TECHNICAL ACTIVITIES

IN 1950

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1950 was a banner production year. Buffalo factory volume was a third greater than it was in 1949. As a result, the laboratory tested more batches, inspected more raw material deliveries, and contributed more time to factory problems than in any previous year on record. This added testing was handled without increased personnel--but research and formulating activities were cut to fit the testing program.

Increased factory volume was attained in spite of raw material shortages that grew steadily worse as the year wore on. Laboratory manpower was called into play to solve or try to solve some of the raw material problems. These activities further curbed normal research and formulating work. As raw materials become more critical, "constructive" research will continue to diminish.

Our technical organization plays an important part in the peace time operations of our company, but it really becomes indispensable during periods of emergency and shortage. Today's technical problems resemble those of late 1941 and early 1942. We are better prepared today than we were a decade ago as we have more personnel and we have the benefit of our World War II experiences to fall back on. Labor turnover is increasing, but laboratory labor problems are less serious than they were ten years ago.

TRADE SALES DEVELOPMENTS

Surfex was our first raw material headache in 1950; it was unobtainable for several months because of a protracted strike in the alkali industry. Numerous listed items--primers, undercoaters, flats and eggshell finishes--had to be changed to permit the use of Surfex substitutes and then changed back again. No difficulties resulted. Titanium dioxide has been and still is an acute problem. A number of formula shifts have been made to utilize lithopone or other more plentiful grades of titanium pigment. Ester gum, phenolic resin, phthalic anhydride, vinyl resin, Selected Oil 500, and cobalt driers have been added to the list of short or restricted raw materials.

In 1950, 209 formula changes were made in listed trade sales items sold in the U. S. More than a quarter of these changes were caused by shortages. In 1949, 59 formula changes were made; none was caused by shortages. 251 formula changes were made in 1942, the majority of which resulted from raw material shortages.

Some of the more important technical developments in the trade sales field were:

The New Vitralite Enamel - $5040 were spent in 1950 in an attempt to improve this enamel. The effect of environment, particularly cooking fumes, on color permanency was intensively studied. Bluing agents were reviewed. The effect of zinc oxide upon after-yellowing and upon package stability was gone into very thoroughly. The possibilities of a safflower oil alkyd were investigated. Safflower alkyds show definite promise and will enable us to lower cost, if and when the oil is freely available.

The New Vitralite Enamel Gloss and Eggshell colors were revised in 1950 to permit use of lower cost P&L resins. Savings of $4700 resulted from this move.

Production of The New Vitralite Enamel (Gloss and Eggshell, White and Colors) reached 153,000 gallons in 1950 and was 144% greater than it was in 1949. White Gloss constitutes about half of our Vitralite enamel production, but the Gloss colors amount to only 9% of this overall figure. In spite of the enormous increase in the production and use of The New Vitralite Enamel in 1950, our production of "61" Enamel (Gloss and Eggshell, White and Colors) remained at a high level and amounted to 73,000 gallons in 1950. 1950 production was only 3% less than it was in 1949. The production of "61" Enamel Eggshell and The New Vitralite Enamel Eggshell were just about equal (70,000 gallons) in 1950.

Effecto - Lower cost and slightly more durable formulas were adopted late in the year. The stability of Effecto Royal Blue and Nantucket Blue were improved. Work entailed an expenditure of $320.

Lyt-all - $4809 were spent on flat wall finishes in 1950. Improved Lyt-all Flowing Flat Colors with better self-coating properties and better washability were adopted. The latest improvements make Lyt-all Flowing Flat one of the outstanding products in its field and our sales substantiate this view. Our industry's trade sales in 1950 were about 16% higher than they were in 1949. The production of trade sales finishes at Buffalo increased 31% during the same period, but production of Lyt-all Flowing Flat (White and Colors) increased 60%. Production of Lyt-all Flowing Flat in 1950 was 109% ahead of 1948 and 440% ahead of 1941. Production of Lyt-all Flowing Flat in 1950 amounted to 321,000 gallons or 13% of our entire trade sales production at Buffalo.

Work was completed on the development of an "odorless" Lyt-all Stippling Eggshell, but this product has not been presented to our management because it cannot be produced under present raw material conditions.

Our production of Lyt-all Stippling Eggshell in 1950 increased about 50% over 1949 production, but 1950 volume was about the same as our 1941 volume.

Solidex - Arcadia Green and Turquoise were improved as a result of the basic work done on Lyt-all Flowing Flat at a cost of only $35. The Solidex formula change enabled us to save $2750 in 1950. No cost saving resulted from the changes in Lyt-all Flowing Flat.

Solidex is the second largest volume trade sales item produced at Buffalo. 228,000 gallons were made in 1950. This was 18% higher than 1949 production.

Vapex Wall Primer - After disastrous field results, the production of Vapex Wall Primer was discontinued in 1950. A vastly improved formula has been adopted but cannot be put into production because of current raw material shortages. $300 was spent on an investigation at Pennsylvania State College to determine the value of Vapex as a vapor barrier. The results were disappointing.

House Paint - A modified house paint tint base utilizing basic silicate of white lead was adopted in June and resulted in an estimated saving of $2500 during the last six months of 1950. Laboratory work on this project amounted to only $14 in 1950 as the basic development work had been performed in previous years.

Nytal 300, a fine particle size extender pigment, has been gradually worked into all paint formulas during the past few years. It replaces magnesium silicate. Since Nytal 300 can be mixed into paint without grinding, our paint manufacturing capacity has been increased greatly. With adequate tank capacity, a production increase of 200% is possible. Only the Waggener Paint Co. has the tankage to take full advantage of Nytal 300.

Considerable work was done in developing house paint formulas containing 14% to 43% less titanium dioxide than the current formula. No action has yet been taken on these formulas. The experimental work cost $323.

House Paint 320 Nut Brown and 323 Chocolate Brown were improved to minimize after tack.

Add-Oil Paste Paint - $270 was expended in developing a lower cost formula with better color, hiding, and leveling.

Cellu-Tone - $441 was spent on Cellu-Tone work. While the current formula is subject to constant criticism, the laboratory has been unable to develop any better formula of the same type. The answer to our Cellu-Tone problem seems to be Cellu-Tone 561 Satin White, an alkyd composition, but raw material shortages prevent its production. Some 2000 gallons of 561 Satin White were produced in 1950 and were used with complete success.

$1750 were spent on latex research. Synthetic rubber latices are the basic raw materials from which Spred Satin and Super Kem-Tone are made. These raw materials make excellent eggshell finishes but are currently unobtainable to us.

Vitralite Transportation Finish - A new brushing line was developed at a cost of $287.

In 1950, the company adopted a new policy with respect to formula labeling, i.e. the use of an imprinted analysis on most listed trade sales items. This action was precipitated by changes in Virginia labeling laws. The dual task of preparing data for formula labeling and of registering our labels in Virginia was assigned to the laboratory. The job required about a month's steady work and cost approximately $1000. Extra stenographic help had to be hired to run off approximately 3300 Formula Analysis Bulletins to record the information. Supplementary work in the Printing Department cost another $1000. While the initial steps in adopting a general formula labeling policy have been painful and costly, future work and expense should be negligible.

INDUSTRIAL SALES DEVELOPMENTS

In 1950, our Buffalo factory produced 894,019 gallons of varnish, enamel, and lacquer for industrial customers. It is difficult to classify this production accurately as it falls into a variety of product types, but the following is rough approximation:

Classification	Production in Thousands of Gals.		Per Cent of Total Industrial Production	
	50	51		
Thinners	170	100	19	
Lacquers	160	145	17	
Baking Enamels	130	225	15	
Primers	100	89	11	
Wrinkle Finishes	100	121	11	
Metal Decorating Finishes	82	128	9	
Adhesives	68	47	8	
Varnishes, Misc.	34	9	4	
Fabric Coatings	21	12	3	1950 38% - baking
Collapsible Tube Finishes	16	11	2	
Hammered Metal Finishes	13	13	1	1951 50%
	894	920	100	

In the lacquer field, wood lacquers and lacquer sealers were the leading production items, although we have no large furniture accounts. We spent $955 on wood lacquer research in 1950. We produced 1300 gallons of "hot" lacquer for two accounts--Western Electric and National Casket Co. We made 5000 gallons of paper lacquer, most of which went to F. N. Burt Co. Our one time biggest lacquer customer, Armstrong Cork Co., bought practically nothing in 1950. A little known fact is that we produced 3000 gallons of lacquer cement in 1950, although the man-on-the-street has never heard of any cement other than Duco.

In the baking enamel field, we made some 27,000 gallons of white in 1950. White production dropped, presumably because of titanium dioxide shortages. $2009 were spent on the development of white baking enamels during 1950--$1607 on specific sales projects and $402 on research. Our major sales effort was directed at the General Electric Co. washing machine account and some eight samples were developed at a cost of $571. We are now an approved supplier, but we probably could not spare the titanium dioxide if we did receive orders.

Our 1950 production of black baking enamels amounted to 28,000 gallons, or about 10,000 gallons more than in 1949. This increase was about equal to the production of Engine Black Gloss for Wright Aeronautical Corp. This item will probably increase in volume as the military program accelerates.

Fedders-Quigan was a large volume purchaser of baking enamel for whom we did $730 worth of laboratory work. In addition to buying 20,000 gallons of enamel, this organization also bought 17,000 gallons of a brown primer and 7200 gallons of zinc chromate primer.

Heintz Manufacturing Co., manufacturers of RCA and Philco television cabinets, became a new customer of ours in 1950 and purchased 18,000 gallons of baking enamel and 1550 gallons of baking varnish. $742 were spent on laboratory development work, in the course of which 17 products were formulated and submitted.

Masell Manufacturing Co. bought 13,500 gallons of green enamel for use on filing cabinets last year. $733 were spent on the development of 16 finishes for this account during the year.

A total of $616 went into improving slide fastener (zipper) enamels in 1950. We have two accounts in this field--Talon and Conmar.

The perennial headache--zinc chromate primer--is again with us as a result of war preparations. A new formula was developed to comply with Specification AN-P-656 at a laboratory cost of $2320. So far, we have produced 6200 gallons of this item. Unlike previous formulas, our present formula seems to have satisfactory aging properties. However, Specification AN-P-656 has been superseded by a new specification, MIL-P-6889a, and we may or may not have to alter our formula. Numerous non-specification zinc chromate primers are being sold in considerable volume. Fedders-Quigan, for example, purchased one such primer for use on air conditioning units.

Specification work is again on the increase and the laboratory spent $2522 in 1950 on the development of products to meet 39 military or federal specifications. The laboratory also prepared 34 navy inspection forms in 1950 at a cost of $903; this was triple the amount spent on the same activity in 1949.

Wrinkle finish production reached an all-time high in 1950. Representatives of New Wrinkle, Inc. reported that our August 1950 sales were the third highest among their licensees and that our sales for the first 6 months of 1950 ranked fourth. We produce about 13% of the wrinkle finish volume of our entire industry (assuming that all manufacturers are licensees of New Wrinkle, Inc.). Pittsburgh Plate Glass Co. and Interchemical Corp. outrank us in sales volume.

A comparison between our 1950 and 1949 activities in the wrinkle finish field is shown below:

	1950	1949
Gallons Produced for:-		
Royal Typewriter Co.	34,500	34,000
International Business Machines	29,000	16,600
Others	36,150	36,320
Total	99,650	86,920
Cost of Laboratory Work:-		
Royal Typewriter Co. projects	$ 329	$ 498
I. B. M. projects	317	632
Eastman Kodak Co. projects	1014	-
Other work for specific accounts	2000	1947
Research	1763	742
Total	$ 5423	$ 3819
No. New Wrinkle Finishes Developed	103	130

The above figures reveal that our increased wrinkle finish volume in 1950 was due almost entirely to the added purchases of International Business Machines. The increase reflects the use of our products by both the Endicott and Poughkeepsie plants of I.B.M. Heretofore, we have sold only the Poughkeepsie plant.

In addition to the $329 spent on laboratory wrinkle work for Royal Typewriter Co., $510 was spent on the development of other finish types. The same situation pertains to laboratory work on I.B.M. projects; $317 was spent on wrinkle finishes and $664 on other finish types.

By far the largest sum spent in developing any wrinkle account in 1950 was the $1014 spent on Eastman Kodak work. Seven finishes were developed before one was approved. This finish will be used on Kodascope Projectors. We also obtained another new wrinkle account--the National Sewing Machine Co.--and it promises to develop good volume, although only an initial production order has so far been received.

Unfortunately the bulk of our wrinkle business requires titanium pigment. Both Royal Typewriter Co. and I.B.M. now buy gray wrinkles; up until a few years ago they purchased blacks.

Our research work on wrinkle finishes in 1950 was directed toward two projects: (1) the attainment of lower costs through improved manufacturing methods, and (2) the development of a vinyl wrinkle. The first project ended successfully. The second was discontinued. We not only failed to develop a good vinyl wrinkle, but we concluded that no vinyl wrinkle could be produced at a reasonable cost.

The metal decorating field continues to provide a substantial outlet for our products. A statistical comparison between our 1950 and 1949 activities in this field is tabulated below:

	1950	1949
Tonnage Increase in U.S. Can Production (as compared with previous year)	17%*	
Production Gallonage Metal Decorating Finishes		
Enamels - U.S.	40,000	
Varnishes - U.S.	41,600	
Subtotal	81,600	68,200
Increase 1950 over 1949	20%	
Enamels - Canada	7,500	
Varnishes - Canada	31,400	
Subtotal	38,900	43,400
Decrease 1950 below 1949	10%	
Cost of Laboratory Work		
Brooklyn Metal Dec. Co. projects	$ 1178	$ 256
American Can Co. projects	469	Not segregated
Other specific sales projects	705	1475
Research	148	3806
Total	$ 2500	$ 5537
No. New Finishes Developed	57	60

*Source - "Modern Packaging"

Half of our 1950 development expense on decorating finishes was applied on problems of the Brooklyn Metal Decorating Co. This company purchased 33,800 gallons in 1950, or about 41% of all products sold in the metal decorating field in the U. S. A quarter of our laboratory work went toward the solution of American Can Co. problems; the balance was spread over a half dozen other accounts.

The development of a satisfactory non-scorch varnish for the Brooklyn Metal Decorating Co. has been our number one problem for three years--and still is. Our last sample was deficient only in that it caused fine print (on decorated tin) to blur slightly when the varnish was applied over it and the ink was still wet. Coarse

print was unaffected. Because varnish performance cannot be forecast in laboratory tests, it is necessary to ask our customer to make actual coating tests. Such tests interrupt production and hence are difficult to arrange. This results in lengthy delays between the development and testing of samples. Only two samples of non-scorch varnish were tested by the Brooklyn Metal Decorating Company in 1950.

In 1947, the Brooklyn Metal Decorating Co. became involved in a lawsuit growing out of the spoilage of a large quantity of cottage cheese packed by Edelstein Foodstuffs in cans made by Fein's Tin Can Co. It was alleged that the cheese was contaminated with banana oil from the "lacquer" lining in the cheese cans. The Brooklyn Metal Decorating Co. sued Pratt & Lambert-Inc. and the Watson-Standard Co., both of which had supplied "lacquer" for the cans in question. Actually, both companies supplied a baking varnish. Damages of $125,000 were claimed. The case came to trial in 1950. After eight days in court, the jury returned a verdict in favor of ourselves as well as all other defendants.

The Brooklyn Metal Decorating Co. suit cost our company nothing but the time of a few employees, but it illustrates a hazard that accompanies the sale of paint for use in contact with foodstuffs. The Brooklyn Metal Decorating Co. has no laboratory of its own and makes no tests to determine the suitability of purchased coatings for food tins. It expects its suppliers to assume all risks. We have no food testing facilities and we have no bacteriologist to make tests, if we wished to do so. This situation poses a problem as to the moral and legal responsibility that our company assumes in selling the Brooklyn Metal Decorating Company. Are our profits commensurate with the risks?

The methods employed by American Can Co. contrast sharply with those used by the Brooklyn Metal Decorating Co. The American Can Co. makes prolonged and precise tests of all paints to insure their suitability for food can use.

Our activities in the collapsible tube field are summarized below:

	1950	1949
Tonnage Increase in U.S. Tube Production (as compared with previous year)	14%*	
Gallons Produced for:-		
Wheeling Stamping Co.	7,000	
Peerless Tube Co.	4,000	
All other U.S. accounts	6,000	
Total U.S. production	17,000	15,900
Increase 1950 over 1949	7%	
Total Canadian production	2,200	2,300

(Table continued next page)

	1950	1949
Cost of Laboratory Work		
Wheeling Stamping Co. projects	$ 442	Not segregated
Other specific sales projects	478	$ 1501
Research	735	4854
Total	$1655	$ 6355
No. New Finishes Developed	38	64

* Source - "Modern Packaging"

While collapsible tube production increased 14% in the U. S., our own sales to this industry increased only 7%. Our position in the collapsible tube field has been weakening over a period of years and 1950 would appear to be no exception. Research work on collapsible tube finishes was drastically curbed in 1950, because our five year sales record has not justified the enormous research expenditures we have been making during this period.

Two technical problems are uppermost in the collapsible tube field: (1) the development of an adherent vinyl type tube coating, and (2) the improvement of existing alkyd coatings. Vinyl compositions offer the chemical resistance that is much desired by the collapsible tube industry, but they have so many disadvantages that no tube manufacturer is using vinyls in quantity. In 1950, Modern Containers, Ltd. purchased 220 gallons of vinyl tube coating for special jobs; about the same quantity was purchased in 1949. Improved alkyd coatings seem to be the real answer to this industry's problems. We seem to need more than an improved alkyd coating to increase our sales in the collapsible tube field.

Our largest purchaser of adhesives is the Carborundum Co. Production and technical activities connected with this account are summarized below:

	1950	1949
Production gallonage	65,000	12,500
Cost of laboratory work	$ 1332	$ 869
No. projects assigned to laboratory	30	26

In 1950, the Carborundum Co. purchased a larger volume of adhesives than it ever previously purchased in any one year, including 1941 when sufficient material was purchased to last during the following four war years.

Carborundum "Fast Cut" is considered the outstanding waterproof sandpaper by the automotive industry. Its superiority is due in a large degree to the adhesive. The Carborundum Co. expects waterproof paper to equal or exceed glue bonded paper in production volume within ten years. Now, waterproof paper amounts to one fifth their total sandpaper volume.

Our major Carborundum Co. project is the development of adhesives that work faster in production--that will do in one coat what three coats formerly did, and that cure faster. In addition to ordinary research and service work, our laboratory spent ten days in training a Carborundum Co. research chemist at our laboratory in paint testing techniques.

For a number of years, we have been attempting to "break into" the General Felt Products Co. of Brooklyn. This company manufactures paper liners or inserts for bottle and jar caps. The liners are varnish coated to resist transmission of liquids through the paper. In 1950, $850 was expended on research work which culminated in the submission of two acceptable products. Providing that we can obtain sufficient phenolic resin, we should be able to sell from 13,000 to 25,000 gallons of these varnishes during 1951.

Thirteen years ago, we assigned the code M4068 to a phenolic resin solution which we have sold sporadically as a resistant clear coating for metal (on lipstick cases, the inside of airplane motors, lighting fixtures, slide fasteners, metal camera parts, etc.). The finish is just about the most resistant clear coating that can be made, but sales have been trifling because the coating could not be applied in production without skips or pinholes. This shortcoming has at last been overcome by blending the phenolic with urea resin. The modified product should fill a very definite need in our industrial line.

In 1949, we spent $519 in matching the grinding liquids of the Jamestown Finishing Products Co. but obtained no business. In 1950, we resubmitted samples and obtained orders that totaled about 15,000 gallons (up to January 1, 1951).

Fabric coatings demand a larger investment in laboratory effort than do most industrial finishes, as the following figures reveal:

	1950	1949
Production Gallonage	20,995	18,000
Cost of Laboratory Work		
Haartz-Mason, Inc. projects	$ 2017	$ 1348
Duro-Gloss projects	418	Not segregated
Other work for specific accounts	589	839
Research	2458	7724
Total	$ 5482	$ 9911
No. New Finishes Developed	68	77

Fabric coatings have been of two types--vinyls and highly plasticized nitrocellulose lacquers. The high cost of the plasticizing resin (Paraplex) in these lacquers was overcome last year by substituting a resin of our own development and manufacture. The development of this resin was an extraordinary achievement as Paraplex has been the only available plasticizer for use in fabric

coatings for a decade or more. Our development places us in an advantageous position for we can now undersell competitors who presumably still use Paraplex.

Vinyl resins are ideally suited for fabric coating, paper coating, and other work where extreme flexibility is required. One paper coater--F. N. Burt (subsidiary of Moore Business Forms)--is using one of our vinyl coatings and desires to buy it in substantially larger volume. Another paper coater--Victor Wagner Co.--would like to buy a vinyl coating but it is doubtful whether we can obtain the resin. All vinyl resins are on allocation.

Our production of spatter or hammered metal finishes jumped from 5000 gallons in 1949 to 13,000 gallons in 1950, but the demand for this novelty coating seems to be on the wane. In 1950, we spent $1084 on laboratory work and developed 42 new spatter enamels.

RESEARCH

Money spent on research in 1950 went into the following types of projects:

Development of Alkyd Resins for P&L Manufacture	$ 11,000
Other Raw Material Investigations	21,900
Development or Improvement of Finished Paints	24,000
Studies of Testing Methods and Tools	8,000
New Factory Processes	700
Total	$ 65,600

Of the 309 new raw materials investigated in 1950, only 67 were of sufficient value or interest to be adopted.

$2660 was spent on styrenated alkyd work. This included investigations of resins offered by commercial resin houses as well as attempts to develop suitable resins of our own. So far, we have failed to develop any styrenated resin that equals those now on the market.

$3963 was spent on vinyl research and included work on vinyl metal finishes as well as vinyl fabric coatings.

Considerable time has been and is being spent on an investigation of the Daniel method for scientifically determining the optimum pigment concentration in stock pastes, and in formulas made directly from pigment. By optimum concentration is meant the best compromise between fast grinding and maximum pigment concentration. Heretofore, pigment concentration has been arrived at by trial and error. Our previous practices have not always been economical practices. By the time this study is concluded, we hope to increase the production capacity of our mills and make better grinds at lower costs than we have in the past. In 1950, $692 were spent on this project.

The laboratory has worked with the factory in studying the application of the Dynamic Disperser (Laird Mixer) to lacquer and other enamels. So far, the Dynamic Disperser seems to be suited only to the production of flat wall coatings.

Approximately 70% of our research involves short term projects that are concluded after an average of five months of work. The remaining 30% require an average of two years to complete.

A very disappointing failure in our research setup was recognized in 1950. In November 1946, our General Research Laboratory staff was increased by transferring an experienced and seemingly skilled man to that work. At the time, it was hoped that a larger general research staff would free that group to do more fundamental work and more work that would strengthen our company's competitive position. In December 1950, it became evident that the hoped for developments were not taking place and the additional chemist was, therefore, assigned to new work. The setup failed primarily because of human factors. The additional chemist lacked persistance, vision, and knowledge, and the group as a whole did not function as a smooth working team. We still need to do more original research, but we will have to wait until the proper man or men can be found or trained.

EQUIPMENT

The following new equipment was acquired in 1950:

4 Stormer Viscosimeters	$ 785
Elcometer Electric Dry Film Thickness Gauge	58
Interchemical Wet Film Thickness Gauge	45
Hegman Fineness of Grind Gauge	68
Electronic Moisture Meter	50
Bristol Portable Recording Thermometer	128
Torsion Balance	118
Bureau of Standards Gloss Standards	70
	$1322

The Stormer Viscosimeter has been adopted as our standard viscosity testing device for paint products, primers, undercoatings, and most lacquers. It replaces the Gardner Mobilometer and our lacquer tubes. The Stormer Viscosimeter was adopted because it is a labor-saving device and is more accurate than the equipment it replaced. It saves labor as there is nothing to clean after a viscosity determination, other than a polished metal paddle. The preparation of necessary data to enable our control laboratories to shift from one set of records to another cost about $1000.

Eleven new books were acquired for the library during 1950.

PERSONNEL

Personnel problems in 1950 were like those in 1941. In each of these years, labor turnover suddenly increased as the draft began to take its toll, and more lucrative jobs attracted our employees. A detailed comparison of the two periods is shown below:

	1950	1949	1942	1941	1940
Resigned	16	7	32	11	2
Transferred to other divisions of the company			2	3	4
Discharged	1		2	3	2
Enlisted or drafted	3		6	5	
Total separations	20*	7	42	22	8
Average number employees	61*	61	55	57	55
Separation Rate	33%	11%	76%	40%	15%

* Excluding three employees hired for temporary jobs

If history repeats itself and the year 1951 resembles 1942, we can expect even greater turnover than we had last year. Twelve of our laboratory employees are of draft age, although three are veterans. One employee is a Navy reservist but is over 26 years of age. In 1942, we had only eight laboratory employees who were of draft age.

As male employees left us in 1950, we replaced them with women employees or with draft-exempt men. The place where losses of male employees will be felt most seriously is in our finishing room.

Fortunately we have a larger laboratory staff today than we had in 1942. If business drops off, we can lose some laboratory employees without replacing them.

In 1950, William Fee became our first and only laboratory pensioner. Because the laboratory is a relatively new department within our company and has been manned for the most part by young people, no employee has heretofore been eligible for retirement.

COMPLAINTS

Complaint Record - Buffalo Factory

Year	Total Complaints Received	Per Cent Justified	Complaint Index*
1950	266	38	77
1949	248	34	96
1948	228	38	76
1941	175	27	66
Avg. 1936-1940 incl.	268	27	154

* Number of complaints per million gallons of manufactured goods

1950 was the fifth consecutive year in which the number of complaints has risen. However, due to a high production level, the complaint index for 1950 dropped below the 1949 index and was about the same as the 1948 index. The per cent of justified complaints rose over the previous year.

Distribution of Complaints by Sales Offices

Originating Sales Div.	No. Complaints 1950	No. Complaints 1949	No. Complaint Records Reported 1950	No. Complaint Records Reported 1949
Central	100	115	64	91
Industrial	94	60	None	None
Western	72	62	47	41
Eastern	29	41	24	38
Canadian	18	7	None	2
Total	313*	285*	135	172

*These totals do not agree with totals in previous table, because they include subsidiary and Fort Erie products as well as Buffalo-made products.

Causes of Complaint

	1950		1949	
	% of Total Complaints	% Justified This Group	% of Total Complaints	% Justified This Group
Color	14	32	16	39
Viscosity	14	52	16	40
Gloss	12	53	8	27
Specks, Dirt, Seeds	9	59	3	50
Drying	8	23	9	16
All Other	43	12	48	16
	100%		100%	

In both 1949 and 1950, more than half of our complaints fell in the first five categories. In both years, color and viscosity complaints tied for first place. Note that complaints on specks, dirt, and seeds are on the rise. Note also that the per cent of justified complaints rose sharply in all five classifications except color. In other words, our formulas appear to be less stable than they formerly were, or we are more careless in our manufacturing, or we are less careful in our inspection. There appears to be a relationship between production volume and quality; when production volume rises sharply, quality suffers.

In 1950, we had 9 complaints on mislabeling, all of which were justified and all of which pertained to Buffalo factory production. In 1949, we had three complaints on the mislabeling of Buffalo factory production. In 1948, we had no complaints on mislabeling.

Our factory believes that these complaints on mislabeling are due to printing department errors, i.e. the inclusion of some "foreign" labels in packages that supposedly contain a single type of label. Our subsidiaries have registered the same criticism of label shipments to them. However, a recent mislabeling complaint belies this general condemnation of the printing department as an entire shipment of wrinkle finish was received by I.B.M. in 5-gallon pails bearing a Lyt-all label.

LABORATORY EXPENSE

The total cost of operating our Buffalo laboratory during 1950 was $234,916 or 3% more than in 1949. This money was spent in carrying on three types of activities--research, work on specific sales problems (laboratory requisitions), and manufacturing services (product control, raw material control, manufacturing problems, small batch manufacture, etc.). Just how much money was spent in each of these three categories is shown below:

Activity	1950	1949	1945
Research	$ 65,600	$ 67,700	$ 30,000
Special Sales Problems	58,200	63,600	59,000
Manufacturing Services	111,100	96,800	61,100
Total	$234,900	$228,100	$150,100

It will be noted that formulating and research activities took slightly less money than they did in 1949. On the other hand, money spent on factory work was 15% greater than it was in 1949 and was almost twice what it was in 1945. The factory jobs that required additional effort were:

	1950 Expenditures Exceeded 1949 Expenditures by:
Manufacturing Control	$ 7,000
Raw Material Control	3,500
Manufacturing Problems	2,800
Complaint Investigations	1,000
	$14,300

All of these increases were a direct result of heavy production in 1950. Heavy production and raw material shortages always mean more manufacturing problems for the laboratory--and a corresponding penalty in other work.

The cost of the laboratory in terms of production gallonage and sales dollars is shown on the following page:

	Cost of Research and Formulating*		Cost of Manufacturing Services	
	1950	1949	1950	1949
Per gallon of Buffalo Factory Production			3.2¢	3.7¢
Per batch made at Buffalo			$5.75	$5.90
Per gallon of Combined Buffalo and Fort Erie Factory Production	2.9¢	4.3¢		
As per cent of Dollar Value of Sales of all Products made at Buffalo and Fort Erie	1.1%	1.5%		

* Research and formulating costs exclude that portion of paint work that benefits our subsidiary companies, but includes cost of paint work for benefit of Fort Erie factory.

COMPARISON P&L LABORATORY SIZE WITH COMPETITORS

The National Research Council has just published the ninth edition of its directory of industrial research laboratories in the United States. Data are based upon information compiled between January and June 1950.

The directory lists 2845 laboratories, 80 of which are listed as paint laboratories. However, only 33 of these 80 laboratories are actually connected with companies manufacturing paint. The remaining 47 are connected with raw material houses or are general consulting laboratories. Information about most of the laboratories connected with paint manufacturers is condensed in the table at the end of this section.

The directory is primarily a tabulation of the number and of the training of employees in industrial research laboratories. For purposes of this directory, research was defined as "development work in processes, equipment, and production as well as fundamental and applied research"; it did not include production control or testing. Personnel was subdivided into three classes: (1) "professionally trained" employees (chemists, engineers, and physicists), (2) other "technical personnel" (laboratory assistants and technicians) and (3) "other" (administrative, clerical, maintenance employees).

In 1950, the size of our laboratory dropped to ~~ninth~~ eleventh place in the industry; in 1946 it occupied seventh place; in 1940 it ranked fifth;

in 1925, it ranked second. The change in rank between the years 1946 and 1950 was due to two facts: (1) the Glidden Company was not listed in previous directories although it probably exceeded our laboratory in size in 1946, and (2) between 1946 and 1950, some four companies with laboratories were absorbed by the American-Marietta Company, the combined laboratories of which now exceed our laboratory in size. The latter company was not previously listed. Many companies previously listed now form part of other organizations.

The laboratories of Sherwin-Williams Company and Pittsburgh Plate Glass have shown a constant and very substantial growth during the past decade. These companies also appear to have made considerable technical progress. The du Pont paint laboratories have exhibited a steady shrinkage. This may have been caused by the reallocation of technical personnel to the central research laboratories and to decentralization of paint work. The Devoe & Raynolds group seems to be undergoing one of its periodic reorganizations of technical personnel. Of the six Devoe & Raynolds subsidiaries, only the laboratory of Jones-Dabney has increased in size since 1946. Grand Rapids Varnish Corporation is another company, the laboratory of which is much smaller than it was in 1946. The laboratories of Arco, Standard Varnish, Rinshed-Mason, Armstrong Paint and Varnish Works, Stanley Chemical Company, Cook Paint & Varnish Company, Baltimore Paint & Color Works, and Pratt & Lambert-Inc. have increased in size appreciably since 1946.

The only disturbing fact revealed by the directory is the comparatively poor showing of the Pratt & Lambert laboratory with respect to its professional quality. Only 30% of our research staff is made up of college trained employees; only one other company ranks lower than we do in this respect, i.e. P. D. George Company. The top ten companies listed in the table have an average of 59% college trained employees in their laboratories. In 1946, the top ten companies averaged 60% college trained employees. The trend is toward higher percentages of professional help. It could be that our dependence on a large number of non-professional employees is false economy. We certainly are not in step with the rest of our industry. The primary reason for employing high school trained assistants instead of chemists is, of course, a matter of dollars and cents. A college trained chemist starts at $3000 per year; a high school trained assistant receives $1768 per year at the end of his or her probationary period. For the first few years of employment, a chemist is rarely worth the extra compensation; after five years of employment, however, the chemist has greater value than the average laboratory assistant with a high school education.

RESEARCH AND DEVELOPMENT PERSONNEL

1950 Rank		Total Research Employees 1950	1946*	1940*	% Professional Employees in 1950 Staff	No. Volumes in 1950 Library
	Over 100 Employees					
1	Sherwin-Williams Co. (Not including Acme Whitehead or Lowe Bros.)	527	435	274	38	3200
2	Pittsburgh Plate Glass**	309	241	71	38	1000
3	E. I. du Pont**	245	254	272	44	
4	Glidden Co.**	181			50	
5	Interchemical Corp.**	148	49		48	450
6	Devoe & Raynolds-all div.	130	149	126	47	
	D&R - parent co. only	47	107	101	42	4000
	Jones-Dabney Co. only	46	42	25	65	
	Other divisions only	37			54	
7	American-Marietta-all div.	111			45	
	Berry Bros. only	22	23		36	
	25-99 Employees					
8	Sun Chemical-all div.	93			57	1200
9	Cook Paint & Varnish Co.	56	29	54	79	220
10	Rinshed-Mason Co.	51	36		59	900
11	Pratt & Lambert-parent co.	50	41	57	30	650
?	Arco Co.	49	29		55	500
13	Stoner-Mudge, Inc.	47			45	200
14	Acme White Lead (S-W subs.)	43	33	39	37	100
15	Standard Varnish Co.	38	25		90	
16	Lowe Bros. (S-W subs.)	36	23	29	47	1500
17	Armstrong Paint & Varnish	25	19		44	100
	Less than 25 Employees					
18	Baltimore Paint & Color	22	14		73	500
19	Minnesota Paints, Inc.	21			43	400
20	Stanley Chemical Co.	20	15	17	65	300
21	P. D. George Co.	18	18		17	100
22	Grand Rapids Varnish Corp.	16	28	17	56	200
23	O'Brien Corp.	16	14	11	44	200
24	Hilo Varnish Corp.	10	10	13	50	500
25	Paragon Paint & Varnish	10	5		50	300
26	Boston Varnish	8			50	
27	Montgomery Ward & Co.**	6	10		66	
28	Cheesman-Elliott	5	4		60	
29	Forman, Ford & Co.	3			100	

** Paint division or divisions, only
* Obtained from previous directories

SUMMARY OF 1950 LABORATORY WORK

	1950	1949
New Products Developed	1,514	1,603
Sales Problems Submitted to Laboratory	1,688	1,790
Sales Problems Reported	1,693	1,811
New Research Problems Assigned	81	60
Research Problems Completed	71	66
New Raw Materials Investigated	309	353
Raw Material Shipments Tested	3,024	2,156
Batches Tested by Buffalo Control Lab.	19,224	16,365
Batches Tested by Fort Erie Control Lab.	2,557	2,135
Service Calls by Technical Personnel	133	139
Technical Department Bulletins Issued	33	63
Paint Manufacturing Bulletins Issued	71	53
Formula Analysis Bulletins Issued	255	33

February 8, 1951