate our reclaiming industry at present capacity through the year 1945.

*Third*, the production of synthetic rubbers.

*Fourth*, we possess in the tires of our automobiles a priceless reserve, which must be guarded with greatest care. It represents a stockpile of some 1,000,000 tons of rubber applicable to the uses of our civilian transportation and the needs of the day-to-day life of our people.