MELPAR-A-GRAPH

MELPAR, INC. • A SUBSIDIARY OF WESTINGHOUSE AIR BRAKE CO.

Volume 7, Number 2 March, 1962

DR. RITT ELECTED VICE PRESIDENT-RESEARCH

Dr. Paul E. Ritt

Appointment of Scientist, Who Directed Many Melpar Research Achievements As Well As The Company's Research Growth, Reflects Melpar's Increasing Emphasis In This Vital Area.

Dr. Paul E. Ritt, Jr. has been elected Vice President-Research by the Melpar Board of Directors according to President Edward M. Bostick.

"This newly created position reflects the increasing emphasis Melpar is placing on research," Mr. Bostick said in making the announcement. "We are expanding, and will continue to expand the scope of the Research Division in line with the continually increasing demands of our rapidly accelerating technology."

Dr. Ritt's election—at the age of 34—is the product of ten years of outstanding service with the Company. Formerly Melpar Research Director, Dr. Ritt joined Melpar as an engineer in the Chemistry Lab in 1952, and rose steadily to his current position. Under his direction, Melpar's research group grew from 5 to 200 scientists who today make up the Research Division.

The work of the division covers a wide spectrum of physical, biological and electronic sciences, and is actively involved in such national defense efforts as overcoming problems in missile guidance, missile re-entry communication and new propulsion schemes. Dr. Ritt is recognized as one of the Nation's authorities on the properties of materials under extreme environments such as re-entry. Achivements of the division under Dr. Ritt include:

Molecular Electronics — Development of a complete workable electronic thin film circuit one millionth of an inch thick.

Quantum Electronics—Development of the most sensitive spectrometer ever reported, making possible insight into the workings of human cells to give a clearer understanding of disease mechanisms.

New Plastics — Development of a new family of plastics, with high heat stability and unusual electrical properties.

Research programs currently well underway include planet atmospheric exploration as well as problems basic to lunar exploration, gaseous discharge phenomenon; a new family of light weight materials that are stable to 2500° F; and high pressure synthesis of materials (such as used in production of man-made diamonds).

Dr. Ritt has published a total of 40 technical papers and has been granted five patents. He has served on the staffs of the University of Virginia and American University, has appeared on television science education programs and has made films on scientific subjects for the Ford Foundation for use in schools.

(See DR. RITT STORY, Page 3)

COMMENDATION LETTER CITES 'UNUSUALLY HIGH RELIABILITY' OF FINDER SYSTEM

Mr. W. C. Purple, Vice President for Engineering and Manufacturing, recently received a letter of commendation from Mr. M. F. Towsley, Manager of the Finder Installation for General Dynamics/Fort Worth. The letter is reprinted below for the benefit of all those Melpar People who had a part in the design and development of the FINDER System and its subsequent success at its field location.

Dear Mr. Purple:

The Installation and Phase II DT&E Testing of the FINDER System at SAC Headquarters has been completed. It was completed on schedule, and there is every indication that Melpar will be well under budget for this task.

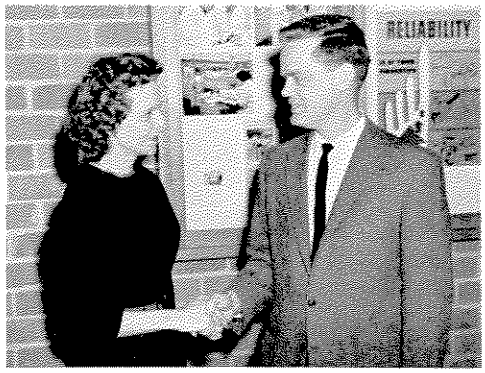
The phrases "on schedule" and "under budget," when used in conjunction with the FINDER System, are somewhat unique. It is my opinion that Melpar's contribution to our having the opportunity of using these phrases in conjunction with FINDER is attributable to two primary factors. One is the unusually high reliability of the system which was not completely anticipated, and the other is the excellent management of the Melpar portion of the task as performed by Mr. Fred J. Michel. Mr. Michel and I have enjoyed a harmonious working relationship based on mutual trust which has resulted in a minimum of red tape, lengthy discussions, and hence, program delays.

I would like to express my appreciation to all of those at Melpar who have contributed towards making the installation and testing of FINDER the success that it was.

Sincerely,
GENERAL DYNAMICS/FORT WORTH
A Division of General Dynamics Corporation

M. F. Towsley

M. F. Towsley
Manager of FINDER Installation



Mrs. Kathleen Drinkard, Light Assembly Task Leader, looks over a Hi-Rel board with Assembly Foreman Henry Shay in the Leesburg Pike Minuteman Assembly clean-room. Selection of Mrs. Drinkard for the December I-PEP Award marked the inauguration of the Minuteman Division's Individual Performance Evaluation Program.

Picture at right shows Mr. Bernard Ullom, Line Inspection Foreman for the Minuteman Division, congratulating Mrs. Helen King, 1st Class Line Inspector Task Leader, who won the I-PEP Award for January.

I-PEP and G-PEP Winners Honored at MM Award Luncheon

Winners of the monthly Individual and Group Performance Evaluation Program competitions (I-PEP and G-PEP respectively) were guests of honor at the February Minuteman Awards Luncheon.

Supervisors of winning groups in the G-PEP competitions were Lane Dudley, Richard Markham and Henry Shay. Key personnel selected to attend the luncheon by winning supervisors were William Gabriel, Reliability Group; Larry Fox, Materials Handling Group; and Mrs. Hazel Jackson, Assembly Group. Mrs. Kathleen Drinkard, Light Assembly Task Leader was presented with the first monthly I-PEP award as a result of the competition held in December. Also attending were Mrs. J. T. Lafrank, Dr. L. A. Schmidt and Dr. T. L. Wood, members of the G-PEP award committee, and Mr. K. E. Schreiber, the Minuteman Division Manager.

Subsequent to the luncheon, Mr. K. E. Schreiber announced that Mrs. Helen King, 1st Class Line Inspector Task Leader has been selected to receive the award for the January I-PEP competition and that Foreman Carl Dolinger's Assembly Retouch group has been chosen as the G-PEP winner for January. They will be honored at a luncheon in March with the February winners.

The Individual Performance Evaluation Program has been established in the Minuteman Division in order to emphasize the importance of the individual in achieving the Division's high reliability and cost-reduction goals. Candidates for the I-PEP Awards are nominated by their supervisor on the basis of the candidates' performance and suggestions leading to the improvement of reliability and reduction of costs. Final selections in the monthly competitions are made by the Manager of the Minuteman Division.

Anyone working on the Minuteman Program is eligible for the I-PEP Award.

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TECHNICAL LEC

Three Evening Technical Lectures were presented during December, January and February which reflect the Company's extensive program to promote the achievement of ever higher standards of reliability.

SOLDERING

The December Evening Technical Lecture was presented by Mr. Richard Hronik, Aerospace Division Project Engineer, on the subject of "Soldering"—one of the most important factors in achieving circuit reliability. Mr. Hronik gave a brief history of soldering dating back to ancient times followed by a discussion of the metallurgy of solder and soldering and a demonstration of soldering techniques.

Richard H. Hronik

Mr. Hronik demonstrated that the most important single factor in achieving reliable solder joints is cleanliness. He cit the Minuteman Division and Fuze Programs as prime examples of Melpar programs in which emphasis on cleanliness

"Simplicity Is The Password To Space System Reliability" . . . Mr. Leonard J. Blumenthal (Photo Inset), Manager of the Reliability Department, introduces an audience of 63 Melpar people to the very timely subject of "Space System Reliability" at the February Evening Technical Lecture. This was the first time that employees' husbands and wives were invited to attend the Evening Technical Lecture and according to Mrs. J. T. Lafrank, Personnel Director, approximately twenty of them took advantage of the opportunity.

Photos by Sakamoto

TURE SERIES FEATURES RELIABILITY TOPICS

is returning large dividends in the achievement of solder circuit reliability.

RELIABILITY OF CIRCUIT ASSEMBLIES

Continuing the emphasis on reliability in the January Evening Technical Lecture, Mr. H. Lane Dudley, supervisor of the Minuteman Division's Reliability Group, spoke on the subject of "Reliability of Printed Circuit Assemblies." Mr. Dudley discussed the factors which contribute to circuit reliability (or the lack of it) and described some of the reliability research Melpar performed during the revision of MIL-E-19600-A (AER)—the military specification for airborne modules—in the areas of component selection, heat transfer, life testing, and circuit investigations leading to the development of standard circuits for the Bureau of Weapons under a U. S. Navy Air Development Center Contract.

H. Lane Dudley

Emphasizing the position of central importance which reliability enjoys in the Minuteman Program, Mr. Dudley explained that the circuit reliability goals of the program for Mean-Time-Between-Failures (MTBF) of 28,000 hours are based on the requirement that each missile remain operational for three years once it is placed in position within the silo. He said that our television receivers with only 3000 parts have a MTBF of six months, whereas Minuteman, with 25,000 parts just in guidance and control, has already achieved a MTBF of 7000 hours or more than nine months. He then went on to discuss the fabrication and assembly techniques being used in the Minuteman Division to reach these high reliability goals.

Concluding his talk, Mr. Dudley emphasized that neither Melpar nor any other company has a panacea for producing reliable electronic sub-assemblies. However, he said, the importance of maintaining and improving process control cannot be overstressed. If at the end of research and development a module is as reliable as it can be made, then the only effect of the manufacturing process will be to decrease its reliability.

He gave special attention to the training program as an essential part of process control. Mr. Dudley said that since one bad solder joint can cause a missile to fail, each worker must be given the perspective of the overall Minuteman Program goals so that he can see that no matter how minute his role, it is just as important as the program director's.

SPACE SYSTEM RELIABILITY

Concluding the series of three Evening Technical Lectures dealing with reliability topics, Mr. L. J. Blumenthal, Manager of the Reliability Department, Reliability and Quality Control Directorate, presented the February Evening Technical Lecture on the topic of "Space System Reliability." The topic became especially timely as a result of Astronaut John Glenn's orbital jaunt in space earlier in the day.

Tracing the historical course of the increase in complexity of commercial products as well as weapon systems (i.e., parts and subsystems), Mr. Blumenthal identified this "complexity explosion" as the primary source of equipment or system unreliability. He said that if we consider reliability to be an inverse function of failure, that is, the more failures that can occur, the lower the chances of success—then we can see that the more components there are, the more items that can fail and the less the reliability ought to be. He added that if the odds against failure for each component in an ICBM with 300,000 parts are 100,000 to one, then the ICBM will fail an average of three different ways each time it is fired.

With reliability defined as "the probability that equipment will operate without functional failure for a specified period of time, and under specified environmental conditions, it becomes apparent, according to Mr. Blumenthal, that a number of compromises or trade-offs must be made between reliability and factors that increase equipment complexity such as, mission time and life, availability, maintainability, human factors, environments, safety, cost, and performance (accuracy, speed, range, etc.).

Moving on to his discussion of "Space System Reliability," Mr. Blumenthal observed that the additional requirements imposed by both manned and unmanned space vehicles has resulted in increased equipment complexity. Having noted earlier in his lecture that complexity is the chief source of equipment failure, Mr. Blumenthal said that it should be obvious that the corrective design technique is simplicity. He emphasized that simplicity is the password to space system reliability. There are many straws in the wind which give us hints, he said, as to the future systems we must develop for space and all of them reflect the demand for simplicity.

In propulsion the trend toward simplicity can be seen in the emphasis on development of solid and packaged liquid fuels. He noted that research in the use of solar cells is turning out well and that they are capable of great redundancy. The development of lighter weight structures and materials will permit greater reliability in other systems, by redundancy. In electronics, redundancy and higher component density will be facilitated by new techniques and applications such as welded modules, printed circuitry, microelectronics, thin films, semiconductors, and molecular electronics.

Stressing the need for prior knowledge of reliability in space systems, Mr. Blumenthal observed that adequate amounts of test data and time to design properly are becoming advantages of bygone days. Whereas with earlier missile systems we have been able to use test data from hundreds of test firings to wring defects out of the design and production processes, space systems cost too much to evaluate by test. Each Saturn launch is estimated to cost $12 million. He said we must demonstrate before-the-fact that the probability of success (the estimated or predicted reliability) will be high enough to insure success of the space system's mission.

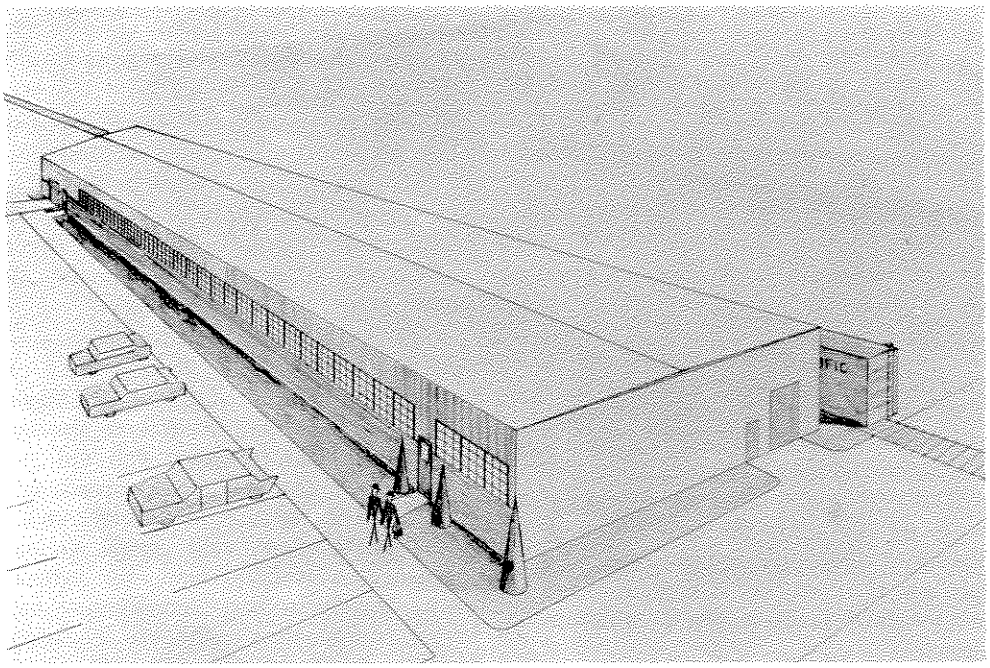
The Evening Technical Lectures are held in the Falls Church cafeteria and all employees, as well as their husbands and wives, are invited to attend.

DR. RITT

(Continued from Page 1)

He is a member of 16 professional societies, and has been elected to the Washington Academy of Science and the Geophysical Union. Both in 1960 and 1961, Dr. Ritt was nominated one of the Ten Outstanding Young Men of the Year by Northern Virginia Junior Chamber of Commerce Organizations.

Melpar's new Vice President received his PH.D. from Georgetown University in 1954 and his M. S. there in 1952. He graduated from Baltimore's Loyola College with a B. S. in 1950.



Artist's drawing of the "shell" building which will house the Company's newest subsidiary, Melpar-Fairmont Corportation. The 16,000 square foot building is being constructed by the Greater Fairmont Development Association and is scheduled to be ready for occupancy by approximately March 31st. "Shell" buildings are being constructed by development groups in many areas endeavoring to attract new industry. Only the outer shell of the building is constructed with the internal features completed according to the tenant's specifications.

GOING UP!

Promotions include L. L. Allison to Principal Engineer, T. L. Alnutt to Project Engineer, C. T. Ambrose to Senior Planner, and W. R. Anderson to Principal Engineer.

A. E. Baker advanced to Planning Support Supervisor, W. H. Boswell to Planning Coordinator, N. O. Brooks to Senior Planner, and C. G. Burns to Shop Foreman.

P. F. Combs moved up to Senior Planner, W. E. Cook to Inspection Foreman, S. H. Cotton to Senior Electrical Engineer, and A. A. Couvillon to Storekeeper.

W. E. Curry was promoted to Senior Planner, J. R. Dent to Senior Electrical Engineer, R. B. Dias to Design Engineer, and C. Dolinger to Assembly Foreman.

G. E. Donahue advanced to Inspection Foreman, R. C. Earnshaw to Administrative Staff Supervisor, B. L. Essary to Senior Electrical Engineer, and J. J. Giuliani to Test Engineer.

T. W. Glass moved up to Assembly Foreman, G. M. Greskovic to Planning Coordinator, R. J. Hale and F. V. Hamby to Electrical Engineer and J. C. Hicks to Planning Coordinator.

H. B. King was promoted to Design Engineer, P. A. Kiser to Engineering Assistant, E. A. Kump to Data Processing Systems and Operations Supervisor, and B. C. Langley to Junior Chemical Engineer.

J. D. Lewis advanced to Principal Engineer, R. G. Lynch to Assembly Foreman, J. L. Mooney to Specifications Supervisor, and J. T. Murray to Principal Engineer.

F. E. Papin moved up to Project Engineer, R. S. Peck to Planning Supervisor, C. H. Pitts to Planning Coordinator, L. R. Terry to Quality Control Engineer, and J. E. Waddle to Junior Engineering Assistant.

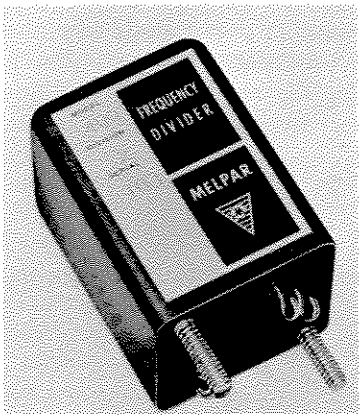
G. W. U. SPRING SEMESTER DRAWS 47 TO IN-PLANT MATH STUDY

Melpar's in-plant study program has enrolled 47 students in four mathematics courses being offered by the George Washington University for the 1962 Spring Semester according to Training Coordinator W. F. Fenton. With seventeen enrollments, the course in Basic Principles of Statistical Methods was the most popular of the courses. The balance of the enrollments were distributed between College Algebra, Analytical Geometry and Calculus I.

At press time well over 100 employees had applied for participation in the Melpar Tuition Reimbursement Plan covering courses being taken on-campus, in-plant and by correspondence.

New Products Corner

(This is the fifteenth in our series of reports on new products being marketed by Melpar's Special Products Division)



FREQUENCY DIVIDERS

A new line of Miniaturized Frequency Dividers have been developed by the Special Products Division which extend the useful frequency range of the Company's Tuning Fork Frequency Standards below 400 cps.

By using the Melpar Frequency Standard and the new Model 400 Dividers, precision frequencies from 3KC down below 1 cps, with accuracies of ± .01% over wide temperature ranges and severe environmental conditions, can be obtained without the use of an oven.

Typical applications of the Tuning Fork Frequency Standards being marketed by the Special Products Division include their use as a frequency reference for aircraft and missile guidance systems, precise time base for high speed counting, and as a clock pulse generator for tape recording. They will also be used with the new Frequency Dividers by one customer to replace a 6 cps motor driven commutator in an aircraft fuel flow system. Since the 250 to 300 hour useful life of the commutator units is approximately one-tenth that of Melpar's transistorized Frequency Standards and Dividers, the customer will be able to achieve a substantial cost-reduction through greatly increased operational reliability and utility.

The combined weight and volume of a Frequency Standard and its associated Frequency Divider can be as low as 5.4 ounces and 5.6 cubic inches respectively.

Each Model 400 Divider contains up to four binary stages, and provides frequency division up to 16:1. These Dividers can be connected in tandem for greater frequency division. Silicone rubber cushioning and hermetic sealing of the case combine to provide excellent resistance to extremes of vibration, shock, altitude, and humidity. Color coded terminals are provided so that the Frequency Divider may be easily connected to the desired circuit.