PRATT & LAMBERT-INC.

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TECHNICAL ACTIVITIES

1956 TECHNICAL ACTIVITIES

ORGANIZATION

Mr. E. J. Zimmer and Mr. N. J. Miller were given the newly created title of Associate Technical Director in 1956 in recognition of their competent and conscientious work over a period of many years.

Mr. W. G. Ringle was named General Research Chemist after serving for nearly two years as acting head of the General Research Laboratory. Mr. M. S. Armstrong was made Research Associate and now acts in a general consulting capacity; he has no administrative responsibilities.

GENERAL RESEARCH

The activities of the General Research Laboratory were expanded in 1956 by the addition of one chemist. Any dramatic improvements that we hope to make in our products are most likely to have their origin in this laboratory. The strengthening and development of personnel in the general research group is, therefore, important to our long term growth.

The General Research Laboratory made some substantial contributions in 1956 as a result of the fresh viewpoint that it has brought to factory problems. Many of these contributions were of a simple nature, but their acceptance depended upon close cooperation with the factory and a sympathetic approach to factory problems. Four of these projects are detailed in the next paragraph.

All resin manufacturing operations were surveyed and then a re-scheduling program was developed to provide the same annual resin production volume from fewer batches and by more efficient methods. The adopted suggestions are saving labor and reducing manufacturing and handling losses. All of our own alkyd resins were classified by type, so that the factory would not produce one kind of resin in equipment previously used to make a dissimilar type of resin. This has reduced the number of specky and substandard batches of resin, previously caused by precipitation of incompatible residual material left in pipe lines and other facilities. A revised filter room floor plan was submitted so that a larger gallonage of alkyd resin can be handled with fewer production complications. Many hours of time and thought were devoted to our future resin processing equipment needs with the object of solving the problem as inexpensively as possible.

A new grinding liquid (X1697) for use as a broad purpose stock paste vehicle was developed in 1956. It is expected to replace the vehicles previously used in X894 pastes, M840 pastes, and CX bases. If successful, it will eliminate two lines of overlapping stock

pastes with obvious economies. Ten batches of X1697, produced in an oil kettle, will replace 55 batches of X894, produced in the overburdened Jones kettle. The vehicle has been adopted at Buffalo and Waggener Paint Company. Its use will be extended to the other subsidiaries and the Fort Erie plant, if no manufacturing kinks develop. Research work on this project cost $5880, but the new vehicle is expected to save the company and its subsidiaries $10,000 per year.

TESTING ACTIVITIES

New raw materials offer a continuing and never-ending investigative problem. Last year, $18,494 were spent in examining 466 new materials. Unfortunately, few lived up to the claims made for them.

Vinyl toluene, recommended as a hardener for alkyd resins and oils, failed to perform as claimed. Considerable time was spent in trying to make a copolymer of vinyl toluene and divinyl benzene, so that a gel structure could be imparted to the alkyd used in New Lyt-all Flowing Flat. The work ended in failure and even the supplier has abandoned interest in the product. Hexahydrophthalic anhydride and Nadic anhydride were promoted as raw materials to make paler alkyd resins. Neither performed as claimed.

For the first time, specifications are available for each of the 750 active raw materials that are in our code list. It required six years for us to attain this goal.

Much of the work performed by our Testing Laboratories is of a routine but necessary nature. The following figures, compiled for 1956, indicate just how much repetitious testing is done to insure proper development and control of our finished products:

Glossmeter readings	9000
Film Thickness readings	2100
Reflectance measurements	1047
Nonvolatiles (excluding raw materials)	920
Acid Numbers (excluding raw materials)	459

Each of these determinations takes time and costs money.

TRADE SALES DEVELOPMENTS

Three major trade sales projects occupied much of the time of our Architectural Enamel & Paint Laboratory during the past year. These projects and their 1956 costs were:

Emulsion paint activities	$14,985
Peeling New Lyt-all Flowing Flat	9,140
Tube System work	11,805
	$35,930

Two new emulsion paint lines were launched in 1956--Vapex Wall Finish for national distribution as an interior finish, and New Alkatite Cement & Stucco Paint for test marketing in Florida as an exterior masonry finish. Preliminary reports on both lines have been gratifying. Florida exposure tests indicate that the exterior emulsion paint is outperforming our standard Alkatite Cement & Stucco Paint. 1956 research work on the interior line cost $2175--on the exterior line $10,408.

The two new lines represent the culmination of six years of research activity in emulsion paint technology. The comparatively modest research expenditures in 1956 tell only part of the story. Since 1950, we have spent $50,000 on emulsion paint research. Obviously, it will take substantial sales of the new paints to repay in profits what has already been invested in the development of the paints.

Three of the Vapex Tinting Colors (Red, Yellow, Black) were reformulated in 1956 so they could be produced by our Buffalo factory. Previously, they have been purchased. The laboratory work involved in reformulation cost $843, but the colors can be manufactured for $1400 less per year than they can be purchased. Two new Vapex Tinting Colors (Bright Blue, Bright Yellow) were formulated at a cost of $636.

Vapex Wall Primer was reformulated in 1956 to permit its sale at a lower and more competitive price. Reformulation cost $924, but the new formula will save $5400 annually.

The peeling of occasional batches of New Lyt-all Flowing Flat has been the subject of an intensive research project, on which $9140 were spent in 1956. Peeling, like so many field defects, cannot be readily reproduced in the laboratory. We have observed that some lots of New Lyt-all Flowing Flat which peel in the field will crack when they are dried in a humidified ice box. Lots that perform successfully in the field do not crack. Cracking is the first phase in peeling. Just why refrigeration causes some lots to crack is not known, but we do know that refrigeration slows drying and, therefore, exaggerates differences in drying. Most lots that peeled in the field dried very positively. When cobalt drier content was reduced, cracking was reduced. The drier content of New Lyt-all Flowing Flat has accordingly been reduced. Whether peeling complaints have been eliminated will be proven only by the statistical evidence provided by hundreds of field jobs.

Heretofore, the vehicle in New Lyt-all Flowing Flat has been made by blending two separately cooked alkyd resins. A single step manufacturing process, developed in 1956, produces a more uniform vehicle at a cost saving that is estimated to be $10,000 per year.

Work on the tube system in 1956 included development of Vitralite Enamel Gloss Bases, Effecto Enamel Supplementary Colors, Low Luster House Paint Bases, and Lyt-all Stippling Eggshell Bases, all of

which were adopted. Vapex Bases have been developed, but their adoption awaits the changeover to universal colorants. Extensive work was also done on Verdura Trim & Shutter Finish Bases and Shake & Shingle Finish Bases, including exposure testing, but these items have not been incorporated in the tube system. 1956 work on bases cost $4675; work on universal colorants cost $7129. Again, these costs tell only part of the story. To date, the tube system represents a development cost of $23,490, and the job is not yet completed.

New trade sales items adopted during 1956, in addition to those already mentioned, included a 12-color line of Exterior Rustic Stains (developed at a cost of $274), and Low Luster House Paint 840 White (developed at a cost of $2717).

The following established items were revised or improved in 1956:

House Paint Blind Green and Verdura Greens - Chrome green replaced with a mixture of shading yellow and iron blue. Potential savings will amount to $2100 per year. Laboratory work cost $63.

House Paint 300 Outside White, 303 Chalk Resistant White, and 317 Mildew & Fume Resistant White - Wrinkling reduced and working qualities improved. Laboratory work cost $2060.

House Paint Exterior Primer 305 White - Basic silicate white lead substituted for part of basic carbonate white lead. Cost savings will amount to $13,000 per year.

Effecto Enamel - Base resin revised for more economical processing at a cost saving of $600 per year.

"38" Pale Trim Varnish - Ever since its adoption in 1946, "38" Pale Trim Varnish has been made in a cumbersome two stage process involving separately cooked alkyds made in open kettles. A new formula utilizing a single closed kettle cook offers improved initial color and better color permanency. Cost savings are expected to amount to $13,000 per year. Laboratory work cost $1900.

Vitralite Enamel - The purchased resin now used in Vitralite Enamel has been offset and can be made in our Dowtherm kettle after solvent reflux facilities have been installed. Laboratory work cost $3073, but savings are expected to amount to $11,000 per year.

Two trade sales research projects have unusual interest. One is aimed at determining why paint gets dirty, if dirt can be repelled, and what can be done to facilitate dirt removal, when dirt collects on paint. It is hoped that the fundamental information uncovered by this work will enable us to materially improve the usefulness of our interior paints and enamels.

The other project is aimed at upgrading the durability of exterior and interior clear finish systems. Ultraviolet light causes varnish

to fail by cracking--both indoors and outdoors, wood to discolor, and stains to fade. The incorporation of an ultraviolet light absorber in the varnish should reduce these harmful effects of light. Among many absorbers that have been studied, a rare earth (cerium) glass, pulverized and used as a transparent pigment, seems to offer the most promise. Practical problems--settling and low gloss--and the failure of later tests to substantiate early findings, have been discouraging features of the work. If we can find an ultraviolet light absorber that can be successfully put into varnish, our varnishes would have a tremendous advantage over competing products--for at least a year or two.

INDUSTRIAL SALES DEVELOPMENTS

The Industrial Sales Department sold 7.4% more gallons in 1956 than it did in 1955, and reduced its laboratory charges by 7.6%.

One feature of laboratory work for industrial accounts is that crises are always developing. Crash programs are then requested to get us out of trouble. These crash programs can be handled only by taking personnel off other jobs (usually research work). The interruptions in research activities cause loss of interest in long range research by personnel and result in considerable repetition when work is resumed. Because of these factors, industrial research costs the company more money than architectural research and the results are less effective.

100 industrial accounts consumed 80% of laboratory time spent on Industrial Sales Department projects in 1956. Three accounts (American Can, IBM, and Carborundum) brought in 30% of our industrial gallonage in 1956 and took 17% of our industrial laboratory effort. The next 10 largest accounts brought in 20% additional gallonage and took 14% of our industrial laboratory effort. The remaining 50% of our industrial gallonage required 69% of our laboratory effort.

American Can Company, our largest industrial customer, purchased 134,000 gallons in 1956, as compared with 140,500 gallons in 1955. The principal item sold to this account is a white coating, that was materially improved early in 1956 to provide better working, leveling, and fabrication. It is claimed that the superiority of our white has now resulted in its displacement of competing whites. Our white is being used in eight different plants of American Can Company; a year ago, we were selling only three plants. It is rather strange, therefore, that the sales of our white declined 3.5% (in gallons) in the same year that can production (as reported by the can industry) increased 5%. We have developed a still better white to overcome stacking difficulties (sticking of coated sheets) in hot humid weather. Laboratory work on American Can Company problems cost $1019 in 1956.

We also sold substantial quantities of metal decorating finishes to Brooklyn Metal Decorating Company (26,800 gallons), Fein Can Company (7200 gallons), and Hazel-Atlas (6900 gallons). Total sales of

metal decorating finishes in the United States and Canada amounted to 207,000 gallons in 1956. Laboratory work for the three accounts mentioned above cost $750. An additional $2066 were spent on general research work in the metal decorating field.

After years of failure, we finally developed a wet-print, non-scorch finishing varnish for Brooklyn Metal Decorating Company that met with an enthusiastic reception. This was the first such varnish that this company ever considered superior to competing varnishes in most features. Only one minor problem remains to be licked--a slight improvement in drying--and then it is hoped we will begin to obtain increased volume from this account.

In Canada, our major problem in the metal decorating field pertains to cork inserts. We have heretofore sold a large volume of adhesive to bottle crown manufacturers for attaching inserts. A shortage of cork has caused crown manufacturers to investigate molded-in-place vinyl plastisols as a substitute. Since our adhesive business will vanish, if cork inserts are discontinued, we have developed a plastisol liner, which is now awaiting a production test.

IBM, our second largest industrial account, purchased 88,870 gallons of material in the United States in 1956. U. S. purchases in 1955 amounted to 50,000 gallons. IBM is our largest wrinkle finish customer (57,850 gallons in the U. S; 3600 gallons in Canada). The wrinkle finish is used on business machines, electric typewriters (finished exclusively with P&L finishes), and military equipment, (Project High--gigantic computers for plotting course of enemy aircraft sighted in northern Canada). Electric typewriters are finished in 19 standard colors that are featured in current IBM advertising.

The major laboratory project for IBM continues to be the development of a vinyl textured finish with unusual wear and mar resistance. We have submitted display panels that have been tentatively approved for texture (a previous stumbling block). Further tests are scheduled on a liquid sample. $4419 have been expended on this and other IBM problems during 1956.

Our total wrinkle finish volume in the U. S. and Canada increased from 83,000 gallons in 1955 to 117,000 gallons in 1956. The volume in 1956 almost equals the record volume received in 1951. Besides IBM, we sold large quantities of wrinkle finish to Royal Typewriter Company (20,000 gallons) and Eastman Kodak Company (14,000 gallons).

Carborundum Company purchases for 1956 amounted to 46,000 gallons, or approximately the same as 1955. The chief laboratory problem for Carborundum is the development of adhesives to cure at progressively lower temperatures. Laboratory work on specific problems cost $2800; an additional $588 were spent on long range research on sandpaper adhesives.

Four of our customers (RCA-Victor, Philco, Red Lion Cabinet, and Heintz Mfg. Co.) are directly or indirectly involved in finishing television cabinets. RCA-Victor is the most exacting buyer. It prepares color standards, approves finishes submitted by paint

companies, and then subcontracts the actual finishing to Red Lion and Heintz Mfg. Co. Philco follows a somewhat similar procedure. RCA-Victor standards are initially prepared by color stylists, who may blend as many as eight different materials to create just the right wood grain effect. After we have matched these impractical standards, RCA-Victor bakes our submitted finishes for 20 minutes at 300°F. When the time arrives to reproduce the effects in production, Heintz bakes the finishes for 10 minutes at 300°F. Hardness, color, and gloss complaints are continuous. In 1956, $4440 were spent on laboratory effort for the four accounts mentioned above. We sold 15,746 gallons of television cabinet enamel and varnish to Heintz Mfg. Co.

Early in 1956, we were under considerable pressure to develop an electrically conducting finish for television tubes. A number of such products were formulated by incorporating a special type of graphite as a conducting pigment. A small volume of finish was sold, then interest declined. Presumably, the television industry found some other way to solve this electrical problem.

A number of other unusual industrial finishes were developed or investigated in 1956. One was a vinyl strip-off coating for Westinghouse Company circuit board panels. The coating was intended for temporary protection of these panels during manufacture and processing. The coating had to adhere well enough so that it wouldn't peel when the panels were drilled and punched, and yet have good stripping qualities, when it came time to remove the finish. It also had to be easily wetted by plating solutions used to deposit the circuits on the panels. Our coating was reported to be the only one that met all requirements.

A vinyl-alkyd textured finish, that bakes at a relatively low temperature (250°F.) and has excellent hardness and abrasion resistance, offers considerable promise as a finish for such products as vending machines. The Industrial Sales Department has named this finish Tex-Dur.

Organic derivatives of titanium have been promoted as heat-resistant coatings, but our laboratory tests indicated that one disadvantage (sensitivity to moisture) outweighs the advantage of heat resistance. Silicone finishes seem to be the best answer to the heat problem. Last year, we sold 1200 gallons of a very expensive silicone finish for use on jet engines.

Epon ester and catalyzed epon coatings have been under continuous investigation. Increased demand is developing for the former, wherever unusual chemical resistance is needed. The catalyzed epons have better chemical resistance, but industrial users resist the mixing operation that this two package system entails.

An unusually brilliant red (called Flamboyant Red) was developed for finishing bicycles made by Murray-Ohio Company. The color depends upon applying a transparent maroon baking enamel over a

bright aluminum powder primer. The brightness and clarity of the effect cannot be reproduced with any typical enamel.

The following table lists some of our larger industrial accounts and also those accounts for whom relatively large amounts of technical work were requested:

Customer	Nature of Business	Gallons Sold 1956	Laboratory Costs 1956
Amer. Sanitary Partition	Toilet partitions	15,000	$ 589
Art Metal	Metal office equip.	4,900	*
Automatic Votg. Mach.	Voting booths	7,800	224
Compco	Fluorescent fixtures	4,000	481
Dunlop Tire & Rubber	Tires, golf balls	16,480	375
Ebco	Water coolers	13,900	704
Fedders-Quigan	Air conditioners	18,700	1713
Hard Mfg. Co.	Hospital beds	12,230	1308
Jeavons Japanning	Custom finishers	**	567
Masell	File cabinets	6,300	*
Metpar Steel Products	Toilet partitions	3,000	621
National Cash Register	Cash registers	**	526
Reznor	Metal work	6,600	125
Rittling	Space heaters	5,200	175
Talon	Zippers	8,550	1206
Titan Mfg. Co.	Space heaters	**	580
Trico Products	Auto accessories	**	542
Union Fork & Hoe	Garden tools	15,200	346
Western Electric (and subcont.)	Telephone equip.	28,350	352
Zenith Metal	Kitchen cabinets	13,000	383

* Less than $100; not tabulated
** Less than 2500 gallons; not tabulated

COMPLAINTS

7% fewer complaints were registered in 1956 than in 1955 and there was also a slight decline in the number of justified complaints. Details follow:

Year	Total No. Complaints	Per Cent Justified Complaints
1956	374	33
1955	401	36
1954	487	27
1953	515	35

The basic causes for 1956 and 1955 complaints were as follows:

		1956	1955
Justified	Package change	13%	17%
	Faulty formulation	6	11
	Faulty quality control	8	7
	Faulty manufacturing	5	1
	All other	1	-
Not Justified and Indeterminable	Presumably due to faulty application or surface preparation	53	36
	Other	14	28
Total		100%	100%

PERSONNEL

Separations	1956	1955	1946
Dissatisfaction with rate of pay or opportunities	7	6	17
Resigned for other reasons (health, pregnancy, domestic problems, education)	12	11	-
Discharged	4	1	3
Transferred to other departments	-	1	3
Total	23	19	23
Avg. number employees	65	64	57
Separation rate	35%	30%	40%

Laboratory turnover in 1956 amounted to 35%--the highest in any year since 1946. In the years between 1946 and 1956, turnover averaged 25%. More than half the employees who left in 1956 had been employed for less than a year.

High turnover reflects the national shortage of qualified research workers. Jobs are so plentiful and wages are so high in the glamour fields (aviation, electronics, nuclear radiation) that a technical career in the paint industry holds little interest. While we have difficulty in attracting new people, we have an unusually stable and effective group of older technical employees.

NEW EQUIPMENT

A Macbeth Color Matching Booth was purchased in 1956 at a cost of $1065. This booth is equipped so that colors may be viewed under either of two light sources--blue light with the characteristics of north daylight, or yellow light with the characteristics of noon

sunlight. Colors that match in both lights are presumed to match under almost any other condition of illumination. The booth is of value in matching competing samples. By selecting pigments that provide a color match in the booth, color problems are minimized when our products are later applied in the field.

LABORATORY EXPENSE

Laboratory activities cost the parent company $350,045 in 1956, or 6% more than in 1955. The money was spent as follows:

	1956	1955
Research	$108,900	$101,640
Sales Problems (Laboratory Requisitions)	74,000	76,610
Manufacturing Services	167,145	152,930
	$350,045	$331,180

Most of the increase in research expenses reflects the cost of the one additional employee who has been assigned to the General Research Laboratory.

The decline in work done on sales problems is primarily due to decreased industrial sales laboratory requisitions. Since 80% of our sales problems originate in the Industrial Sales Department, any change in that department's policies or activities are quickly reflected in the over-all picture.

Half of the increased cost of manufacturing services was due to production problems arising from the launching of Vapex Wall Finish and New Alkatite Cement & Stucco Paint. Most of the remaining increase reflects the added cost of quality control resulting from wage increases.

In terms of production, research and development cost the company 4.1 cents per gallon (see footnote) in 1956, and 4.2 cents in 1955. Manufacturing services cost 4.3 cents per gallon in 1956, and 4.2 cents per gallon in 1955. It cost $5.74 to test each batch of paint and varnish made at Buffalo in 1956, and $5.16 in 1955.

Note: Figures apply only to Buffalo factory production. They exclude research and other expenses applicable to Fort Erie and subsidiary plant production.

SUMMARY

	1956	1955
New Products Developed	1,349	1,382
Sales Problems Reported by Laboratory	1,405	1,510
Research Problems Completed	46	58
New Raw Materials Investigated	466	475
Raw Material Shipments Tested	3,007	2,835
Batches Tested - Buffalo Control Labs.	19,128	19,314
- Ft. Erie Control Lab.	2,996	2,861
Service Calls by Technical Personnel	127	133
Technical Department Bulletins Issued	43	40
Paint Manufacturing Bulletins Issued	45	33
Label Bulletins Issued	51	65

February 26, 1957