News Letter Committee—JAMES J. DUGGAN (*Chairman*), Carbide & Carbon Chemicals Corp., South Charleston, W. Va.
R. S. MACKIE, Incandescent Lamp Dept., General Electric Co., Cleveland, Ohio.
J. H. TAYLOR, Procter & Gamble Co., Cincinnati, Ohio.

Engineering Committee—D. S. MCEACHERN (*Chairman*), American Cyanamid Co., New York, N. Y.
HAROLD W. BAKER, Eastman Kodak Co., Rochester, N. Y.
F. W. JURICK, Westvaco Chlorine Products Corp., Carteret, N. J.
*S. E. WHITING, Liberty Mutual Insurance Co., Boston, Mass.

Data Sheet Committee—S. M. MCCUTCHEON (*Chairman*), The Dow Chemical Co., Midland, Mich.
*RALPH O. KEEFER, Aluminum Co. of America, Pittsburgh, Pa.

Health Committee—DR. LEONARD GREENBURG (*Chairman*), N. Y. State Department of Labor, New York, N. Y.
*JOHN S. SHAW, Hercules Powder Co., Wilmington, Del.

Membership Committee—C. E. SEVRENS (*Chairman*), Monsanto Chemical Co., Boston, Mass.
W. L. HAMMERSLEY, Electric Storage Battery Co., Philadelphia, Pa.

Poster Committee—H. R. BIXLER (*Chairman*), Union Carbide & Carbon Corp., New York, N. Y.
JOHN CLEMENTS, Michigan Alkali Co., Wyandotte, Mich.
*RALPH L. ROGERS, JR., Tennessee Eastman Corp., Kingsport, Tenn.

Publicity Committee—S. D. KIRKPATRICK (*Chairman*), Chemical & Metallurgical Engineering, New York, N. Y.
*A. L. WATSON, Koppers Co., Pittsburgh, Pa.
CLARENCE WIGLE, Niagara Alkali Co., Niagara Falls, N. Y.

Safety Instruction Card Committee—E. F. KING (*Chairman*), Lever Brothers Co., Cambridge, Mass.
*JOHN ROACH, Deputy Commissioner of Labor, Trenton, N. J.
K. E. ROOF, Willard Storage Battery Co., Cleveland, Ohio.

Statistics & Contest Committee—R. C. STRATTON (*Chairman*), The Travelers Insurance Co., Hartford, Conn.
*H. L. MINER, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

*Past General Chairman

TUESDAY LUNCHEON SESSION

October 8, 1940

The opening session was a special luncheon meeting, attended by a large number of delegates. General Chairman Ralph O. Keefer, Purchasing Agent, Aluminum Company of America, Pittsburgh, Pa., presided.

Following the luncheon, the Chairman welcomed the delegates and guests, spoke briefly of the Section's activities during the past year, and then introduced the speaker of the occasion, Mr. O. S. True, whose address is given below.

The Use of Rubber and Rubber Compounds in the Chemical Industry

By O. S. TRUE

United States Rubber Company, New York, N. Y.

Strictly speaking, rubber as such would be of little value to the chemical industry. It owes its valuable properties to an ability to combine chemically with certain substances such as sulphur, and to its ability to incorporate with and to hold in uniform

dispersion certain reinforcing materials such as carbon black. Also the quality and durability of modern compounds has been much improved by the addition of small quantities of accelerators and anti-oxidants, for the most part complex organic materials which improve the uniformity of the cure and increase the resistance to natural aging.

Rubber can be compounded so as to provide substantial resistance to corrosion and abrasion, as well as high dielectric, low co-efficient of heat transfer, and marked ability to absorb vibration and shock. These properties make rubber of value to the chemical industry.

With regard to corrosion, an ever-present problem in the chemical industry, rubber can be compounded to satisfactorily resist the following:

1. Most inorganic acids—including hydrochloric, phosphoric, dilute sulphuric, etc.
2. Most organic acids—such as acetic, formic, tartaric, etc.
3. Inorganic basis—caustic soda, etc.
4. Inorganic salts—chlorides, sulfates, etc.
5. Organic salts—acetates, tartrates, etc.
6. Bleach solutions—hypochlorites, chlorine solutions.

No one compound is satisfactory for use in connection with all of the above classifications but a suitable compound can be obtained for each individual requirement.

Rubber is not suitable for use with the following:

1. Strong oxidizing agents—such as nitric and chromic acids.
2. Aromatic hydrocarbons—such as benzol and toluol.
3. Aliphatic hydrocarbons—petroleum and its derivatives.

Rubber has one further limitation which should be borne in mind: namely, temperature. While compounders have improved the temperature resistance of rubber, 180 to 200 degrees F. must still be considered the practical maximum for industrial rubber goods, if long life is to be obtained.

For present purposes, some generalization may be made. There is the type abrasion caused by a material sliding over a surface, a shearing action, and there is the type caused by impinging of a material against a surface, abrasion due to impact. Between the two extreme types is an infinite number of combinations. Different rubber compounds are necessary for different types of abrasion, but unless the impact is so severe as to cut the rubber to pieces, the proper compound has a very high degree of resistance to abrasion. Without qualitative tests it is not possible to say just how much more resistant rubber is than some other material, but such tests can be made if necessary. When corrosion and abrasion are both present, rubber is an ideal material although if the corrosive action is so severe as to make necessary a compound designed primarily to resist corrosion, it might be necessary to sacrifice some abrasion resistance.

With regard to dielectric for potentials up to 10,000 volts, rubber is generally considered the best available commercial insulation. Furthermore, rubber can be compounded to provide low water absorption, thus maintaining its high insulating factor, a characteristic not enjoyed by most other insulating materials. Rubber insulation finds its most common use with electric wires and cables, although it has also wide application in connection with electro chemical processes where resistance to corrosion and to stray current losses are both important.

The ability of rubber to absorb vibration and shock is due to a high degree of resilience. If displaced under load it immediately returns to its original position when the load is removed. The movement is accomplished with a minimum of internal friction. This characteristic enables engineers to design rubber springs and vibration dampeners, a recent application of rubber that is proving very beneficial in many of the process industries.

Rubber may be considered a good thermal insulator with coefficient of heat transfer corresponding approximately to that of asbestos. This permits transfer of solutions through rubber lined pipe with small loss of heat content, and evaporation in rubber lined vacuum crystallizers without excessive radiation. On the other hand, low heat transfer precludes the possibility of temperature control by indirect heating in rubber lined jacketed kettles or similar equipment, it being necessary to maintain temperature by heating coils or direct injection of steam.

Rubber compounds vary in tensile strength from 2,000 to 10,000 lbs. per sq. inch, in elongation or stretch from 800 per cent to