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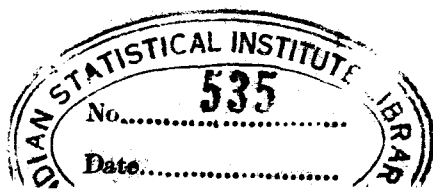
W. A. SHEWHART'S COLLECTION

Some Professional Problems  
of the  
Industrial Statistician

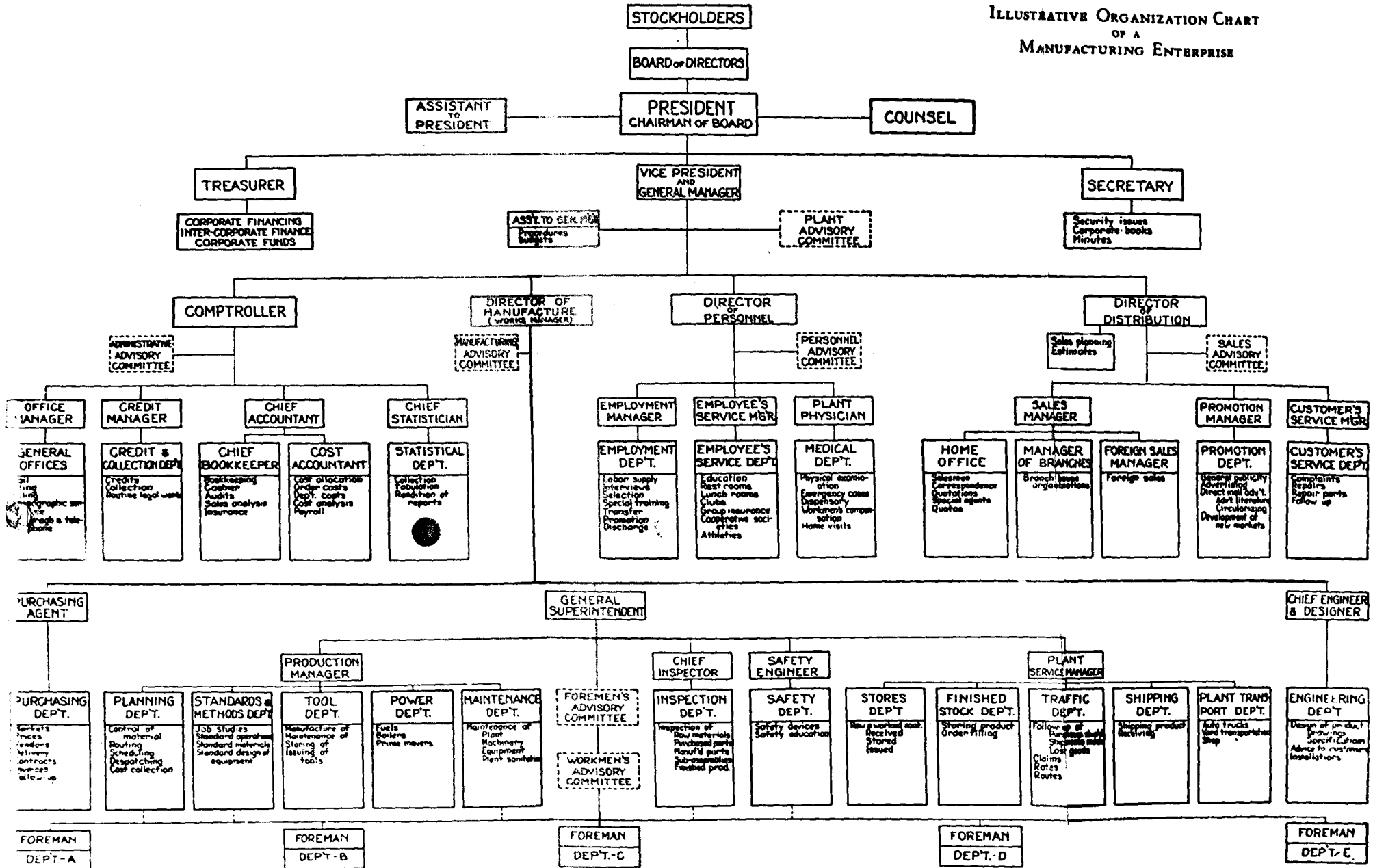
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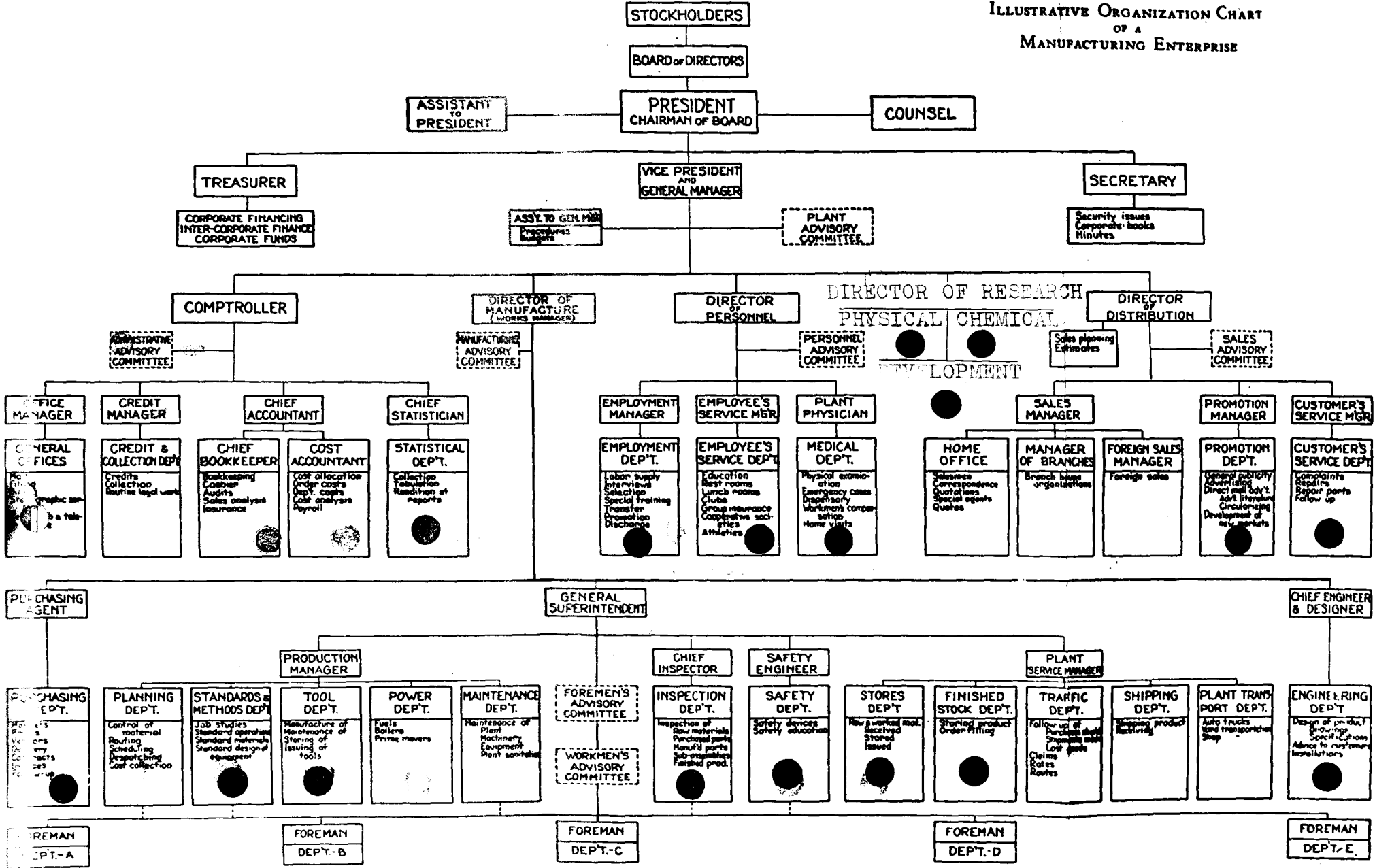
To be presented at luncheon meeting of  
the Institute of Mathematical Statistics  
and the American Statistical Association,  
Washington, May 6, 1944.



ILLUSTRATIVE ORGANIZATION CHART  
OF A  
MANUFACTURING ENTERPRISE



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## What does the industrial statistician need to know?

1. Mathematical statistics.
2. Contributions to subject matter fields - subject matter information that could only be gotten by the statistician in the first place and that requires the help of the statistician in making the best use thereof.

### Science

#### Natural

Physics  
Chemistry  
Biology  
Psychology  
Meteorology  
Medicine  
Astronomy  
etc.

#### Social

Sociology  
Economics  
Law  
etc.

### Applied Industrial

Electrical Engineering  
Mechanical       "  
Civil               "  
Metallurgical   "  
Communications  "  
Management     "  
Time Studies  
Marketing Research  
Agriculture  
Industrial Chemistry  
Production Control  
Standardization  
etc.

Agriculture  
Mines  
etc.



Raw Materials



Research  
Design  
Development  
Production  
Inspection



Distribution

### Definition of Management

"Management is the art and science of preparing, organizing, and directing human effort applied to control the forces and to utilize the materials of nature for the benefit of man "

1944

Who are you?

What do you do for a living?

etc.

Statistician like the engi-  
neer at the Pearly Gates.

This type of man does not in general  
read

The Annals of Mathematical Statistics  
P. Chomskaya

# What does the Statistician do for a Living?

## 1. R. A. Fisher

Statistics: a) Study of populations.  
b) Study of variation.  
c) Study of methods of  
reduction of data.

## 2. Yule and Kendall

Statistical Methods: Methods specially  
adapted to elucidation  
of quantitative data  
affected by multiplicity of  
causes.

## 3. Royal Statistical Society

Descriptive Statistics: Collection, sum-  
marization, and  
interpretation of data without  
reference to questions of  
sampling.

Mathematical Statistics: Specialized  
theory for test-  
ing significance of sampling  
enquiries.

Statistician one who forges tools for the  
other fellow to use.

Story of Pat and Mike.

What Recognition have you Attained  
among your Fellowmen?

(after 100 years)

1. Statistics not recognized as a profession by fellow scientists:

National Academy  
American Men of Science (no \*)

2. Industry.

Statistician is simply a data gatherer who may graduate into something higher.

3. National Roster.

The Profession of Mathematics - Under  
title  
of "Applied Mathematics" we read:

"Applied mathematics includes its applications in the fields of ballistics, cryptanalysis, harmonic analysis, and in probability and mathematical statistics. The latter specialty involves gathering of data by sampling methods, evaluating such information, and preparing it for the guidance and use of technicians in related fields".



## American Statistical Association

1839 - The objects of the Association shall be to collect, preserve, and diffuse statistical information in the different departments of human knowledge. To this end it is part of the purpose of this Association to conduct meetings and publish scientific papers, to promote the improvement of statistical data and technique, to foster contacts among persons seriously concerned with statistical information, problems, and methods, with a view to stimulating research and elevating the standards of statistical work, and to encourage the application of statistical science to practical affairs.

## Institute of Mathematical Statistics

1935 - To promote the interests of mathematical statistics.

## Econometric Society

1930 - The Econometric Society is an international society for the advancement of economic theory in its relation to statistics and mathematics. Its main object shall be to promote studies that aim at a unification of the theoretical-quantitative and the empirical-quantitative approach to economic problems and that are penetrated by constructive and rigorous thinking similar to that which has come to dominate in the natural sciences. Any activity which promises ultimately to further such unification of theoretical and factual studies in economics shall be within the sphere of interest of the Society.

## Psychometric Society

1935 - The primary objective of the Psychometric Society is to promote the development of psychology as a quantitative rational science. This concept of quantification involves more than fitting of empirical curves to experimental data. It involves the formulation of hypotheses in mathematical form, their development into a consistent quantitative psychological theory, and quantitative tests of the agreement between theory and the experimental data.

## Society of Industrial Quality Statisticians

1941 - To promote the industrial application of methods of mathematical statistics.

What do industrial statisticians  
need to do?

1. Cooperate.
2. Know statisticians in all subject matter fields.
3. Have a subject matter journal for material of common interest to all industrial statisticians with an editorial board made up of mathematical statisticians and authorities in separate subject matter fields.
4. Cooperate with scientists and applied scientists through their recognized societies.
5. Get recognition as scientists both pure and applied.
  - 5.1 Starring in American Men of Science
  - 5.2 National Academy of Science, etc.
6. Statistical Scientist in special subject matter field > Scientist in special subject matter field: hence build up

Statistical physics,  
Statistical chemistry,  
Statistical engineering,  
Statistical biology, etc.

## What Others Have Done?

### 1. The Chemists.

#### 1.1 Strong organization

"The objects of the American Chemical Society shall be to encourage in the broadest and most liberal manner the advancement of chemistry in all its branches; the promotion of research in chemical science and industry; the improvement of the qualifications and usefulness of chemists through high standards of professional ethics, education, and attainments; the increase and diffusion of chemical knowledge; and by its meetings, professional contacts, reports, papers, discussions, and publications, to promote scientific interests and inquiry, thereby fostering public welfare and education, aiding the development of our country's industries, and adding to the material prosperity and happiness of our people.

#### 1.2 Chemical (scientist).

### 2. The Physicists.

#### 2.1 "Split-up" disease.

"A growing tendency for physics to "split up". The Optical Society had been founded in 1916, the Acoustical Society in 1929. The Society of Rheology, partly

concerned with physics, was founded in 1929. The American Association of Physics Teachers was in process of formation. In related fields were such organizations as the American Meteorological Society, the Institute of Radio Engineers, and special divisions of other engineering societies. Groups interested in other special fields of physics were seriously considering the establishment of still more societies.

No responsible person could contemplate these trends without grave concern. Must the results of research be inadequately reported or be suppressed through lack of funds? Must there be an increasing number of overlapping but unconnected societies for physicists to pay dues to? Would all of the profitable applications of physics appear under some other name, rendering no recognition and no financial support back to the parent science? Did these many groups have no common interests and objectives which they could attain better together than separately?

## .2 The cure: American Institute of Physics.

"The purpose of this corporation shall be the advancement of and diffusion of knowledge of the science of physics and its applications to human welfare, and to this end it is part of the purpose of this corporation to undertake, among other measures, the publication of scientific journals devoted wholly or mainly to physics and/or related sciences; to serve the public by making available to journals, newspapers, and other channels of public information reliable communications as to physics and its progress; to cooperate with local, national and international organizations devoted to physics; to promote unity and

effectiveness of effort among all those who are devoting themselves to physics by research, by application of its principles, by teaching or by study; and to foster the relations of the science of physics to other sciences and to the arts and industries.

3. Other professional groups.

Engineers.

Psychologists.

What we can do

Two possibilities are:

1. Stimulate the Association to fulfil its function as set forth in its constitution and draw all groups together much as the Chemical Society did.
2. Found a membership corporation patterned after the Institute of Physics.

