computable things. There is no reason for all of this fog, or the varying statements, except through inadequate information. If these things are collected and correlated, as they have been by me and by many others, it is not a difficult thing, and we can proceed with the rather confident expectation of achieving the results intended.

This little graph that I am handing to you will indicate the studies that have been made to show the relative efficiency of the tanker, the inland barges, the pipe line, and the tank car in carrying oil. You will note instantly by the chart two things: First, as has been stated heretofore, that the tank car is the least efficient from the point of view of the use of steel; the pipe line next, the inland barge next, and the tanker the most efficient of all.

Mr. PITTENGER. We have some rather valuable testimony on that.

Mr. BUCKMAN. You have; and it is not my intention to dwell on that. It was substantially accurate. I merely want to call attention to the factors.

Now, you can make these figures come out any way you want to make them come out if you do not make an honest approach to the problem. All you have to do is to vary these hidden factors, and the answer to the equation will be about as you desire. I call that to your attention.

I have laid on paper the factors which I have used, and I wish to state that they are in my best judgment, the factors which will probably govern. I do not maintain that a slight modification here and there, and inconsequential raising or lowering of a figure in a factor, could not represent an improvement on the factors I have taken, because it is impossible to compute them to a dot. But I do say that they are on the target, and represent the consensus of opinion of competent engineers.

For instance, a tanker of 85,000-barrel capacity—and that is the average tanker capacity of the entire tanker fleet under the American flag excepting the Great Lakes tankers—requires approximately 2,400 tons of steel. We have heard a lot of fanning of the air about how much steel it requires. That is the experience. That is the steel that is in the fleet, on the average—2,400 tons to a ship.

The average speed of the whole fleet is 12.7 miles per hour. It is 11 and a fraction knots, but I have reduced it to statute miles in order to compare it with overland routes of transportation.

Mr. DONDERO. Is the number of tons of steel in the Great Lakes tankers larger or smaller than the ocean tankers?

Mr. BUCKMAN. As a rule it is smaller. They are smaller tankers.

The CHAIRMAN. They are made of lighter construction. They are not very large ships.

Mr. BUCKMAN. It is unsafe to apply these factors to any one ship. They would never fit it. These are the average of the fleet.

Now, on inland barges I have assumed the varying factors, and you can easily select a barge which will vary from these factors; but I have assumed barges that I think represent sound engineering principles in construction and economic dimensions.

The CHAIRMAN. And the average?

Mr. BUCKMAN. And the average; the average of a program that I think we should adopt; not the average of all the barges that you might