that it is better never to cut the line of communication with him.

R. G. Scott[1]: The development of scientific management in a plant can never be considered a finished task. The so-called installation is but the ground-work for further continuous development. We expect to keep experts in the shops for the maintenance of equipment; likewise we should have competent men for the maintenance and further development of management methods. It would be a great benefit to the latter if there could be, as Mr. O'Connor suggests, a central place for the filing of standards and the detail developments of different firms.

I believe that about a year ago Mr. Lichtner made some such suggestion in a paper presented to this Society.[2] I do not know whether anything has been done as a result of that earlier suggestion. I believe that a central file of approved standards, and of modifications under particular circumstances, as in the experience of Mr. O'Connor, would be valuable.

The accepted standards of Taylor technique are pretty well proved and every modification should thoroughly prove itself before being accepted. There is no better way—but it is a costly way—of convincing executives who don't understand and scoff at prescribed standards of method, than to compel them to go back to and work for a while with the pre-Taylor methods. During the "flood" period of activity during the war, to which Mr. O'Connor refers, in our plant also time and not cost become the prime consideration, and yielding now to this influence and now to that, considerable changes in methods were made. But when I got back to the company after a considerable absence, the first thing with which I was greeted by a superintendent—who had been a foreman—was: "How soon can we get back to our previous methods of doing work?" The changes in method which had come about during the pressure of the "flood," made the Taylor methods, which had been disturbed, look all the better to the operating men!

The "flood" period, when speed and not cost was the dominant factor, may have caused the evolution of some better details of method, and these should be searched out; but I cannot believe that that period accomplished in that respect very much good. Our real problem is not how much we can get out of such periods, but a spreading of the gospel of scientific management to the end that these flood and ebb periods will cease to be, or will be minimized in their influence.

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[2] *Bulletin*, Vol. V., No. 4

Frank B. Gilbreth[1]: The one idea I want to leave is that the crux of the problem is to effect a difficult reconciliation—difficult because we haven't yet learned how. On the one hand, we know that nothing is exactly right in the work of any one of us—Taylor included; on the other hand, the question of changing the Taylor System is a very serious thing. I bet Mr. O'Connor is monkeying with dynamite and may get into serious trouble if he doesn't look out.

We have got to discover by more exact measurements which give more exact standards—the evolution which makes for improvement in detail without change in its principles and methods which are fundamental and permanent. Not all apparent change is really change; for instance, there are many who consider the work of Gantt a deviation from the Taylor philosophy. It isn't at all; Gantt simply stressed certain parts more than Taylor himself did.

The aim of this Society should be to preserve the best there is in the Taylor System, and to consider any change as monkeying with dynamite, and handle it accordingly.

Richard A. Feiss:[2] There was something in Mr. Lewis' discussion which struck me forcibly. It seems to me that if ever there was a time when scientific management and the methods it involves must be maintained, it is in a time of depression like the present.

This ruthless cutting down of overhead by discontinuing the so-called overhead involved in the maintenance of the best methods, is costly in the long run—as costly as would be the cutting down of the maintenance of physicial equipment. It is in these times that industry must preserve everything which makes it more efficient; including the continuation of securing information in the planning department—indirect expense; overhead—which will make it still more efficient.

So I was struck by Mr. Lewis' report that at Tabor they figure that eventually it would cost more to rebuild methods than to keep them intact in these times of depression.

H. K. Hathaway[3]: At the risk of again laying myself open to criticism on the score of being orthodox, dogmatic and reactionary, I wish to add to that of Mr. Gilbreth my plea and warning against what experience has taught me to be an extremely dangerous and often unnecessary and expensive practice; namely, yielding too readily to an immature desire to change from methods and mechanism of proven worth without having fully understood or established their use to the fullest degree. I have made my full share of contribution to what Mr. Taylor characterized as "damned improvements," only to learn that the closer I adhered to the methods and mechanism developed under Taylor's guidance the more might I count upon the results being satisfactory.

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[2] Joseph & Feiss Company, Cleveland.

[3] Consulting Engineer, Philadelphia.



I do not question the fact that the mechanism described by Mr. O'Connor is working—that it may be working better than the mechanism which it superseded and with an apparent saving in cost of operation. I do wonder, however, whether in this case the original plan had been fully applied and perfected in all of the details of its operation, whether some of the savings may not be more apparent than real, whether work lopped off at one point may not have been later added at another in order to compensate for unforeseen loss of control.

For some reason—which may be clear to the student of psychology—sometimes it is difficult to make the original plan operate smoothly and there comes a time when it takes courage, patience and great faith to stick to it until it has been made to work. At this stage the installing engineer is beseiged with all manner of suggested changes and the temptation to follow the course of least resistance is great. Everyone is tired and more or less discouraged. Something different from that with which they have been struggling is a welcome relief. Hence if a change is decided upon, all hands—particularly those who have proposed the change—go at it with a vigor and spirit which makes it an apparent success from the start. If one-half of this vigor and determination had been applied to making the original plan work and to its intelligent development and refinement, it would have been made to work smoothly and more satisfactorily than the substitute.

From the foregoing I do not want it understood that I advocate anything so foolish as attempting to apply for example the mechanism or system, as developed by Taylor or under his direction for a specific general machine shop, to a machine shop engaged on repetitive work, to a totally different type of industry or even to another general machine shop. Each business presents in a greater or lesser degree special problems which must be met. Even in the case of a given business, variations in the mechanism may be required to suit different products or varying quantities in which a given product may be manufactured. Such adaptations are of course necessary.

Changes will inevitably take place as time goes on and as experience and changing conditions call for them. Such changes come about as a matter of evolution and the establishment of ever improving standards.

Mr. O'Connor in his paper pointed out the necessity, to some extent directly and to a greater extent inferentially, for greater supervision of the operation and development system. Mr. Lewis also brought that thought out in his discussion. I don't think the production manager is the one who ought to be responsible in such matters. It ought to be someone who bears less closely a relationship to operation and production; more the relationship of the engineering department or the inspector, or of the maintenance department, or a combination of those three. Maintenance and development of the system and plan of organization should be regarded as a definite and major function preferably to be filled by the company's employee who acted as the consulting engineer's principal assistant during the period of development and installation.

I trust that I may not be violating professional ethics in saying that most companies dispense too soon with the services of the consulting engineer under whose direction their application of scientific management was made—for this the consulting engineer himself is as often to blame as the client. A continuing relationship somewhat akin to that which exists between a corporation and its legal adviser, but requiring more regular contact and more initiative on the engineer's part, is desirable. Under such an arrangement, naturally the man in the plant whose function it would be to look after development and maintenance of system, would be in effect the consulting engineer's representative.

I do not want my discussion to be regarded as a sweeping condemnation of the changes described in Mr. O'Connor's paper, although I do believe that he has in making the change lost certain things fundamentally necessary to perfect control, the value of which may not have been apparent owing to imperfect development and use of the original mechanism and plan, and to a lack of complete understanding of it and its purposes. In fact I feel that there may be some impropriety in my discussing his paper without a better understanding of all of the details of the scheme which he describes, and by comparison showing in detail the relative advantages and disadvantages of each. I wish time permitted be to do so. Likewise I wish to say that I do not want to be construed as disagreeing with Mr. Barth, whose pupil I still consider myself. Essentially I believe I am in accord with him in this matter.

Mr. O'Connor has done in presenting this paper a finer and bigger thing than the mere description of a mechanism; he has helped to bring us back to the prac-