

OUR RESEARCH LABORATORIES

The Research Laboratories of National Lead Company were started in 1892, and since then have presented an interesting story of continued progress and development exemplifying the benefits that accrue from the cooperative efforts of management and research.

The first Laboratory was located in Adams Street, Brooklyn, and was under the direction of Dr. G. W. Thompson who, with only one assistant, undertook to handle all of the chemical problems arising in the various plants of the newly formed National Lead Company. At that time the principal functions of the Laboratory were to maintain the high quality of the Company's products through regular analyses of samples of the plants' output, and develop new products. Improvements in various manufacturing processes naturally resulted.

The original Laboratory was soon found to be inadequate and in 1899 a four story building at 129 York Street was purchased and converted to accommodate the growing staff. Within a very few years an addition was erected where metallurgical investigations were conducted. Practical tests were made on pigments, drying oils and paints in this same building.

LABORATORY BUILT

By 1925 the Laboratory staff numbered about fifty and the scope of investigations had increased to such extent that it was necessary to build another, even larger Laboratory. The present five story building at the corner of York and Jay Streets, Brooklyn, was erected at that time.

In all its history there have been only a few changes in the directorship of the Research Laboratories. Dr. Thompson, after his retirement in 1938, was succeeded by R. L. Hallett and a few years later when Mr. Hallett was appointed Chief Chemist of National Lead Company, Alex Stewart became Director of Research.

LABORATORIES DEPARTMENTALIZED

The organization of the Laboratories has been changed from time to time to meet changing demands. Special departments have been established to handle the various phases of the work. Each is under the guidance of a well-trained, experienced individual who is responsible for all of the activities of his department and who reports directly to the Director of Research.

ANALYTICAL: The General Analytical Department conducts periodical examinations of National Lead Company's various products, analyzes materials submitted by other departments in connection with research and service work and handles all analysis work submitted by our various branches.

RESEARCH AND SERVICE: The Paint and Pigment Research and Service Department comprises four divisions—Sales Service, General Paint Research and Service, Sayville Experimental and Test Division (atmospheric and marine exposures) and Metal Paint Research and Service.

METALLURGICAL: Metal problems including metal refining, improvement of metal products and processes, and general physical metallurgy are handled by the Metallurgical Department. This department is located in the new laboratory building and also operates a pilot plant at 129 York Street.

STORAGE BATTERY: The Storage Battery Department has been constantly increasing the scope of its activities. The lead acid storage battery is highly important in these days of automotive transportation and the number of problems handled by this group is increasing constantly.

ORGANIC VEHICLE: Problems concerning organic products are handled by the Organic Vehicle

Research Department. It is the duty of this group to develop new vehicles, improve present vehicles and the processes for making them and, in general, to investigate all problems involving organic chemistry. The rubber laboratory, for example, is part of this department. Investigation of organic by-products is an important part of the work.

MICROSCOPIC AND PHOTOGRAPHIC: Physical testing, microscopy, spectroscopy and photography are all handled under the direction of the Microscopic and Photographic Department. Problems concerning physical examination of paint materials and metal products are handled by this group.

NEW PRODUCT: In every research laboratory, there is one department which devotes its attention to pure scientific research. All departments are naturally on the alert for possible new products and processes but the actual research work involved is handled under the direction of the New Product Research and Development Department.

CORROSION: The function of the Corrosion Department is to study the various theories of corrosion, investigate corrosion testing methods, develop and investigate corrosion inhibitive systems. In general, it is the duty of this department to study corrosion from the broadest possible viewpoint.

ADMINISTRATIVE: The Administrative Department comprises the executive, purchasing, accounting and library divisions. The functions of the first two are self-evident. The library division in addition to its obvious activities, such as preparation of literature surveys, compilation of market data and reviewing of current technical publications, also assists in the preparation of patent applications.

MAINTENANCE: The Maintenance Department is responsible for the upkeep of the buildings and the general equipment. This is important, because the best efforts of the staff can be exerted only under proper working conditions.

All departments cooperate so that every detail of each problem is given adequate attention by competent individuals. Regular meetings of the department heads, with special meetings of certain groups as the need arises, are of considerable assistance in maintaining the necessary cooperation.

Other Laboratory Activities

The Laboratory activities are not confined to the Brooklyn building. Members of the staff regularly visit our various manufacturing branches in connection with their investigations. They also cooperate with various institutions where investigations are being conducted under industrial fellowships.

The Sayville Experimental Station, which was started in 1916, and our Fresh Water Test Basin at New Kensington, Pa., started in 1941, are really parts of the Laboratories. Our regular paint products and also new pigments and vehicles are subjected to exterior tests at these stations. Products are not released for the general market until they have been given suitable tests and have demonstrated their value fully in practical exterior exposure programs.

Achievements

The achievements of the Research Laboratories are reflected by the many diversified products which the company manufactures for home and industry. The Research Laboratories have contributed greatly to the development, manufacture and sales of these products and have been an important factor in establishing the Dutch Boy as the symbol of quality.

The plastic industry makes extensive use of lead as molds. These are made by several processes, including die-casting and dipping steel patterns into molten lead, the lead solidifying on the steel. Molds are used once and remelted.

Pulverized metallic lead is added to grease for heavy duty machinery. It provides lubrication at heavy loads and prevents the grease from being thrown off open gears at high rates of revolution.

Probably one of the least known uses of lead is in the manufacture of the highest grade glassware, lenses and in glazing pottery.

Lead Goes To War

All of the foregoing are wartime as well as peacetime uses, but here are a few that are of a little more direct value in a war. Bullet cores make use of lead's density and ease of fabrication. Lead provides the necessary ballistic characteristics, stability in flight, to small arms ammunition, that is, up to .50 calibre. It is used in ammunition for rifles, carbines, pistols, machine guns, sub-machine guns and other small arms. The lead is first extruded as rod, cut into short lengths, swaged to the approximate shape of the bullet core and then pressed into the jacket. Pure lead and antimonial lead containing up to 2½% antimony are employed.

Lead enters into ammunition in many other ways. Lead azide, a chemical compound of lead and nitrogen, is used as a detonator in explosives. Antimonial lead die-castings form the bodies of practice bombs, and frangible bullets made of lead powder and thermosetting plastics are used to train bomber gunners in actual firing at attacking planes. Lead gaskets are used in certain types of shells. Lead counterweights are employed in torpedo mechanisms.

Lead, for its weight alone, finds many war uses in addition to torpedo mechanisms. It is employed for counter-weights in many kinds of guns, large and small. Submarine and other naval vessels employ it for ballast. It is used to provide perfect balance in airplanes and gliders and in that case is usually applied in the form of strip. Depending upon shape and other conditions counter-weights are generally either cast, or extruded and cut to size.

Lead Used in Most Industries

There are numerous other uses of lead not included in the preceding discussion but, coupled with the fact that there is scarcely an American industry of any importance which does not use the metal in one form or another, the evidence is sufficient to give us a feeling of stability and a justifiable pride in an industry of which we of National Lead Company are such an important part.

NATIONAL LEAD COMPANY—ITS ACHIEVEMENTS

So much for the importance of the lead industry and the prominent role we play in it, but let's examine some of the reasons why National Lead Company with its beginnings in pre-Revolutionary times in the East and in Pioneer Days in the Frontier States, has made a record of achievement and courageous planning that few American companies even less venerable can match.

Faced Many Problems

During the first decade after incorporation, much of the management's efforts were devoted to the improvement of the existing properties, to the increase and betterment of production facilities and to the elimination of uneconomical units. This resulted in a reduction of operating costs and was financed entirely out of earnings or with the proceeds of property sold.

Diversified Products

Comparatively soon after the turn of the Twentieth Century, National Lead Company launched a program of expansion and diversification of products. This became a fixed policy of our company and has been brought to its present high state of effectiveness through research in our Laboratories, purchase of patents and through ownership of all or part of the capital stock

of other companies. An examination of the list of products at the back of this Manual will show how widely the policy of diversifying our products has been developed.

It was during the early 1900's that the Company acquired the United Lead Company, manufacturers of metallic lead and lead alloy products, thus broadening this field. In the same period was purchased the entire capital stock of Carter White Lead. This made available a new and quicker white lead process. Also added to the fold were the Magnus Metal Company, the United States Cartridge Company and Heath & Milligan, a concern making mixed paints and varnishes. The latter two companies were sold later.

Entered New Markets

New modern plants were erected in Chicago, Cincinnati, Philadelphia, Pittsburgh and St. Louis to replace eleven outmoded factories in these same cities. The National Lead Company of California was organized to take over manufacturing properties near San Francisco and our West Coast business was launched. Later this was further extended to include Morris P. Kirk & Sons, makers of metallic lead products, and the Bass-Hueter Company, mixed paint and varnish manufacturers. The latter products are now sold under the Dutch Boy trademark.

This policy of adding fields of operation and of experimenting with new products has continued throughout the years. It is a method that has always been conservatively exercised, however, and with minor exceptions the various companies have been so developed that they have added substantial profits to the Company's earnings.

Established Financial Stability

The resulting diversification of products has also aided the management to ride out successfully the various periods of poor business that have affected the United States since National Lead Company was incorporated. For example, in the 1931 Annual report there was a listing of the losses of various departments of the Company over business of the previous year. They ranged as high as 44% yet the average was only 17%, a direct advantage of not having all our "eggs in one basket." The Company's financing has, of course, kept pace with its expansion in holdings. In 1891 the authorized capital stock was \$30,000,000. This was increased in 1905 to \$50,000,000 and in 1927 to \$100,000,000. Reserves have been built up and maintained to protect the interests of the Company and its employees.

The soundness of these policies, backed by conservative but effective merchandising, is best proven by the record of sales and profits, which, except during depression years, have advanced steadily.

New Products in Line with Experience

Among the more important products that have been added to the Company's line since its beginning in 1891 are titanium pigments, paints, special paint oils, special castor oils, traps, bends, valves and fittings, bearings, bearing metals, printers' metals, tellurium lead products, barytes products and brass bearings.

It should be noted that all these products are either made, wholly or in part, from lead or else they can be classified in a marketing sense as belonging to fields already served by some division of our Company. In this way full advantage has always been taken of our management's knowledge of a given market and the financial risks of venturing into the completely unknown have been largely eliminated.

Research an Important Factor

Research is another important activity of the Company that was started about a year after its incorporation and which has also had a great deal to do with product diversification. To research may be credited the development of new products as well as the improvement of existing products in all divisions of our activities. And progress through research is continually going on. Since 1892, when the late Dr. G. W. Thompson became Chief Chemist of the Company and

founded our General Laboratories, several millions have been spent in research to good purpose. Our Laboratories in Brooklyn, which in 1906 had grown to a staff of six employees, now employ over 100, and their work is supplemented throughout the Company by many other plant and division laboratories. Research has ever been a constantly growing force in the Company and an effective hedge against being left behind in the fast-moving procession of the day.

Kept Abreast of Industrial Development

The field now served by National Lead Company is greatly broadened since the Nineties when white lead was the chief product manufactured. From the narrow outlet represented by the limited paint market of that day it has spread to practically every major field including railroad, automobile, agriculture, rubber, glass, chemical, electrical and airplane manufacture. Some of those activities were, of course, unknown in 1891. Others were just in their early stages. So it can be said that the Company has grown with the country. It has kept abreast of the great industrial development during the period of its existence, retaining its important place financially and productively among the leaders of the day.

Stock Ownership Unique

Such is the National Lead Company today. Its owners may well be proud. And who are these owners?

Back in 1891 it could be said that fewer than 130 individuals represented the stock ownership of the original companies. Over the years, this small number has multiplied many times so that today there are upwards of 18,000 owners of National Lead Company.

The interesting fact about this group is not the number. Some concerns have stockholders running into the hundreds of thousands. But of the approximately 12,000 holders of National Lead Company's common stock about 65% are owners of 100 shares or less and the same is true of nearly 90% of the preferred stockholders. Another interesting fact is that approximately 47% of the total stockholders are women who own about one million shares of stock, including the preferred.

There is also a high representation of preferred stock holdings for trusts and estates due, naturally, to the investment rather than the speculative nature of the stock. Another healthy sign is that the employees of the Company, and particularly the rank and file, are well represented in the stockholding body.

Personnel Policies Progressive

The Company's policy toward employees has been one of the most enlightened among industrial concerns. Even back during the Company's beginning, in an era when little attention was paid to this phase of business management, there was a definite policy of fair treatment.

At first this took the form of safeguarding the workers' health. In this the Company was always ahead of statutory requirements. At considerable expense, factories were renovated to incorporate such improvements as showers, well-equipped washrooms, restaurants where good food could be purchased at low prices, rest rooms and separate lockers for the workmen. Other safety factors such as respirators and goggles were furnished and suction equipment for eliminating dust was installed. The Company was among the first in employing plant physicians.

But there is also a feeling for what might be termed the mental well-being of the employee, giving him the peace of mind and sense of security that makes for loyalty, efficiency and clear thinking.

Adopted Retirement Plan

As early as 1912 the Company established a formal pension system for taking care of the employees who had or were beginning to reach the retirement age. This system was continued with various revisions of detail until 1937, when the present Retirement Annuity Plan was started with the approval of the Company's stockholders.