Q. M. 10

INSPECTION ENGINEERING FROM THE VIEWPOINT OF MANAGEMENT

It is one thing for a person to make up his own mind and it is another thing for the same person to convince others that he has made up his mind in the right way. As long as any one of us is a member of society, he cannot be totally free to make judgments influencing others. There are, in other words, certain restraints imposed by the society or group in which we live. These are imposed either by laws or by the mores, customs, and interests of organized society. Hence the science and art of discharging a judicial function depends not only upon the nature of the technical questions involved in the judgment but also upon such restraints of organized society. As an example, we need only recall how the form of organization of a society influences the science and art of court procedure as evidenced by the wide differences between the judicial systems of the major countries of the world today. Now, judgments about quality, like the judgments of legal judges, must be potentially approvable in the long run by others influenced by the judgments. It follows that in order to develop a science and art of inspection engineering, it is necessary not only to consider the function of inspection engineering from the viewpoint of the technical problems of judging but also to take into account the relation of this function to management and, through management, to the organized institutions, legal or otherwise, of the society in which the corporation operates. The object of the present memorandum is to consider briefly the problem of judging quality from this viewpoint.

We may start with two generally accepted facts:
a) Any corporation has certain rights and duties recognized by the legal authority of the state and certain rights and duties fixed by the mores, customs, and interests of society,
b) It is both necessary and to the interest of the corporation that its acts be within the limits set by such restraints.
Broadly speaking, of course, management is responsible for seeing that the acts of those discharging the judicial function in quality control as well as the acts of those exercising all other functions are potentially approvable by the legal authority of the State and by the majority of those in any way affected by the acts of the corporate entity.

Next we may note that the reason for existence of a corporation engaged in the production of manufactured goods is to produce goods that are wanted by potential consumers. In this sense, therefore, the control of the quality of product

in a way to satisfy these wants in an adequate, dependable, and economic manner is the most fundamental job of management. To a large extent the attitude of the public toward a corporation over a long period of time will be determined by the degree of success with which this job is carried out.

Now, as we have seen, the functions of judging quality are to shape or determine the standard of quality; to give adequate assurance that the quality of product going into service meets this standard in the light of specifications, custom, precedent, authority, and natural law; and to adjudicate complaints on the basis of such a standard. If these judicial functions are successfully carried out, the management of the corporation can rest assured that one of its principal duties has been discharged. In this way the inspection engineering department is peculiarly placed in a strategic position between the corporation and the public. Hence the inspection engineering function of judging quality is of great importance from the viewpoint of attaining and keeping the good will of the consuming public.

In this set-up one of the most important points to keep in mind is that in the last analysis the consuming public will decide whether or not it[1] deems that the quality of product supplied is satisfactory, adequate, dependable, and economic.[2] Now, it is one thing to judge whether or not the physical characteristics of a thing fall within previously specified limits but it is quite a different thing to judge whether or not the quality of that thing is that potentially wanted by the consuming public. On the one hand, wants are subject to change without notice, as it were, and on the other hand, it is exceedingly difficult to determine with precision just exactly what is wanted at any time. Hence the problem of the judge of quality is one which demands that he keep forever in the closest possible touch with any information that will help him to determine correctly what is wanted. This is particularly true in his judgment of those very important quality characteristics of a thing which it is not possible to specify exactly and which are for the most part the basis of the sensory reaction of a person to the thing. Here he must do his best to keep his finger, as it were, on the pulse of the consumer in much the same way that it is generally recognized that a legal judge must keep his finger on the psychological and sociological pulse of society in rendering his decisions, particularly in common law cases and in the interpretation of statutes and even constitutions.

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1) That is through the institutions of organized society such as standardizing bodies, consumer organizations, trade associations and the like.

2) This statement would not necessarily be true under certain political organizations of society such as in the case of dictatorships.

In order that we may visualize the place of inspection engineering in a program of quality control, let us consider the schematic chart of Fig. 1.

State	Employees	Stockholders
	MANAGEMENT	
LEGISLATIVE ACT	EXECUTIVE ACT	JUDICIAL ACT
a)research - human wants and natural science b)development c)design	a)manufacturing	a)inspection engineering
SPECIFICATION (Symbolic representation of quality of a thing thought to be wanted)	PIECES OF PRODUCT	ADEQUATE EVIDENCE OF STANDARD QUALITY AND ADJUDICATION OF COMPLAINTS

FIG. 1

From the viewpoint of management, there are the three coordinate acts: legislative, executive, and judicial. In performing the legislative act there must be departments of research responsible for discovering human wants and principles of natural science as well as departments of development and design. The executive or production act carried out by the manufacturing organization may be, and usually is, broken down into several subsidiary steps. The function of judging belongs to inspection engineering. It is to be expected, of course, that in large organizations parts of this job will be delegated to various sub-divisions of the corporate organization in much the same way that the judicial function in law is delegated to a system of courts and not, for obvious reasons, to a single court. On the other hand, it is necessary that within such a system of courts there be a recognized hierarchy with a supreme court at the top. In the case of quality engineering, the jurisdiction of the supreme judicial court covers any question bearing upon the quality of the thing when entering service or involved in the adjudication of complaints.

The next point to be noted is the fundamental difference in the character of the output of the three acts. The first turns out a specification or a symbolic representation of the quality of a thing thought to be wanted, the second, physical things or pieces of product, and the third, evidence of standard quality and adjudication of complaints. We may with profit go one step further in analyzing the product of inspection engineering since, as already pointed out, the standards of quality and the judgments about quality must be potentially approvable by the established institutions of the consuming public. It follows that in the last analysis, the physical product of inspection engineering is certain decisions and a record of the evidence made the basis for the decisions. This evidence, therefore, must not only be such as to provide the necessary assurance to the inspection engineer acting as a judge of quality, but must also be potentially such as to provide adequate assurance to management and to the majority of consumers or those acting for consumers.[1]

Now that we see rather clearly the distinct differences in the outputs of the three coordinate acts in quality control, the next point of interest is to consider the characteristic differences in the requirements in respect to training and education of the personnel needed to carry out the three acts. It is unnecessary here to say much about such differences in so far as they pertain to the legislative and executive

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1) Such as standardizing bodies, consumer groups and the like.

acts because the distinct difference between these two from the viewpoint of requirements in both training and experience is already well established. In fact, such differences are recognized by engineering schools in the training of students. The important thing to note, however, is that the requirements in respect to the judicial function are only within recent years beginning to be appreciated. Let us therefore consider briefly the general nature of some of the requirements placed upon the personnel responsible for carrying out the judicial act in quality control.

Granted that there are certain things which the inspection engineer must know about the theory and art of research, development, and design, as well as that of production, it is obvious that he cannot hope to duplicate the experience of others in these respective fields. In an analogous case, it is desirable for the legal judge to know as much as possible of what is behind legislative and executive acts, but he cannot hope to know as much as is to be known in these fields for all the cases which come before him. However, the judge, whether of quality or of law, must bring to the job of judging a particular qualification not to be found in the one who legislates or the one who executes. His is a problem of knowing how to go about judging any type of problem which may come before him. That is, he must be versed in the theory and established practice of stating the case, securing adequate evidence and lastly, rendering judgment.

We as citizens expect legal judges to keep abreast of the latest developments in the technique of interpreting laws in the form of statutes, custom and precedent. We expect them to keep abreast of the latest developments in the theory of knowledge in so far as this will enable them to give the greatest assurance of obtaining adequate data and rendering just judgments. In other words, we expect them to act in accord with an established science of jurisprudence. Likewise consumer and producer have the right to expect a judge of quality to act in accord with an <u>established quality jurisprudence</u>. Now what does this really mean?

As we have seen, the first step in judging quality is that of shaping the standard in terms of specifications, policy of the management, specification, authority, custom, precedent, and natural law. Now, the aspect of this standard which is of greatest importance from the viewpoint of satisfaction is that of the wantability of a thing. Thus it is that the inspection engineer must develop and apply a theory of value or method of rating the quality of a thing from the viewpoint of its

wantability in accord with the latest discoveries of the psychology of human wants both individual and social, subject, however, to the prevailing mores, customs and laws of organized[1] society. He must also know in what sense the specifications must be considered binding from a legal viewpoint; he must be forever alive to likely changes in the customs or social ends sought by society; he must keep abreast of the latest developments in determining the natural laws governing the variations which must be left to chance; and he must keep an up-to-date and adequate survey of the run of quality of each kind of product and the precedents established by previous acts of judgment. Furthermore, it is necessary for the quality judge to keep in mind that his judgments are of the nature of probable inferences based upon the data which he accumulates. He is therefore expected to be familiar with the accepted theory of probable inference. This means that he must be acquainted with the latest developments in the theory of induction and the theory of statistics. Out of such elements, the inspection engineer must develop and apply the science and art of rendering quality judgments.

To summarize what has been said about the place of inspection engineering in a program of quality control, we may say that inspection engineering is responsible to management and through management to society at large for rendering certain quality judgments of key importance from the viewpoint of the relation of the corporation to the public. This function is on a coordinate plane with those of specification and production. Not only are these three coordinate functions different but the products derived from carrying out the functions are fundamentally different in kind - in the one case, specifications; in the second, things; and in the third, judicial decisions.

It is perhaps most important to note that the training and experience required to carry out the specialized function of inspection engineering is fundamentally different from that in the other two coordinate fields. In much the same way that legal decisions should be based upon an established science of jurisprudence, the acts of inspection engineering should be founded upon an established science and art of judging quality - quality jurisprudence - acceptable to the established institutions of society. In fact, certain aspects of quality jurisprudence must be in keeping with established legal jurisprudence particularly in so far as the latter covers contractual relations and responsibility implied in the use of specifications as a part of contracts.

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1) One of the types of organization of particular importance is that of the local, state, national and international standardizing [illegible] in the field of industry and government.