of the toluene process, which under tests at the flying fields enabled the training plane to climb about 5 per cent faster with an economy in fuel consumption of about 8 per cent. This fuel consisted essentially of 60 per cent unsaturated hydrocarbons, 30 per cent benzene, and 10 per cent paraffin hydrocarbons. Refined by a special process, he found by service tests that it was possible to eliminate gumming and corrosion.

In more recent years our medalist has made an extensive study of the petroleum oils used in the gas industry, with special attention to the development of methods for their identification. These researches, which are still in progress, involve the preparation of a large number of hydrocarbons from different series and then the determination of their physical constants, among which are a number of unusual ones, such as magnetic rotation, electrostatic double refraction, and absorption spectra, particularly in the ultraviolet.

An examination of the many articles from Mr. Fulweiler's pen, and published in various journals, indicates still further the great diversity of his researches and developments. A paper on "Physical Theory of Coal Carbonization" as early as 1908 was awarded the Beale Medal by the American Gas Institute. This was followed by "Theory of Flame and Mantle Illuminosity," "Physical Characteristics of Ferric Oxide," "Purification of Water for Gas-Making Purposes," "A Source of Light, Giving a Continuous Spectrum in the Ultraviolet," "The Development of Modern Road Surfaces," "Destructive Action of Motor Traffic on Road Surfaces," and "Refractory Problems in the Gas Industry."

The subjects of wood preserving and of refractories, both vital to the economic success of a gas plant, have received very careful study, as have also the many intricate problems involved in gas purification. In this field researches have been conducted to determine the nature of the sulfur compounds in illuminating gas, and also the chemical reactions involved in the purification by iron oxide and its subsequent revivification.

These and other papers in addition to the one for which this medal is awarded, demonstrate conclusively that the industry which had its inception over a century and a quarter ago in a relatively crude way, now maintains its important position as a result of systematic scientific research and control. Notwithstanding the volumes that have already been written describing the work of the scientists in this and earlier generations, our medalist has found new fields to investigate and with results that have materially advanced the industry in which he has chosen to labor.

We are glad to find a man who will freely impart of the information obtained through his researches and experience and is willing to publish papers which, as our donors suggest, "offer useful suggestions" to his colleagues.

On behalf of the American Section of the Society of Chemical Industry, I am honored in presenting to you—Mr. Fulweiler—this beautiful medal, not so much as an incentive to spur you on to other and increasing activities, for you do not seem to require such a stimulus, but as a token of appreciation from your many friends in the chemical profession. May you ever see in it an expression of our good will and may it bring you much happiness throughout a long and useful life.

Acceptance

By W. H. Fulweiler

In accepting this beautiful Grasselli medal, I find it difficult properly to express my appreciation of the many complimentary remarks you have made about my work. I am going to refrain from saying the usual things about my unworthiness, as I feel that this would be a reflection of the committee's judgment, and I wish to assure you that I am not unmindful of the honor that has been bestowed on me.

Thirty years ago the gas industry was doomed to early oblivion by the glowing possibilities of electricity. In spite of the tremendous strides of the electrical industry as a competitor, the gas industry to-day employs five times as many men as it did in 1890, its products have ten times their value and the money invested would to-day approximate $4,000,000,000, which is nearly twenty times that invested in the industry in 1890. If the recent predictions of a prominent statistician regarding the early demise of the industry prove to be as correct as the predictions of 1890, we, in the industry, will have little to worry us.

It is true that the gas industry has lost a considerable portion of its lighting business. This has probably been fortunate, rather than unfortunate, as it has undoubtedly been a strong factor in eliminating the candle-power standards which prevented real progress of the industry for so many years.

The future of our industry, as I see it, is to be the delivery of heat energy in the most convenient, efficient, and economical form. A modern carbureted water-gas plant will deliver in the form of salable gas nearly 70 per cent of the heat energy put into the process.

To-day, a great deal of attention is being given to what is called the complete gasification of coal, as by this means we hope to transform even a greater percentage of heat energy in the fuel into gas. The processes that have been evolved to date yield a gas of much lower heating value from that which we are accustomed, being in the neighborhood of 340 B. t. u. per cu. ft., but it may well be that the heating value of the future will approximate this figure.

Technically, the gas industry is in the position of utilizing in everyday practice some of the most complicated chemical and physical reactions with very vague ideas of the mechanism involved, so that there is a large field for research work in determining the "why" of many of our commercial processes. A good start has been made, but there is a tremendous amount of work yet to be done.

I wish to take this opportunity to express my thanks to the Grasselli Chemical Company for its generosity in providing this medal, to the Committee for their consideration in awarding it to me, and to Dr. Miner for the many nice things he has said in presenting the medal to me.

Duplication of Bibliographic Lists and References

One of the first things a research chemist or chemical engineer does in preparation for work on a new problem is to establish the prior art on the subject. This is so essential that hundreds or even thousands of dollars' worth of time may be spent on the search for pertinent literature in various publications. Often distant libraries have to be visited or books borrowed from them. Not infrequently it is subsequently discovered that a complete bibliography on the subject, which would have saved at least half of the time of the searcher, exists. Quite commonly several individuals or industrial concerns simultaneously prepare reference lists or abstracts on the same subject. One notable instance of this sort of wasteful duplication is the compilation of a complete bibliography on the Grignard reaction by Dr. Henry Gilman in Iowa and Dr. C. J. West in Massachusetts working in ignorance of one another's interest.

Bibliographies on scientific and technological subjects are constantly being prepared. Some are published. Some remain in manuscript. It is to the advantage of all investigators to be able to locate such reference lists when they need them. The Research Information Service of the National Research Council, Washington, has established a bibliographic section which aims to serve as a clearing house for information about the sources and availability of both published and unpublished lists of references. The catalog of bibliographies already contains thousands of cards. You are urgently invited to avail yourself of this new aid to research and to further its development by reporting bibliographies of your own which you would be willing to have duplicated or to loan under suitable conditions.