

THE LABORATORY IN 1948

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During 1948, the furore of technical activity that characterized the first two postwar years began to subside. Fewer sales problems were submitted to the laboratory in 1948; fewer research projects were tackled; fewer new raw materials were examined; fewer factory batches were tested; and fewer technical and manufacturing bulletins were issued. Formulating once more began to take on the stability of the prewar period when changes in listed items were infrequent. During 1948, for example, only 105 changes were made in listed U. S. and Canadian formulas; in 1947, 526 changes were made in these same formulas.

The return to normalcy has brought serious technical problems in its wake. Instead of the routine formula changes demanded in the early postwar period, we now have fewer problems but they are more exacting and more involved. The demand for better and better quality is insistent. This explains why an apparently smaller output of laboratory work required the same sized staff in 1948 as in 1947.

RESEARCH AND EQUIPMENT

Research was stressed to a greater extent in 1948 than it has been in many years. The effect of this drive on research with respect to laboratory expense is covered in later pages under the heading "Laboratory Expense".

One direction in which research was accelerated was in resin development. Until last year, our laboratory had only one glass unit for making small batches of experimental synthetic resins. During 1948, our experimental capacity was increased fourfold, by purchases of additional equipment totaling \$1568. Each of these units is provided with an electrically heated mantle, which can be held within close temperature limits, an individual motor driven stirrer, and the usual supplementary condensers and fittings. This additional equipment can be handled by a single operator. All equipment is now enclosed in a hood so that dangerous fumes will not be spilled into the laboratory. Heretofore, our single unit was in the open.

It has been claimed that one new chemical reaches commercial production every day. All new chemicals are being scrutinized for their possible usefulness in resins and protective coatings, but it is obvious that only the most interesting can be fully tested.

During 1948, our research work was concentrated on new fatty acids (especially those derived from foots and tall oil), Epons (reaction products of bis-phenol and epichlorhydrin), and styrene reactions. Styrenated alkyds seem to offer great promise as they are very fast drying--but, like everything else, they have at least one disadvantage, and that is brittleness.

In addition to the new resin equipment described above, the laboratory also acquired a large new oven, a new mobilometer, a wet film thickness gauge and a Bird film applicator.

TRADE SALES DEVELOPMENTS

A large number of architectural items were improved and several new items were developed during 1948. In the following list of 1948 developments, the items marked with an asterisk represent definite technical achievements:

- * Lyt-all Double Duty Primer - Now made on "odorless" formula coupled with all the advantages of prior formulas. Development work cost \$1494.

- * Lyt-all Spectrum Colors - Now offer little tendency to streak when carefully applied. Development work cost \$2115.

Effecto - White now made suitable for either interior or exterior use. Formerly yellowed badly on interior surfaces. Four new colors were developed for the line. In Canada, Effecto formulas were upgraded in quality and are now made similar to U. S. formulas. Total development work on Effecto cost \$1044.

Verdura Trim & Shutter Finish (Canada) - Upgraded in quality; now made similar to U. S. formulas. Development work cost \$120.

- * "61" Actinic Enamel White Gloss - A completely new, "non-yellowing" type enamel made from alkyd resin of our own production (in contrast to the New Vitralite Enamel which is produced from purchased alkyd). Development work cost \$737.

Oil Stains - Five colors revised to give improved package stability. Development work cost \$294.

Machinery Enamel - Changed from slow drying basis to 6 hour drying. Development work cost \$513.

The New Vitralite Enamel Gloss and Eggshell - Gloss formula changed in hope of providing improved package stability. Eggshell reduced in cost and titanium dioxide content without reducing quality. Continuous research work has been underway on both the Gloss and Eggshell and accounted for an expenditure of \$1888 in 1948.

House Paint - U. S. formula for Outside White improved in working qualities. The Canadian formulas for Outside White and Tints was revised to contain a new lead pigment (basic silicate of white lead, popularly described as sand with pigment qualities) at a reduced cost. No research work was required on these changes in 1948 as they were based on prior developments.

Fume Proof White was reformulated with improved durability at lower cost. These developments cost \$213.

* 312 Maroon was changed from an oil paint with undependable drying qualities and poor gloss retention to a vastly superior alkyd composition. Development work cost \$223.

Oil Color Chinese Vermilion - A new molybdate orange oil color with the capacity for producing permanent pink tints. Development work cost \$214.

"61" Brushing Lacquer - Entire line brought up-to-date and made with improved odor and better working qualities. Development work cost \$1099.

Cobaltene - A new cobalt drier for white enamels and alkyd finishes. No new research work required.

No. 25 Zinc Chromate Primer - A new rust and corrosion inhibitive metal primer. No research work required in 1948 as formula was based on a wartime development.

* "61" Spar Varnish - Now made with greatly improved durability. Development work cost \$772.

No. 1 Asphaltum - Now made in suitable quality for both interior and exterior work. No new research work required.

Aluminum Paint - Now combines qualities of old Interior Aluminum Paint and Exterior Aluminum Paint. No new research work required.

In addition to these completed developments, considerable research effort was also put into perfecting the Cellu-Tone formula. So far, \$2025 has been expended on this problem. The development of a better formula looks extremely promising.

The study of floor varnish and floor enamel continues year after year. In 1948, a total of \$2071 was spent in attempting to improve our finishes in this field. Among new raw materials, the Epon resins appear most promising. They produce very hard, fast drying, water resistant finishes.

Much laboratory work is being done on emulsion finishes for the wall coating field. In 1948, effort was concentrated on vinyl and chlorinated rubber emulsions with a total expenditure of \$2254. It is hoped that this work will ultimately yield a wall primer that can be successfully applied over wet plaster, over porous plaster, and over dry wall construction.

Our effort to develop an alkyd base flat wall finish was discontinued after an expenditure of \$772. An alkyd finish in the luster of Lyt-all Flowing Flat had insufficient advantage over Lyt-all Flowing Flat to justify its higher cost.

Research work on transportation finishes amounted to \$1243 during 1948 and covered a wide range of products--primers, undercoatings, enamels, striping enamels, freight car and hopper car paints. During the past year, 115 sales problems in the transportation field were also referred to the laboratory and represented a development cost of \$4518.

The development of experimental house paints for exposure on our test fences at Swormville, N. Y., and at Kansas City requires considerable laboratory time each spring. Last year, \$1971 was spent on this project. In addition to development expense, construction work on the fences averages \$200 per year, paint application costs \$400, and land rent costs another \$50, annually. From \$100-\$200 is usually spent in making factory batches of a few experimental paints for application on test houses, where weathering can be observed under the actual exposure conditions to which a dwelling house is subjected.

From 50 to 100 experimental house paints are prepared and tested each year. Of these, not more than five or six are usually of sufficient interest to warrant a retest or application on a test house. At the present time, 1037 different paint systems (includes industrial and transportation finishes as well as house paints) are under test at one or more of our test fences.

While the house paint testing program represents an annual cost of about \$2700, its value is continually being demonstrated. We were able to adopt an easier working House Paint 300 Outside White in September 1948 for U. S. distribution without undue delay, only because the ground work had been laid by years of prior exposure testing. Our new Canadian formula was likewise based on work done in previous years.

INDUSTRIAL DEVELOPMENTS

In 1948, 750,000 gallons of industrial finishes were made at the Buffalo factory. Of this volume, about 110,000 gallons represented alkyd enamels of the smooth type (i.e. not wrinkle or spatter enamels). About a quarter of the alkyds were white baking enamels and another quarter were black baking enamels.

The gallonage of white baking enamels sold in 1948 was only slightly greater than it was in 1947. In the latter year, shortages of phthalic anhydride were a limiting factor. In 1948, we had sufficient phthalic anhydride, but we lacked titanium dioxide. Now we have no shortages, but there is no indication that sales are going to boom in 1949. It now appears that our prices are high. The price angle is proving to be a new stumbling block in the sale of many other industrial items.

One of our bigger white baking enamel projects in 1948 was the development of a washing machine enamel for General Electric Co. Five samples were submitted at a laboratory cost of \$14.04, but none of the samples has been approved. If we can meet the requirements of this account, a large potential volume awaits us. Galenot Products Co., manufacturers of kitchen cabinets, also represents a large potential outlet, where samples have been submitted but where no approval has yet been obtained. Lennox Metal, manufacturers of metal medicine cabinets, has just approved one of our whites (K1406) and large volume is possible, if our price is right.

In the high bake white field, luster and color improvements are constantly in demand. Every effort is being made to improve our products in these two respects.

Probably our largest lacquer account is the Armstrong Cork Co., which purchased approximately 13,000 gallons of lacquer enamel and thinner in 1948 for use on tile board. Laboratory work for the account amounted to \$730 and resulted in the development of coatings with improved soap resistance. A new undercoating (GX1152) was also developed and presumably will enable us to obtain considerable business other than just lacquer and thinner. About 4000 gallons of undercoating have been sold during the past three months, but the experience has not been an entirely happy one for it led to a justified complaint, the settlement of which will cost us \$1300.

The Westinghouse Electric Corp. was also a large lacquer user in 1948 and purchased 5000 gallons of a gray motor lacquer. This lacquer was developed at a cost of \$174.

The F. N. Burt Co. was our next largest lacquer account and purchased 4050 gallons of four different paper lacquers in 1948. Laboratory work on F. N. Burt Co. problems amounted to \$313 during

the same period. This company is apparently trying to obtain the superior qualities of a lacquer at the price of a spirit label varnish. In order to assist our laboratory in its development work, the F. N. Burt Co. has loaned us an experimental paper coating machine, which is claimed to be worth \$7000.

In the collapsible tube field, 50 new products were developed in 1948 at a laboratory cost of \$2636. Research work amounted to another \$194. We produced 17,000 gallons of tube coatings in the U. S. and 2,000 gallons (U. S.) in Canada (as compared with 26,000 gallons in the U. S. and 1,300 gallons in Canada during 1947). Tube coating developments are probably more expensive than any other type of developmental work. Last year, each gallon of tube coating represented a development cost of 15 cents per gallon. An outstanding vinyl base white tube enamel (99-619) was formulated in 1948, but since it does not "take" conventional printing inks satisfactorily, its salability is definitely limited. Work is being continued in an effort to solve the ink problem. Whether our shrinking sales to the collapsible tube industry warrant the amount of laboratory effort we are putting into this field is a big unanswered question.

In 1948, we produced 114,300 gallons of metal decorating finishes in the U. S. and Canada, of which about half were varnishes and half were enamels. While the total gallonage sold in 1948 increased about 6%, one item--a varnish sold in Canada--showed a 29% increase in sales volume and was largely responsible for the favorable over-all picture.

The biggest single problem in the metal decorating field in 1948 was the development of a "non-scorching" varnish--i.e. one which does not discolor during seam soldering and which can be applied over wet ink without dulling. A varnish with suitable heat resistance was formulated in 1947 but no satisfactory solution has yet been found for the ink problem. Laboratory work has thus far cost \$413.

The large anticipated business in Sleekoat (a combination lubricant and protective coating for automobile springs) failed to materialize in 1948. One customer--Spring Perch Co.--found another source of supply that could undersell us. Spring production was generally hampered by steel shortages. A new faster drying, more resistant Sleekoat (GX090) has been developed but still awaits customer approval. \$373 was spent on laboratory work connected with this problem.

The laboratory spent considerable time on slide fastener (zipper) enamels in 1948. Seventy one new formulas were developed for the Talon Fastener Co. at a cost of \$630. We now supply Talon with 203 different colors. While Talon is our major fastener account, we also sell other fastener producers, one of which--Conmar--required \$330 of development work in 1948.

In 1948, our wrinkle finish volume amounted to 82,169 gallons, or about 10% less than the 1947 volume. Most of the decrease seems to have resulted from the activities of one account--the Royal Typewriter Co. In 1947, this account purchased 25,000 gallons of a black wrinkle finish (GX011). In 1948, it purchased only 13,000 gallons of this finish. During 1948, Royal portable typewriters were converted from a black to a gray wrinkle finish. Because of the titanium dioxide situation, we did not attempt to participate in the gray wrinkle business until December 1948, at which time one of our products (GX7308) was approved. Laboratory work on problems for Royal Typewriter Co. (and its subcontractor, Hawley Products) amounted to \$440 during the past year.

During 1948, a total of 126 new wrinkle formulas were developed at a cost of \$3506. Research work amounted to another \$894. Our wrinkle finishes continue to be held in high esteem by the industrial trade and this fact contributed to our success in obtaining the business of International Business Machine Corp. at their Poughkeepsie plant. Since obtaining this account late in 1948, 4500 gallons of wrinkle finishes (GX087, GX7235, and GX7236) have been sold. Laboratory work incidental to obtaining the account amounted to \$627.

One by-product of wrinkle finish sales is a substantial demand for touch-up lacquer.

Spatter or hammered metal finish is another novelty paint which is suddenly gaining in popularity, and on which \$1338 were spent in laboratory work during 1948. Up until now, we have been handicapped by having no completely satisfactory one-coat spatter, but this problem has finally been solved. The Eastman Kodak Co. is a potentially big outlet for spatter enamel. This company is bringing out a new amateur motion picture camera, on which our gray spatter (GX7263) has been approved. The first order has just been received and amounts to 600 gallons. \$637 was spent on laboratory effort in connection with the cultivation of this account.

The Carborundum Co. entered into production on a new industrial high bake sandpaper in April 1948 and are using adhesives of our manufacture. During the year, this account purchased a total of 41,000 gallons of adhesives. Laboratory work amounted to \$883.

A surprising amount--1600 gallons--of luminous paint was sold to one industrial account, Winchester Arms, in 1948 for use on flash-light cases. Along with the luminous paint, we also sold another 3000 gallons of primer and clear. Development work cost \$209.

Fabric coatings still require a large amount of laboratory work. Some \$2323 was spent in 1948 on problems for two accounts--Haartz Mason, Inc. and Buffalo Weaving and Belting Co. An additional \$865 was spent on several other accounts, and \$441 went into research. This makes a total of over \$3600 for laboratory work.

Among new developments were a grease resistant vinyl coating (99-606) for cotton belts and more durable and colorfast coatings for artificial leather. 2000 gallons of the vinyl coating were sold.

COMPLAINTS

Complaint Record - Buffalo Factory

<u>Year</u>	<u>Total Complaints Received</u>	<u>Per Cent Justified</u>	<u>Complaint Index*</u>
1948	228	38	76
1947	141	38	52
1946	82	43	31
1940	248	22	134
1938	239	28	156

*Number of complaints per million gallons of manufactured goods.

The above table offers further proof of the return to normalcy. During 1948, we received more complaints than we received in any year since 1940. This year, we are being deluged with complaints. In 1948, the number of justified complaints is considerably higher than it was in 1940, although the complaint index is lower--thanks to a high level of production. The continuing high percentage of justified complaints is a disturbing factor. An analysis of the justified complaints reveals that half of them pertained to three factors--gloss, color (or color change), and speckiness (seediness or fineness). The percentage of justified gloss and color complaints was higher in 1948 than in 1947; the percentage of justified speckiness complaints in 1948 dropped to two thirds the 1947 figure.

In 1948, 45% of all complaints resulted from the dissatisfaction of our customers with the appearance of new paint jobs (i.e. gloss, streaking, hiding, leveling, etc), 42% resulted from the working or package condition of our liquid paints, and only 13% resulted from alleged service failures. The danger of service failure is always uppermost in our minds--and possibly is over stressed. The consumer's interest seems to center on the liquid paint and the appearance of the job immediately after its completion.

The distribution of complaints by sales offices together with related data are indicated below:

<u>Originating Sales Division</u>	<u>No. Complaints Referred to Lab. or Subsidiaries</u>	<u>No. Complaint Records Reported by Sales Offices</u>	<u>Cash Settlements (2)</u>
Eastern	51	40	\$340.50
Western	82	41	\$187.50
Central	56	21	\$100.00
Canadian	9	5	None
Industrial	<u>65</u>	<u>0</u>	<u>Not known</u>
	263 (1)	107	\$628.00

(1) This total is higher than the total in the previous table because it includes subsidiary company production as well as Buffalo production.

(2) Based on information in Complaint Records. Nature of settlement is not always stated.

It will be noted that about 40% of our trade sales complaints originate in the Western Division. It seems strange that criticism should be concentrated in this one area. It may be thought that this results from better screening of complaints by other offices. Actually, the ratio of justified complaints to total complaints is about the same in all divisions, so screening is not the answer.

Laboratory complaint investigations cost the company \$2750 during 1948. This is more money than was spent in developing any new trade sales product or in improving any trade sales product during the same period.

PERSONNEL

Labor turnover again decreased, as indicated by the following figures:

	<u>1948</u>	<u>1947</u>	<u>1946</u>	<u>1940</u>
Resigned	9	13	17	2
Transferred to other departments or to subsidiaries		1	1	4
Discharged		1	4	2
Enlisted		<u>1</u>	<u>1</u>	<u>1</u>
Total separations	9	16	23	8
Average number employees	60	58	57	55
Separation rate	15%	28%	40%	15%

The separation rate in 1948 was the lowest since 1940, and is another evidence of returning normalcy. No one has left the employ of the laboratory for the past five months, which is an all-time record.

A third of our technical employees are young women, 60% of whom are married. We have a rather unusual marital situation in that three married couples are now in the employ of the laboratory. These six individuals were employed before they were married and have continued in our employ after their marriage.

LABORATORY EXPENSE

In 1948, the cost of operating the laboratory again established an all-time record. 1948 operations cost \$209,401, or approximately 13% more than they did in 1947. Over 90% of the increase was due to salaries and wages. Expenses, other than salaries and wages, amounted to 16% of the over-all laboratory operating cost in 1948; this percentage is low, based on figures published in laboratory accounting literature.

The money spent on laboratory work was distributed as follows:

<u>Activity</u>	<u>1948</u>	<u>1947</u>	<u>Increase 1948 over 1947</u>
Research	\$ 60,800	\$ 45,500	34%
Special Sales Problems			
(Lab. Requisitions)	60,800	58,900	3%
Manufact. Services	<u>87,800</u>	<u>81,100</u>	<u>8%</u>
Total	\$209,400	\$185,500	13%

From the above figures, it is evident that additional research expenditures accounted for most of the increase in last year's operating cost. About 85% more money was spent on research in 1948 than during the average war year, when personnel limitations seriously handicapped all but the most essential activities. The amount spent on research in 1948 was not disproportionately high, but the amount spent during the war years was extremely low. Money spent on research work can be curbed at any time, but no drastic action seems warranted at this moment. Our accelerated research program is only two years old and insufficient time has elapsed to determine its value or lack of value. Research is most effective when it is consistently supported year after year; research that is "on" today and "off" tomorrow costs a lot in the end and rarely accomplishes what is desired.

The cost of processing special sales problems in 1948 was only slightly greater than it was in 1947 and was about equal to that in 1945. Of the \$60,800 spent on special sales problems last year, our sales divisions contributed \$49,780 (in the form of laboratory charges) or 82% of the actual cost.

The cost of the laboratory in terms of production and sales is shown below:

	<u>Research and Formulating</u>			<u>Manufacturing Services</u>		
	<u>1948</u>	<u>1947</u>	<u>1940</u>	<u>1948</u>	<u>1947</u>	<u>1940</u>
Cost per gallon of Production of Buffalo Plant				2.7¢	2.7¢	*
Cost per gallon of Production of Buffalo and Fort Erie Plants	3.4¢	3.2¢	4.0¢			2.2¢
Cost per Dollar of Sales of Products Made at Buffalo and Fort Erie	1.3¢	1.2¢	1.8¢			

*Prior to June 1, 1947, all Fort Erie production was tested at Buffalo and control costs were not segregated to show exact cost of work for Buffalo Plant only. The Fort Erie Plant now has a control laboratory of its own, but all research and formulating on Canadian products are still performed in the Buffalo laboratory.

It will be noted that research and formulating effort cost more per gallon and more per dollar of sales than they did in 1947, but considerably less than they did in the prewar year of 1940. The cost of manufacturing services per gallon of production have, however, risen steadily since 1940.

Part of the rise in the unit cost of manufacturing services is, of course, due to larger factory volume, which entails more testing personnel at today's inflated wage rates. However, some 3511 hours of laboratory effort were spent in 1948 on purely factory problems and in making small batches for the factory. This time is roughly equivalent to the work of two employees for the entire year. With proper factory liaison personnel to handle some of these matters, high priced laboratory talent could be used more effectively for research and formulating.

SUMMARY OF LABORATORY WORK

	<u>1948</u>	<u>1947</u>
New Products Developed	1,632	1,595
Sales Problems Submitted to Laboratory	1,810	1,855
Sales Problems Reported	1,815	1,915
New Research Problems Assigned	50	75
Research Problems Completed	85	73
New Raw Materials Investigated	342	353
Raw Material Shipments Tested	2,438	2,432
Batches Tested by Buffalo Control Laboratories	16,783	17,132
Batches Tested by Fort Erie Control Laboratory	1,938	867*
Service Calls Made by Technical Employees	146	129
Technical Department Bulletins Issued	56	104
Paint Manufacturing Bulletins Issued	58	80

*Laboratory organized June 1, 1947; therefore figures cover only seven months' operation.

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