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THE ARMY INDUSTRIAL COLLEGE
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Course 1938-1939

"Business Forecasting"

by

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Dynamician

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BUSINESS FORECASTING

Thank you very much, Colonel Miles, for that splendid build-up As I was saying to Commander Dunham a few minutes ago, it's that sort of a build-up that rather makes me feel pretty nervous, because it means that now I have something of a reputation to uphold.

Ever since the days of Joseph, men have been trying to fathom the vagaries of the business cycle. Now mark you that well, for as I take it, that is the very reason why you men are foregathered here today. Now I am no interpreter of dreams as was Joseph of Biblical days, but you all recall that Pharaoh had two dreams - the dream about the seven fat kine and the seven lean kine, and the dream about the seven full ears of corn and the seven empty ears of corn No, I am no interpreter of dreams nor am I a crystal-gazer, a tea-leaf reader, or a palmist All I hope to do and have been doing for years, which I take it you men, too, are doing, is to study the facts of business as they are - in their proper relationships so that I may get a realistic perspective of the future I stress that - the current facts in their proper relationships. Now it is no news to you men who have been studying business statistics that since the late spring of the year we have seen measurable improvement in many segments of the economy I need hardly point out to you, that cotton textile mills today, on a single-shift basis, are operating at virtually double capacity or on a double-shift basis close to capacity. I need hardly point out to you, either, that the shoe industry is close to making an all-time high in productive activity at this very moment. The tobacco industry, of which the cigarette branch is the cap-stone, likewise is making enviable records both on the production and consuming sides The automobile-tire industry is again regaining its stride and making perceptible advances in the trek towards better times And the all-important manufactured good industries, likewise, are moving onward and upward, not with any of the spectacular performance of some of the other industries I mentioned, but none the less in the direction of greater activity. Thus far I have not touched upon another very important measure of the improving conditions that have been witnessed since late spring and that is the field of retail distribution This slight was intended only because retail trade thus far, on a dollar basis, is not yet up to the level from which it fell a year ago, though in terms of physical volume we are probably near that point at this minute.

Now I might go on and enumerate other factors, the statistics on which have unmistakably pointed to the improvement which has taken place in recent months. I might include rayon and wool consumption, I might include silk consumption, but for illustration of the point, I need not go further in discussing here that phase of the economy And what is that phase of the economy? It is what the economist and statistician has come to call the consumer goods lines - the consumer goods industries - the industries which produce for the ultimate consumer for rather quick consumption And mark you that well!

We'll have more to say about that phase of the economy a little later on. Now there are other phases in this very complex economy of ours. There is agriculture, a pretty sick pup, but I need not go into that - now, at any rate I might touch upon the railroad picture, also a pretty sick canine with not a few fleas and worse, yes, for worse, no effective flea powder.

But there is one other basic part of our economy that is again beginning to show active signs of improvement, and that is the phase that is popularly termed the durable goods industries, as distinguished from the consumer goods industries. Now the capstone of the durable goods industries is construction. On this very platform a year ago, though I had grave misgivings as to the then noticeable decline in industrial activity that I believed would extend - in fact, did extend - into 1958, I said the construction industry would turn out to be the one really bright spot That is precisely what happened.

At the present time the construction industry is running within striking distance of the volume cumulatively reported during the first nine months of last year And the latest current figures, that is, for the month of September, are measurably better than the volume reported a year earlier No other basic industry in the capital goods or durable goods field can point to that record of accomplishment. Now I need not go into the reasons for that at this time The fact is there At this juncture, it makes very little difference, to my way of thinking, as to whether that was induced by so-called public spending and lending or whether it was induced by private initiative or a combination of both, that fact of improvement is there. We have had that kind of a performance Now coupled with the very favorable conditions in the construction industry, quite naturally there has been an unfoldment of favorable characteristics in those industries that are feeder to the construction industry, chiefly the building and equipment industries, an activity which is again beginning to perk up. So much for the durable goods industries,

It is no longer of moment then to argue the fact of business recovery It is here Make no mistake about it - it is here, and this recovery movement could be - and I emphasize that - the most enduring and the most regular recovery of any that has been witnessed in this country since the fits and starts that were ushered in, in 1932. Now I said it could be the most enduring and most regular recovery, whether it will be, in my judgment, depends entirely upon the combined vision of management, of labor, and of government Yes, I know you men have been hearing all about the need for vision, of management, labor, and government in recent days, but that battle-cry is well founded

Now, as for myself, I can foresee a continuation of the current improvement in business and industrial activity, with only minor interruptions, through the first half of next year and possibly to September of next year That will happen after that depends, in my judgment, entirely upon how well the present differences between management, labor, and government are composed by those highly-placed That is a big order and we might just as well grapple with it now rather than wait until June or September of next year No , in terms of the Federal Reserve Index of Industrial Production - which I take it most of you men are familiar with - this is the way it would work out But let me hold on a second as this is quite a departure for me, because, as I will point out a little later on, I have always hesitated to make any specific predictions in terms of magnitudes, in the past all of my predictions from this platform have been in terms of directional change Well, here goes The Federal Reserve Board Index, as I see it, for the first half of the coming year will work out to an average of, roughly, 100 100 is the average for the years 1923-1925, this period is the basing point for the Federal Reserve Index of Industrial Production Should that prediction be approximated in results, it would compare with an average for the initial half of 1938 of only 78, but - and mark you this well - it would still be a considerable distance removed from the average productive level, as measured by that index, reported for the first half of 1937, which worked out to about 116 Now there you have it.

I have attempted very briefly to re-orient some of the facts of recovery, to touch first upon one segment of the economy - the consumer goods industries - and then on the other hand to touch upon the other phase of the economy - the heavy goods or capital goods or durable goods industries of which construction is the keystone With that as a background, I'd like to direct your attention now to the chart on the wall.

This top line - the broken line - is the Federal Reserve Index of Industrial Production, 1923-1925 equalling 100. Now I need not stand up here and dwell too long on the contours of this line. Any of you men who were unfortunate enough to have speculated in '29 know pretty well what the course of this curve was without resort to it But there it is in broad outline as near as any composite index of American economic life can show it - there are the alternations in business and industrial activity which we have come to call, ever since Joseph's days, "the business cycle".

This other line is a "contraption". That is all it is - a contraption Now a few minutes back I asked you to mark all that I had delineated what, to my mind, represents two broad segments of the economy - the capital goods industries, on the one hand, and the consumer goods industries, on the other. This contraption attempts to measure the maladjustments between those two broad segments of the economy, for in my studies that extend over a period of almost twenty years, I have come to believe, with growing conviction, that the alternations in business and industrial movements which we dignify by the term business cycle result very largely, more largely perhaps than we ever suspect, from economic maladjustments and especially from the maladjustments between the capital goods and consumer goods industries.

That being as it is, I have chosen to call this contraption my maladjustment curve I cannot state too strongly that I am ever-mindful that one day this curve will probably go wrong I do not picture it here for any other reason than to indicate a working tool that must square with logic and I don't mind telling you that frequently I have found logic in direct apparent opposition with the implications of the curve. Wherever I have permitted my seeming logic to go counter to the implications of the curve, I have been wrong on every occasion As you look upon this chart, you find a certain determinable relationship as between the major movements of my contraption and the Federal Reserve Board Index of Industrial Production While this chart only goes back to 1926, my studies have been carried back to 1919, and the major relationships between production and the maladjustment curve were just as important in those earlier years. Now you will notice that this maladjustment curve went merrily on and upward through 1927 and reached a peak in mid-1928, from which point it started downward and continued downward, throughout, to the tail-end of 1929 You will notice, likewise, that this bottom (in the production index) in 1927 in many respects mirrored the bottom made a year earlier in the maladjustment contraption in 1926 So it was in 1928, in the middle of the year, that I began to get quite concerned over the outlook for industrial production. I had very little to say about it publicly,

but I was very concerned about it, particularly after this line (the maladjustment curve) had declined and kept on declining through to the end of 1928 At that time I was willing to venture the prediction - and did - that before 1929 would become history this country would be in the throes of a major business decline.

Now, a while back, when I ventured the prediction as to the position of industrial production during the first half of 1939, I said I was going to do something that I had never before done from this platform In the past I have used my contraption solely as a means of measuring directional movements and not magnitudes Each of these directional movements in this curve (pointing) - I don't care where you take it - means either a bettering or a worsening in the relationships between capital goods and consumer goods For that reason each of these directional changes (in the maladjustment curve) is a forecaster of industrial production eleven to thirteen months hence

Now I know, as you look at that chart, you will ask, "Well, you have a little bend there, where does it show up over here (in the production index)? You have a little bend down in here, here does it show up here (pointing to production curve) and how can you relate those movements?" Well, I have done it and will continue to do it until the chart goes wrong, but in the main, every one of those little ripples that mark a change in direction in the maladjustment curve have had their counterpart in the industrial production index of the Federal Reserve Board, months hence.

Now on my desk chart, from which this wall chart is drawn, in 1932, I drew a projection in this way I had no idea as to the coming of the N R A , which this peak (pointing to production index, mid-1933) mirrored I had little idea at that time of the likelihood of the closing of the banks in early 1933 Yet on my calculations, this contraption had sunken so low in terms of true adjustment that I was willing to state that that particular move upward (maladjustment curve, Spring, 1932) was evidence of a definite change in the direction of the production curve a year hence When I had gotten down in here (maladjustment curve in Autumn, 1932) I saw no change in direction and despite an earlier forecasted rise in the Federal Reserve Board Index of Industrial Production a year later - which came - I ventured the prediction that that recovery when it comes just could not last, that (pointing to maladjustment curve, Spring, 1932) was not a true reversal Belief in a sustained recovery in production was therefore contrary to all of the calculations which measured the relationships between the consumers and capital goods industries When, after this curve (pointing to

maladjustment curve) started turning downward again in 1932 as it did (Autumn, 1932) and we were to get a few months later that rise in the industrial production index (in 1933) along in here (Spring, 1933) I said this (pointing to rise in production curve) was only an abortive rise, it was not the real thing, it couldn't last. The relationships between the two segments of the economy were not conducive to a lasting recovery

Then as we got down to the end of 1933 we had a slight bend in the maladjustment curve Let me take you back just a second through all of '33, in the face of all this sharp upward move (in production index), I had no change in direction, (in the maladjustment curve) it was something of a blind spot, yet I was willing to stand on my opinion that this (pointing to production curve in 1933) was an abortive rise When I got down here in 1933 with this change in direction (in maladjustment curve), I took heart I had some measurable results on which I was willing to stand I stated that we would get its counterpart in directional change about a year later in the production curve But during this period we had some very abnormal factors in the economy We had an unheard-of peace-time spending program by the government, the sort of factor that I had never had to contend with way back in 1920 and 1923 or any other later period When this (pointing to maladjustment curve) started to turn down again I still held tenuously to my ground that any recovery up in here (in production) would be a short-lived one. As a result you see, by the mere outline of the Federal Reserve Index of Industrial Production a very irregular movement over the entire period since 1932, more irregular than at any time in the history of that curve and mark you this, this curve is corrected for seasonal adjustments When I got in here (pointing to maladjustment curve) in '34 I again started to feel - look into the future - to see whether this bend could turn out as an important change. In 1934, just as I did not have any foreknowledge back here (1932) that we were going to get an N.R A , or that the banks were going to re-open on a new basis, or the dollar would be devalued, I did not have in 1934 any advance idea or communion with the justices of the Supreme Court as to what they were going to do with this self-same creature, the N R.A. But there you had a turn (in the maladjustment curve) and in squaring that in relationship with all other elements, I stated that we could get a more orthodox business recovery True, this recovery (pointing to production) was irregular and these little changes in here (in maladjustment curve) foreshadowed the irregularity Then when we got down here in 1935, on the very eve that the Supreme Court did what it did to the N.R A and the Triple A and what-have-you, I had the beginnings of a relatively long march upwards in my contraption So I concluded that this period of recovery could be one to continue through the year 1936.

That, you see, I had by way of forecast months in advance

Now what happened? From this very platform two years ago (pointing to maladjustment curve, autumn, 1936), I pointed out this change in direction (downward) No, I didn't have the knowledge beforehand as to the depth of the impending change and the steepness of the decline in the industrial production index - not quite that far in advance. But as I was on my guard, from this very platform I pointed out that all could be considered well, so far as industrial production was concerned, at least through the first half of 1937, but that after that, we should watch out for a downward reaction Yes, I know we got a recovery in my curve through the final few months of 1936, but when I got that little jigger back there - directional change, mind you, not magnitude - I was certain that my earlier conviction back here about an impending downturn in production was well-founded, and that, too, was months in advance of the tumble that started in the Federal Reserve Board Index in August, 1937 This tumble carried the index precipitately downward from a level of about 118 to a level of 76, the sharpest, the most devastating decline in industrial production in at least two generations, and probably the most devastating one since the depression of the 30's a century ago You can call it recession, if you like, but whatever you call it, it raised havoc with men, business, industry, and government.

Well, I started out this talk by telling you men something you already knew, that we have had, and are now having, a business recovery. There is the measure of the recovery in the Federal Reserve Board Index of Industrial Production (pointing to production curve) from the low at mid-year of 76 (1938) to the latest figure of the Federal Reserve Board at 90 for the month of September. Quite a perceptible reversal of the devastating decline that occurred late in '37 and continued through the late spring of the current year.

There is the position of my contraption - the curve of maladjustment at the end of 1937 (pointing). You look here and you say, "Well, your curve started upward in January, 1937, the business curve or industrial production curve started up in June, 1938. I thought you said the contraption has a way of forecasting by eleven to thirteen months" Well, that kind of overstated itself that time. But there is the position of the curve at the end of 1937 - about as low as it was at the beginning of '37 - and quite a perceptible change in the slope. Though I haven't touched upon slopes, and all those other statistical mechanisms you men are familiar with, all those things enter into this computation. There is some change in directional movement (in maladjustment curve) in the tail-end

of 1937 Bearing in mind that this chart, if it has any value at all to me, has a forecast value of eleven to thirteen months, I say for the record that this current improvement in the Federal Reserve Board Index of Industrial Production is just about due for an interruption Now you men are going to be able to check that statement, or rather that prediction, pretty soon I have every reason to believe that you will be able to check it before the snow flies So I'd like now to show you that which, I take it, you all would like to see, and that is the current position of the maladjustment curve (Removed paper-flap obscuring maladjustment curve for months of 1938.)

Now, half an hour or so ago, I said I could see the recovery movement in industry continue at least through the first half of next year and possibly to September of next year, with only minor interruptions Where do I get that idea of a minor interruption? I get it right here (pointing to maladjustment, Autumn, 1937) It is of relatively no consequence Well, you look at that and you say that "that is a pretty good bend in there" You're right. You say, "that is of no consequence, when back here you said that this little jigger in here portended that kind of a rise in production (pointing) How can that be?" Again I reiterate - directional change, and magnitude, that is all that this curve attempts to measure I know by now you're all kind of starry-eyed and would like to know what is under this other paper flap Before I take that sheet off, I'd like to add to what I said at the outset of this talk and that is that this time, I'm doing something, so far as memory serves me, I have never before done from this platform Thus far I have stressed only directional change This time I'm going to show you precisely how I arrived at my estimate of the probabilities for production for the first half of the year when I said, so far as I can see, the average level of industrial activity during the first half of next year would approximate 100 on the Federal Reserve Index (Removed paper flap obscuring estimates of production for months of 1939)

I put that projection in quite faintly (pointing to curve of 1939 estimates), in the hopes that some of you men in the back might not see it But in all seriousness, I really want you to see it Please do not try to read exact points of the projection There is that little bend in the curve (production) which I expect to occur before this year becomes history. No, I haven't calculated the projection from this curve (pointing to maladjustment). This curve is only a curve measuring directional change I have another device I didn't bring that along in my bag of tricks, but I use that device to interpolate magnitudes in relationship to the implications of this maladjustment curve,

that is how this projection for 1939 was obtained

I know very well that the stock market seems to be going up and we have word from abroad that peace seems assured. We hear about the coming peace on the labor front and the coming truce between management and government I know that people are beginning to think in an optimistic vein and that perhaps some even dare to think this the New Era which has been in eclipse temporarily since '28 and '29 And maybe they are right Yet I won't go beyond 1939 in my forecast I don't have enough on hich to go and I'm satisfied to stick my neck out only to the extent of the year beginning with September and carrying through to September of '39.

Now, of course, if this maladjustment curve should change its current direction later on, I will have had ample time, if it still is the trustworthy measure of the shape of things to come, to talk about what is going to happen over here (pointing to 1939 production estimates) long before it may happen That is why it is that I have stressed - and always stress - the fact that directional change is far more important, if you can foresee it, than is an estimate of probable amplitude

Now why did I say, at the outset, that industrial production could be rather reasonably relied on to continue onward, with only minor interruptions, at least through the first half of next year and possibly to September? The secret is now out I am not yet ready to say, although I have some pretty good basis for saying it, that this change in direction is as important as, let us say, that change in direction (pointing to maladjustment). I am not going to say it, because there isn't anything in the picture at this time that warrants the belief that that change in direction is as of great importance as this change in direction. But soon I will have facts that will make it possible for me to evaluate, in its proper significance, the importance of this change (pointing to downward turn of maladjustment curve in September, 1938)

If then there is one thing I would like to leave you with at this time, it is that some time after the middle of next year, watch out for a downward reversal of the current recovery in production In order to watch out, for that period nine months to a year hence, you must watch the current unfoldment of the capital goods and consumer goods lines in their proper relationships There is another point I'd like to leave with you, and that is that there is enough reason to believe, that the much-hoped-for and much-talked-of vision in management, government, and labor may not be forthcoming, that the much-hoped-for cooperation may

not be forthcoming I want to go on record on this point because I feel that if this contraption is worth anything at all, I had far rather have been a month too early - months too early - than one minute too late in catching its significance There is something that can be done about it, but it will not be done either by management or by government or by labor or by all combined unless each gets out of its own smug complacency, unless each, in viewing the facts of current recovery and the prospects for its continuation, will stop gloating over the size of the recovery or the return of men to the factories - unless each does something about insuring the continuation of this improvement on an enduring and more regular basis.

No, I'm no seventh son of a seventh son, nor a crystal gazer I would rather be known as a dynamician and not, as Colonel Miles referred to me, as a statistician I would prefer to be known as one who measures the dynamics of the economic mechanisms, and not as one who measures too much or relies too heavily upon the mere statistics or the statics of the economic machine The economy in which we live is a dynamic economy and that is why I have stressed the need for studying in the consumer goods lines the independent movements of such things as cotton mill activity and wool consumption and the production of shoes, rubber tires, tobacco products, manufactured foods, and even retail trade. There is need for measuring them independently

This is a useful device (pointing to production curve), this Federal Reserve Index of Industrial Production, a very useful device to measure the composite picture of the economy as near as any such composite, on the basis of existing facts, may measure it But you must measure, if you will get the feel of the dynamics in the economy, you must measure first the independent industries, for each of them has its own dynamics The same goes for the capital goods industries.

It does not suffice to have an index of capital goods production such as would include, let us say, the production of lumber, and the production of cement and the production of steel and the myriad other items of durable goods or even the production of automobiles. You must measure the capital goods field as you should, in the consumer goods field, the dynamics and not so much the statics I have stressed that point I have said that each of these industries has its own peculiar dynamic movements I'm a firm believer in the theory of rhythm and harmonics If you had a wall chart that extended from here to the other end of the room and were able to chart on that surface the independent movements of every industry for which statistics are available, I could show you precisely what I mean when I say that each of them has

a harmonic movement that needs isolation Unless you isolate these harmonics you cannot, in my judgment, properly appraise their interactions and the meaning of the ultimate composite even if you were to study religiously, as many, many people do, the curve of industrial production.

And so I close on the note that now above all else is the time to keep one's feet on the ground Now is no time to permit oneself to be carried away by the seeming exuberance and seeming optimism which stems from the theory that this recovery movement in industry and in business is of an enduring character. It can and could be made to, whether it will be depends, as I have said before, entirely upon the combined enlightened cooperation and vision of labor, government, and management.

Thank you very much for your kind attention

DISCUSSION

following lecture by Mr. L. Seth Schnitman on

"Business Forecasting"

The Army Industrial College
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Q. Mr. Schnitman, in your very excellent talk you made use of the term "maladjustment" in connection with that word "curve". I think I have an idea of what you mean by maladjustment. I am not sure. Would you be kind enough to elucidate that just a little further?

A. I know my talk has gone over. If I hadn't gotten that question or a question similar to it, frankly, I would have felt quite badly. A few years back I had thought that the time had about arrived where I ought to let the public, and certainly the members of The Army Industrial College staff and student body in on my "contraption". I had thought the time had come when I ought to dedicate it to the public use, but we are now in such difficult times, where an increasing burden is being put on the economy and flowing from the economy it tied to Government, Governmental policies, if you will, that I have preferred not to disclose it, and I take it that is really the true import of your question--precisely the technique which I have employed in arriving at the measurement of maladjustments between the consumer goods and capital goods industries. Now a year ago that question was raised, By Colonel Jordan, I believe, and I said that I had hoped to dedicate it to the public, probably when it goes wrong, whereupon Colonel Jordan countered: "Well, I had hoped you were going to dedicate it to The Army Industrial College".

Q. Following that same idea, not trying to draw you out any further on that particular subject, but one thought occurred to me--the rather abrupt departure of the upper curve from the lower one, which I understood you to say was perhaps contributable to some measure to the progress of Government spending. Do you consider that that in itself would constitute a major maladjustment?

A. Very true. As a matter of fact the true adjustment--and that is why I, frankly and in all seriousness, have yet to dedicate it to anyone--the true adjustment is this hundred line. That hundred line does not mean 1923 to 1925, it doesn't mean 1926 as a hundred, it doesn't mean anything with reference to this line. For true adjustment it might just as well have been zero, and when in my calculations on which this line is based and the independent items included in the curve, I failed to find, after this adjustment curve had gotten within distance of 1929, and even allowing for the per capita picture, and it doesn't measure the per capita, it is only physical volume without regard to growth of , I didn't get anything there in regard to my computations in here, I began to wonder if I had not yet been able to properly isolate all of the factors which might--this particular sort of information machine might be forecasting, and there is a definite implication, in my judgment--and in this type of forecast you will have to take my word for it as being in my judgment because you don't know what this contains--this thing in here and the fact that it is so far removed from there has important implications in the longer aim of the future. Just what I am not ready to say but by and large I want to reiterate once again that it is,

at this moment, only in the directional change, regardless of the position away from the hundred or adjustment line that the nearby forecast is of value. This curve might be way down to the bottom, it wouldn't alter my nearby forecast, yet it would put me on guard that there is something materially wrong somewhere in the economy for the longer range. Does that answer your question?

A. Yes.

Colonel Miles: Do you think it might be a progressive deterioration in the law of supply and demand?

A. I think that is a tenable conclusion to be drawn from the position of that curve.

Q. Mr. Schnitman, in considering the current recovery in the construction industry you didn't make any distinction between that part of recovery resulting from private spending and Government spending and lending. Can we infer from that that that supports or substantiates our method of spending our way out of a depression?

A. Quite to the contrary. I am not one who believes that we can buy our way out of a depression for long. I rather choose to take the point of view in direct answer to that question, that at this juncture in the improvement it is not too wise to look a gift horse in the mouth. Just don't fight the recovery, that is what I mean. Recovery is there. It is coming and whether you like it or not you are going to get a recovery, as I see it, and whether it comes out of Government spending alone or private spending alone or whether it is a combination of both, recovery is there, and if it means anything at all to you individually, you

might just as well take advantage of it for the time being.

Q. In case of war, of course, the production is tremendously increased. What effect would that have on your maladjustment curve?

A. Well, on rather imperfect data--my data do not run back prior to 1919--on rather imperfect data I have projected back, particularly because of this recent war scare, I have projected back through the beginning of the century. I don't want to talk too much about that because it is very largely inferential. One of the basic elements in the picture I have had to guess at. If it had been one of the elements which happened to be constant in my computation it would have been a cinch, but unfortunately that was not the case. Now, in direct answer to that question, I think, on the studies carried back, it is safe to conclude that on directional change this device would still hold, but my collateral device, which I may bring down here next year, on which this thing here has been interpolated, it will not hold. It would just be impossible to figure the magnitudes, but on directional change I believe now, from the studies of the historical picture prior to 1919, it would probably hold.

Q. I notice back in 1926 to the middle of 1927 the maladjustment curve very closely approaches one hundred. Are we to understand from that that the economic picture was closest in adjustment then?

A. Precisely, and you can also draw the same inference that, even though we are in a recovery, and mark you this again, this is a very irregular thing. There has been nothing like this. You can carry your industrial index back to the beginning of 1919 and if you want to--1900, there are some of them that are tacked on here. You can take it right

to Colonel Ayres index which carries you back to 1790.

Q. Might I be permitted to say, as some economists say, that in the "glorious twenties" we were quite a bit out of adjustment?

A. Well, that very largely came in here. The Federal Reserve System made, in my judgment, a very bad boner, but in 1926, and little did it--with all due deference to it--little did the United States Department of Labor realize, when it selected the year 1926 as a basing point for wholesale prices, that that was a pretty good year, because that year was selected in 1926 or 1927. By hindsight it was a very good year. Here is where your economy got out of kelter, right up through there, even though it was well above adjustment. The implications there were just as important as the downward swing of adjustment.

Q. That wouldn't form on the enormous sums to Europe and South America--those tremendous loans?

A. That was part and parcel of the whole picture, although there are absolutely no financial items considered in that curve. The reason financial items have been distinguished from, and that has come only out of a painstaking study--originally as this was conceived financial items were definitely considered and tabulated, and the reason that was finally thrown out was because I one day suddenly awoke to a very elemental fact, and that is that money was only a medium of exchange, and that bricks on the one hand must exchange for wheat on the other hand. We use money to make change. Now at one time a pound of cotton or ten pounds of cotton might exchange for ten pounds of wheat. That might or might not be the normal relationship. At another time it might take twenty pounds of cotton to exchange for a bushel of wheat. And so I

ruled out all the financial items.

Q. Current discussion is increasingly along the line of the one group to call attention to the fact that our free competitive system is more and more being monkeyed with, and another group who say it ought to be controlled less and less. Have your studies, particularly those you carried back, brought any light, or have you any beliefs that you care to express on how you feel on this problem?

A. I am a middle-of-the-courser. I think that you can have and we, doubtless, are having today too much control. I believe, on the other hand, that we need controls, but only at basic points. I am not going to stand up here and tell you that I could find the basic points. In my own little sphere of metaphysics I have gotten to the point that perhaps I'd like to try it, but I haven't gotten anybody to listen to the requested opportunity. As a matter of fact, I might even go on further on that point and say that should I at the very minute disclose--this is a very simple thing. It used to be a very compound affair, very complex. It would take me no end of time to compute. It is very simple now, just like the safety pin, you know. When it was first put on the market people wondered: "Why didn't I think of that. Its so simple." That is the sort of thing this is, very simple, nothing complex about it, but--if I were to disclose completely the small items and the few elements that go into this thing, not only to this group, but to every industrial manager in this country, to every Government official, and to every labor leader, the farmers, the railroad people, and so on, you might say: "Well, we would be on a perfect economy then because everybody knows how the economy works and, therefore, we need no longer

have these ordinary snags because we will have known in advance the shape of things to come." No, I don't believe that at all. In this room there are perhaps one hundred men--one hundred and twenty-five men. Each of you has his own independent mentality, each of you might be using this same device in the full knowledge of what it contains, but one day you would suddenly awaken and say: "No, that can't be right. It just isn't right. It doesn't square with the logic." So you would just run pell-mell right against the chart--not the chart, the mathematics. It is as simple as all that and one of these days I am mindful it is going to go wrong, and then you would be rugged individualists once more, just as the farmer is today, and that is why your controls in the farm problem aren't working and won't ever work, in my opinion. Every farmer and his brother are trying to beat the gun. Sure, they'll promise you the world and a fence around it that they'll cut down on this, that and the other commodity in the way of production for the sake of some little pap, mental manna, but in the back of it all they are rugged individualists, they still have a mind, and that is why I say that even if this thing were in the hands of every one of you, I doubt very much whether any serious impairment would result to the maladjustment curve as a forecast of mass movement and this curve measures the mass psychology as translated into production.

Colonel Miles: Are there any other questions?

Commander Dunham: I would like to preface my remarks by the statement that I appreciate fully the ridiculousness of such requests as that of the press reporter who requested Mr. Einstein to explain his Theory of Relativity in a few words. You haven't disclosed what is in a maladjustment

curve but I suppose we may all hazard a guess. I would say that, probably, due to the importance of the automobile field, that that bears a big place, plays a big part in your curve. Now, in the few classes of statistics which we had here I had a question put to me about the measurement of accidents and the residual factors in the sequel. Suppose, as we did, that within a year or two we had some serious strike in the automobile industry. Can you in a few words tell us how you determine the effect of those strikes in the computation of your curve? How do you allow for a thing like that?

A. Well, I don't allow for it, but you are on sound ground, on very sound ground, when you say the automobile business figures very prominently in this curve. It does. I don't have to allow for the accidentals in this thing. I just skip all that. Its grand, you know, to sit down with a pencil and paper and calculator and figure out all these coefficients and all that sort of thing, and when you get up you are pretty woozy and you draw a line or a number of lines on the chart—you finally find intertwining—you didn't know whether you were coming or going. All that stuff is out the window now. It was all very necessary but I don't have to figure such accidentals as strikes. Yet the automobile industry is a prominent part of this curve. Now I stressed very strongly from the beginning the need for determination of the situation in the consumer goods and capital goods industries. Now I know you have organizations and economists and statisticians who have their own devices, they don't follow a maladjustment curve. If they did I would be pretty—I mean my competitive position would be pretty sorely weakened merely on the name of the device, but they have their devices

and they attempt to measure--some of them even say measure maladjustments. I happen to know of two organizations with very large research staffs that come fairly close. I don't know how they arrive at it but they come fairly close to the contours of this line even as to the directional movement, but they don't time its travel. They come within perhaps three to five months on the timing, on the forecast timing, but they catch for the most part most of these moves. But you are one hundred per cent right when you say, I repeat that, that automobiles are an important item . It is a sort of betwixt-between affair, between capital and consumer--you can argue till the cows come home whether it is capital or consumer goods--but it partakes of both. One need not worry about such a transitory situation in any industry as a strike. As a matter of fact, just let me call your attention to this. Take the movement down in there in 1926. Do you think I knew that Henry Ford was contemplating changing from his Model T to the Model A. No, I had no knowledge of it. Now that type of a shutdown in a major segment of the automobile industry was just as significant, just as important, perhaps more so, as a strike. It gave you this business depression of 1927. Now I didn't know way back in here that had broken out on a basis of the history I had back in 1919. It had broken out on a basis never before seen in the way of a maladjustment. I had no knowledge that the banks over here in March, 1933, every bank in the country was going to be closed. Yet, when it got down in here and I began to see the news that ten banks here were closing and ten banks there and so on and so forth, well, I was perfectly willing and I knew in my computations, if I were going to rely on them at any time I could rely on them then in the face of this decline we would see in business. I was

willing to stick my neck out and say that we would see quite a perceptible monetary crisis. We rely entirely too much as human individuals on the headlines of the newspapers effecting current conditions. But what happens over here does not stem from the things that are happening here--it stems from the things that are happening over here and over here and there. You have got to measure those things, if you can. That is what I am trying to do.

Colonel Miles: Are there any other questions?

Q. A few days ago we had a problem in the class here preparing a graph or chart or curve, and in that we considered seasonal trends and seasonal variations. We had a lecture a few days ago, a very good talk, from a gentleman who talked about hobbies. He thought everyone should have a hobby. Well, I have had a hobby for the past couple of years of aquariums. I have some fish aquariums.

Mr. Schnitman: Pardon me, may I intrude just long enough to say I am glad you didn't say you have a hobby of collecting statistical methods for the best way of smoothing curves for seasonal variations.

Q. The reason I brought this question we had of submitting a chart--I had a dream that I had changed my hobby from tropical fish collection to making graphs and charts and curves and I saw all over my walls, charts of all kinds. Everything you could think of was charted and graphed. I wanted to tell you I don't feel, after listening to your lecture this morning, that I should change my present hobby to rating statistical information or putting it down in a table. I would like to find out how I could obtain this information you have here, not your secret of preparing it, but the information you publish after you have figured it out.

A. Well, I want to be sure I get the second part of it. You want--

Q. I'd like to get this information. For instance, when you chart this do you publish your information in any way?

A. You mean my findings? No, I make that available only to the few clients that I serve.

Q. I still don't think I'll take the hobby.

A. I'm sorry I intruded and took the wind out of your sails, and then after you proceeded a little bit longer I thought you were going to ask me to take the role of Joseph and interpret your dream, but, in all seriousness, speaking about seasonal variations, I am really very glad that question came up. A few years ago when I was in the Government Service, a survey of current business was made. I was a member of a committee that had the dignified title of "The Interdepartmental Committee on Statistical Methods". That was the forerunner of what we now call the Central Statistical Board. I had attended, as a member of this group, a few meetings, and the question came up as to what to do about this thing we call "seasonal variation" in business statistics. Well, the representatives of the Federal Reserve Board, who were then working on the Federal Reserve Board of Industrial Production and retail trade and so on, talked about the Warren-Pearson method, and the experts from the Department of Labor talked about their method, and the experts from the Interstate Commerce Commission talked about that method, and so on and so forth, and I rather shied away from the conversation and decided that I was going to investigate and see if there was anything in it. We had been doing some work on it in our own work, so I one day had a dream. I was sitting back in my chair and in my dream I said:

"There must be something to this. Let's see if there is." So I concluded that in the last analysis, we can talk about smoothing statistics, talk about seasonal variations, but in the last analysis what we really mean to eliminate is the element, the seasons. What is more seasonal than the seasons? That is my first question to myself. Well, that sounded like it was logical and I decided I ought to pursue that and see whether there was anything to it. So I hied over to the weather bureau and I got this statistical record of the temperature changes, mean temperature changes, and the rainfall for the city of Washington extending over a period of thirty years, and for the same period for the cities of Seattle, of Atlanta, and several other cities, and I applied all of the conversation that I had heard at that particular meeting as to the best ways of smoothing the statistical curves of the so-called seasonal variations. One element would take ten times the amount of time to compute as the other simpler element, and they were arguing at this particular meeting as to which was the best, most precise way of smoothing the statistics of the seasonal curve. So I took the longest, most tedious method and applied it to these observations on mean changes in the temperature and rainfall in a number of cities, and, of course, you certainly know that within a space of a generation, thirty years, you couldn't really say there was any long term secular growth in that element so you could just dismiss it, so that your seasonal index need not take any account of the secular factor. So I worked out these two series of indexes on the seasonality of precipitation and temperature in these two quite diverse methods and then I had a seasonal index and the seasonal index that I got from either method or from both methods was practically identical. One had taken about ten times the time mathematically to compute. Now what is the purpose of a

seasonal index? As applied to business statistics, it is to give you a tool to eliminate the seasonal factor. Now, that being the case, my reason followed, lets see how this seasonal index works on the thing that is really seasonal--the weather and precipitation, etc. So I took my observations and the seasonal indexes and divided them into the known facts about the precipitation and the weather readings, the temperature, and I got a curve out that was the classiest looking thing you ever saw on God's green earth. Now if there was any element that was seasonal, my logic seemed to dictate to me, it was the weather. It is, and if you smoothed it by seasonal index it was built from its own observation and you should get a straight line. You would get a horizontal mean line. Here these men, these so-called statisticians, and I have a high regard for all of them, had been arguing for hours at this meeting as to what was the best method to smooth the seasonal variations, as though you could get a precise method.

Colonel Miles: Are there any questions from any of our visitors? Any further questions from the faculty? There appear to be none. Well, we are certainly greatly indebted to Mr. Schnitman for this most excellent talk. Mr. Schnitman is one of the men who come to us and get really down to the ground. He doesn't tell us his secrets but he gives us a pretty good idea of what its all about, and in that comparison of these curves, I think we have to say he has something there.

Mr. Schnitman: Thank you very much.