

Marine Corps Emphasis Is Physical Fitness for Combat

During the early months of the Korean War, Americans learned a bitter lesson that has been a truism since the beginning of organized warfare. The lesson was that in order to cope with the rigors of warfare, the youth of America must be in superlative physical condition.

In Korea, where the ridges looked rugged even to a mountain goat, American troops were confronted with the problem of extremes of climate and mountainous terrain, a combination which required a healthy, well conditioned body and a rugged constitution to overcome.

CO Believes in Physical Fitness

Lieutenant Colonel H. V. Joslin, Commanding Officer of Marine Barracks, also knows that the physical condition of men may well be the difference between life or death. Armed with this knowledge, and supported by directives from Headquarters Marine Corps, Lt. Col. Joslin insures that a continuing and rigorous physical fitness program may be divided into two distinct phases. They are military training with which this article is concerned, and organized athletics. The two, in conjunction, insure the highest state of physical fitness.

SeaBees Help

In order to insure that Marines have every opportunity to attain the high state of physical readiness required, an obstacle course was recently constructed east of the housing areas on "B" Mountain. With the Naval Reserve CB 11-2 unit from Bakersfield, California, providing the technical know-how and equipment, and the men of Marine Barracks providing the labor, this course was constructed in two days time. The result is a course that will test the physical prowess of any man.

Specific Purpose

Each obstacle is designed specifically to build up a specific part of the body. In order to gain the maximum advantage from the course, personnel running it must use the prescribed method of surmounting each of the obstacles. In this way, once a man has learned to run the course correctly, his body begins to round into shape.

It is imperative, however, that proper training be administered prior to running the course. At Marine Barracks, personnel are first "walked" through the course. The proper method of surmounting each obstacle is demonstrated and explained, and the purpose for the obstacle is stated. After the troops have become familiar with the course, they are run through it slowly. Any mistakes made are corrected on the spot. At first, no time limit is set for the running of the course. It is more important that the correct methods of running the course be learned in the beginning.

Time Limits

As the training of the troops continues, time limits are set on the running of the course. Special assistance is given those who fall to negotiate the course as prescribed. In special cases, where an individual is markedly overweight or underweight or lacks the physical coordination or dexterity required, medical attention may be called for. With proper dieting, most special cases can be resolved. Under unusual conditions an individual may not be able to run all or part of the course.

The obstacle course itself is divided up into a series of obstacles, each related to the other and each is designed to develop a high level of physical agility and adeptness.

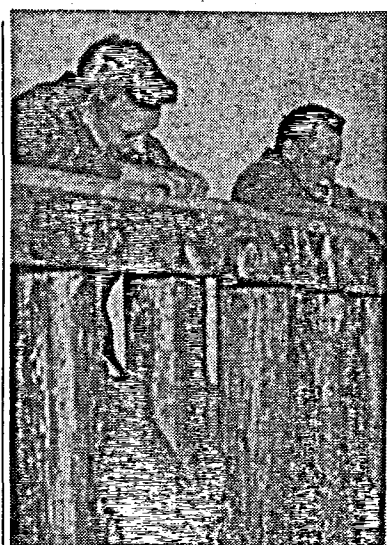
The Course

From the starting position, four individuals are run through the course together. The first obstacle that they encounter is an up and over bar, which is designed to develop the arms.

After negotiating the up and over bar, the individual's stride is broken by a low jump. These low jumps are spaced throughout the course to cause persons to break stride and jump with no more than a few steps in unbroken approach. The runner next is confronted by an elaborate system of logs and pipes which consecutively require him to balance himself, swing hand over hand on overhead pipes, balance walk on sloping logs, and execute a high log roll over.

High Roll

As the individual comes off the



RUGGED—After a tough day of this these two Marines will be ready for chow call and the sack.



"IF I HAD WINGS"—This wing-footed Marine clears the first of two 8 ft. wide pits.

high roll over he again must break stride because of the low jump logs. He must next surmount a log wall and, following that, the low roll over logs. He then is required to negotiate the vault logs, again break his stride on low jump logs, and then pull himself through the high double bar obstacle.

Double Bar and Low Jump

Immediately after dropping from the high double bar, the runner's stride is broken by a low jump and then he must jump the double pit which marks the end of the course. All of these obstacles build the muscular strength and wind of the runner, and tend to improve his muscular coordination. Upon completion of the course described above, the troops have the opportunity to run it again, this time in reverse. The obstacles accomplish the same purpose this time, only present a somewhat different problem to the runner.

End Results

As has been stated before, the sole purpose of the course is to build the Marine into as fine a physical specimen as possible. Only by being in superb physical condition can the individual Marine expect to fulfill his part as a member of the Marine air-ground team which has proven its effectiveness in combat.

The highly trained, well disciplined and physically fit Leatherneck is essential to the present concept of modern warfare.

With the discipline and training necessary to fight today's complex battles, and with the physical condition which will enable him to carry out his assigned mission, today's Marine is a worthy successor to those who fought and won the battles of Korea, World War II, and, indeed, all of the skirmishes that have gone before.

C.I.F. Champs...

(Continued from Page A-1)

racked up a perfect Golden League record before making history for the school by winning their first C.I.F. championship.

This is the fourth straight year Burroughs has played in the C.I.F. tournament and the third straight year of league championships.

Following a pep rally last Monday on the campus, school was dismissed for a half-day holiday in honor of the team's victory.

COMING EVENTS

St. Michael's Women's Guild

A regular meeting of the Women's Guild of St. Michael's Episcopal Mission will be held in the home of Mrs. Elinor Field, 522-A Nimitz next Monday at 8 p.m.

In addition to the meeting will be a kitchen shower for the new church kitchen.

Community Church Guild

The Circles of the Women's Guild of NOTS Community Church will meet during the month of March as follows:

Naomi Circle will meet Monday, March 17, at 8 p.m. in the home of Virginia Murphy, 103-A Mitscher.

Phoebe Circle will meet Tuesday, March 18, at 9 a.m. in the home of Mrs. Clare Hunter at 607 Lexington.

Mary-Martha Circle will meet Tuesday, March 18, at 1:30 p.m. in the home of Mrs. Ruth Bowles, 208-B Halsey.

Hannah Circle meets Tuesday, March 18, at 8 p.m. in the home of Mrs. Edith Huse, 203-A Wasp Road.

AICHE Meet

The March meeting of the American Institute of Chemical Engineers will be held in the Commissioned Officers' Mess Monday, March 17. Dinner is scheduled for 6:30 p.m. and the program at 8 p.m.

Dr. Hugh W. Hunter, Head of Propellants and Explosives Department will speak on the general role of elementary and secondary schools in scientific education.

A member of the Kern County Board of Education since it was organized in 1956 Dr. Hunter has taken an active part in PTA work. Members are urged to bring their wives.

Sports Car Club

The Indian Wells Valley Sports Car Club will hold a Gymkhana on the Bank of America parking lot at China Lake at 1:30 p.m. next Sunday, March 16. Entry fees will be \$1.

Dragster Invitational

A special dragster invitational is scheduled for next Sunday, March 16, at 9 a.m. and eliminations at 2 p.m. at the Inyokern Airport, according to the Dust Devils Auto Club, Inc., officials.

Some of the fastest roadsters in existence will be here to compete for a \$100 bond for a new speed record to exceed 155.17 mph. A \$50 bond will be given for top eliminator and five \$25 bonds to the first five cars to turn in a speed of over 125 mph.

Job Opportunities

Administrative Officer, GS-12. As Head of Staff, Engineering Department, the incumbent would perform studies involving plant and facilities, methods analysis, economy, safety and operational procedures, supervise staff employees performing personnel, budget, fiscal and general administrative functions.

Incumbent will represent the department at technical and staff meetings, panels and committees, with other departments and outside activities. Candidates must be well experienced in administration. Interested persons should contact Mrs. Auchterlonie, Ext. 71393.

Maintenance Engineer, GS-13. Subject Engineer is to occupy the Directorship of the Controlled Maintenance Division within the Public Works Department at NOTS.

The Maintenance Control Division is responsible for the integration for a maintenance work load program, the continuous inspection of public works and public utilities in order to reveal the need for maintenance work, the preparation of man-power and material estimates for job orders, determination of the need for engineering advice and assistance, and the initiation of the performance of work by contract. Those interested should contact Ann Carter, Ext. 72215.

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ROCKETEE

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Vol. XIV, No. 10

U. S. Naval Ordnance Test Station, China Lake, California

Friday, March 14, 1958

Seabees Celebrate 16th Anniversary

The Naval Reserve Construction Battalion Division 11-2 will have a Cake-Cutting Ceremony and Teen-Age Dance tonight at 8 p.m. in Burroughs Cafeteria in honor of the unit's 16th anniversary. The event is admission free and will be open to the public.

Highlights of the evening will include the crowning of the "Queen Bee" who will reign over the festivities. The four candidates vying for the honor are: Linda Darneal and Carmen Abbott of Trona High School; and Peggy Milligan and Dolores Burke, of Burroughs High School.

Cdr. S. W. Mitchell, Head of Command Administration Department, will deliver the welcoming address in behalf of the Station Commander, Captain G. H. Carruthers, Public Works Officer, will officiate in the queen coronation ceremonies.

Master of ceremonies for the occasion will be Tom Reside, 11th Naval District SeaBee Reserve program officer. Cdr. R. C. Ingram, Assistant Public Works Officer, will talk on the significance of the SeaBee birthday and the opportunities the SeaBee program offers young men.

The coronation and birthday cake-cutting ceremony will be followed by dancing to the music of the "Pastels."

Arrangements for the anniversary celebration were under the direction of LCDr. Irwin I. Shull, USNR, commanding officer of the local SeaBee unit.

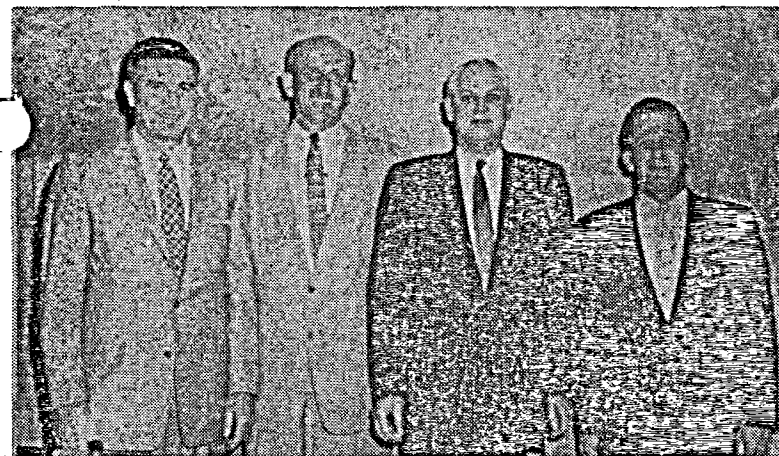
Junior High Pupils Give Vocal Concert

George Carson, head of Burroughs High School music department, will serve as guest conductor of the 100-voice East Kern Elementary Honor Chorus at a concert to be held tonight at 7:30 in the James Monroe School auditorium in Ridgecrest. The concert will be presented to parents and friends free of charge.

Vocal teachers preparing students from the seventh and eighth grades are Letha B. Julian of Edwards and Gephart; Marilyn Thixton, Burroughs Junior High School; and Emma Lou Kahrt, Indian Wells Valley School District. Emma Lou Kahrt, chairman of the concert, is being assisted with the preparations by Alice Dale and PTA mothers.

The program will include a varied group of folk songs, spirituals and art songs by Robert Franz and Johannes Brahms. The James Monroe orchestra, directed by Willard P. Swadburg, will present several selections.

Since coming to China Lake in 1954, Carson has served as chairman of the Kern County High School Honor Chorus in 1956, and the Desert Area High School Honor Band and Chorus in 1957. He is also director of music for the NOTS Community Church.



CREDIT UNION DIRECTORS INSTALLED—Directors of the NOTS Employees Federal Credit Union for 1958-59 have been elected and installed. The newly-elected Board (l. to r.) are: Henry H. Wair, president; William Koontz, vice-president; Robert Holloway, treasurer; and Lewis Radcliff, clerk.



CAP CHAPLAINS VISIT NOTS—California Wing Civil Air Patrol Chaplains met here this week for a three-day conference which included a tour of the Station's facilities. Shown in front row (l. to r.) are: Cdr. J. D. Hester, Station Chaplain; Maj. D. T. McLaughlin, San Jose; Capt. Russell Hensley, Reseda; Maj. C. J. Hinkley, Bolling AFB; Capt. William Clayton, Arcadia; Lt. Harold Best, Azusa; Lt. Marilyn McCampbell, San Jose; Lt. W. James Smith, Pacoima; Capt. Terman Krus, Corona; Lt. Robert C. Thomas, Palmdale; Maj. Fred L. Richards, NOTS. Second row (l. to r.) are: Capt. J. M. Postle, Hawthorne; Lt. Calvin

Seavearingin, Tulare; Lt. LeRoy E. Gillaspie, Bellflower; Henry Ball, Brentwood; Lt. Leonard Soper, Compton; Lt. Loren G. Pettersen, Whittier; Lt. Albion Hoff, La Mirada; Maj. Neville E. Carlson, Fillmore; Third row (l. to r.) are: Maj. Gordon Blalock, Bakersfield; Lt. Al Blumehien, Oxnard; Lt. R. W. Combs, San Jose; Lt. Robert C. Wheatley, Vallejo; Lt. William Summerscales, San Carlos; Capt. Gerald Polman, Glendale. Fourth row (l. to r.) are: J. Wesley Yardo, Santa Clara; W. Shelburn Brown, Pasadena; Lt. Don Farrand, Palo Alto; A. F. (Andy) Hayes, Glendale; Capt. John A. MacDonald, Lakeport.

Burros Team Grabs C.I.F. Champ Title

Dallin Childs was the man of the hour last Friday when he led the Burroughs High School basketball cagers to the C.I.F. championship in the Northern Group of the Southern Section by defeating Bell Gardens 41-40, scoring the winning point in the last 15 second of play. Over 100 schools competed for the title.

Played before a standing room only crowd in the Trona High School gym, the championship game proved exciting from beginning to end. Burroughs led 13-7 at the end of the first quarter with Bell Gardens continually creeping up to tie the score 30-all at the end of the third quarter.

Until the final 45 second of the game Bell Gardens led the Burros 37-40. Jay Carty was fouled, tossed a free throw and narrowed the score one point. Bell Gardens retrieved the ball only to have Childs steal it back from under their basket. Childs made the winning field goal and the crowd and team went wild.

The Bell Gardens team outsize the Burros, but also made four more fouls with one of their players fouling out.

High point man for the Burros was six-foot-six Jay Carty who scored 13 points. Doug Brewer chalked up 11 points for a close second followed by Bill Wilde, seven points; Dallin Childs, six points, and Larry Fletcher, four points.

The victorious Burros and their coach, Jim Nau, were honored by the school and community for their outstanding season of 23 games won, two lost. The team previously defeated San Luis Obispo 51-36 in the preliminaries to the C.I.F. tourney, then beat St. Agnes 65-52 in the semi-finals before they met Bell Gardens in the finals. The Burros (Continued on Page A-4)

Leaves After 14 Years



Arthur S. Ellings
ENDS 14 YEARS AT NOTS—Today Arthur S. Ellings, Division Head, Product and Production Engineering Division, will end 14 years of employment on the Station. Ellings came to work on the Station in October 1944 for Caltech and transferred to Civil Service when the Navy took over in 1945. Under the old Rocket Department, he was a project engineer in development of the 2.75 Mighty Mouse rocket. He transferred to the Engineering Department in July 1954. On his termination at NOTS he will be employed by Ramo-Wooldrige in their new space technology laboratory.

CS Exams Open For Station Jobs

Civil Service examinations have been announced by the Board of U. S. Civil Service Examiners, Eleventh Naval District, San Diego for vacancies at China Lake.

Applications may be filed with the Board Representative in the Personnel Department, Ext. 72657, not later than March 31 for the following:

Meat Cutter at \$2.27 per hour with two years experience; Meat Packager at \$1.91 per hour with six months experience; and Helper, Lithographic Pressman at \$2.01 per hour with 6 months experience.

Other examinations to be accepted until further notice are:

Electrician (Telephone) at \$2.52 per hour with 3 years experience; Fireman at \$2.18 per hour with 1 year experience; Heating Plant Operator at \$2.27 per hour with 2 years experience; Electrician (Aircraft) at \$2.52 per hour with 4 years experience; and Cable Splicer at \$2.52 per hour with 3 years experience.

Synopsis of Special Services In China Lake Schools Listed

(This is the first in a series of articles proposed to inform the community of the special services offered children in the China Lake Elementary District.)

Many people in the China Lake area are not aware of the special services that are offered here by the China Lake Elementary School system. In addition to the regular classroom teachers, there are others who play an important role in meeting the objectives of education and the needs of children.

With the rapid development of a complex urban life, modern inventions, and the shift from individual ownership of farms and small business to employment in large industries, education has taken on much more important, complicated, and far-reaching aims, methods, techniques, and procedures.

Educators today feel that education and life should be synonymous enough so that the objectives of one are the objectives of the other. This then puts the burden of many special services upon the school district.

Each of these special services will be explained in detail in the ensuing articles. The educational objectives of each service will be noted and the methods used to reach these objectives will be shown.

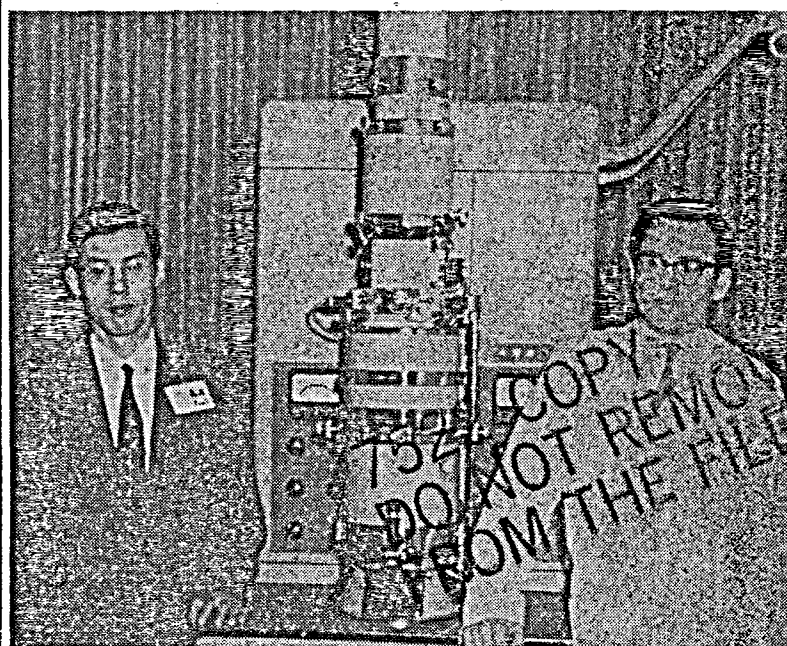
Wanda Shomate is employed by the school district to be a leader in the development of the curriculum in all the different subjects, supply text books and materials, and assist in supervision of teaching techniques.

Gene White, supervisor of the district's hot lunch program, has jurisdiction over the four cafeterias operating in the China Lake Elementary School District.

Wanda Wisler is a teacher of handicapped children. A separate classroom is maintained for these children and the class attendance is small, allowing for individual instruction.

Sylvia Tillitt, Junior High School principal, directs the gifted child program, designed to enrich the curriculum for children with superior ability.

(Continued on Page A-4)



ELECTRON MICROSCOPE ARRIVES—Tsugio Ito (left) of Japan Electron Optics Laboratory Co., Ltd., and Dr. Ernst Bauer of Research Department are shown with the newly-installed JEM-5G electron microscope in Research Dept. First of its type in this country, the instrument will be used to provide knowledge fundamental to the problem of search and detection in electron microscopy and diffraction.

ROCKETEER

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CAPTAIN W. W. HOLLISTER, UNITED STATES NAVY
Commander

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BUDD COTT
Editor

PHILLIPS WAIR
Asst. Editor

Nova Semeyn, Annex Correspondent (Foothill, phone Ext. 35). Art by Illustration Group, Technical Information Department. Photography by Rocketeer Photo Staff—Bob Fortinberry, PHAN, Randy L. Lyles, PH3. Photographers for the Pasadena columns are—Shav Monsen, A. E. Black, and D. Sanchez.

Office Building 35, Top Deck — Telephone 71354, 72082, 71659

'Name the Center' Contest

By Contest Chairman "Mike" Michaelson, SN, VX-5

Sometime in April the new youth recreation center is due to open and a contest for naming the center starts today.

Entry blanks have been distributed to high school students and must be returned by April 1, the closing date of the contest, to representatives of the Teen Organization Management Board (TOMB). Each person is limited to one entry. Keith Emerson is the high school distribution chairman.

Military representatives are: David Watkins, FN, NAF; Robert Avalos, AN, NOTS; "Mike" Michaelson, SN, VX-5, and Henry "Phil" Pott, Marine Barracks.

The winning entry will receive \$10 in cold, hard, but beautiful cash. The four runners-up will receive free membership cards. So submit your entry now and you might be \$10 richer!

Town Hall Meeting

Next Monday night, March 17, at 7 o'clock, a town hall meeting will be held in the Community Center.

A panel composed of TOMB members will conduct the meeting to answer questions of persons interested in the function of the youth recreation center.



GIRL SCOUT LEADERS HONORED—Local leaders in Girl Scout work are honored at a tea held during Girl Scout Week for outstanding leadership. Cornelia Butler, Senior Scout (third from left) congratulates leaders (l. to r.) Betty Curtis, Charlotte Gould, and Mildred Searly during award presentation ceremonies at the Girl Scout Troop House.

Girl Scout Week, March 9-15 Celebrates 46th Anniversary

During the week-long 46th anniversary celebration of Girl Scout Week, March 9-15, local troops participated in the observance by presenting awards of merit to adult leaders.

Highlighting the week of activities was a tea held in the Girl Scout Troop House on Sunday, March 9, honoring local Girl Scout leaders.

Mrs. Maurice Curtis was presented a "Thanks" badge for her work as District Chairman of the Indian Wells Valley Girl Scouts and her work as member of the Kern County Girl Scout Council. Mrs. Curtis has accepted another duty as personnel director of Kern County Council Girl Scouts.

Mrs. James Searly received a "Thanks" badge from the girls of Girl Scout troop 24 for her enthusiastic leadership in District Day Camp, Sing Outs, and activities from Brownie Days through the Intermediate stage into Senior Scout programs.

Mrs. Albert Gould received an Honorary Life Membership from East Kern County Council PTA for her service to youth through Girl Scout leadership.

"Beautification" was announced as the Council-wide project for Kern County Girl Scouts at a meeting of the Kern County Council Girl Scout Board here last Wednesday.

Girl Scouts of Indian Wells Valley will work with their fathers to

Your Credit Union

Q. Can you get a new loan from your Credit Union if you still have some payments to make on your old loan?

A. There's nothing to stop you from borrowing again while you still owe money. Every loan is judged on its merits.

Q. Can you withdraw your savings from the Credit Union any time you want to?

A. Yes. Credit Unions have the right to require prior notice, but they rarely do.

Q. Who owns the Credit Union?

A. Your Credit Union belongs entirely to the members. No one else owns any part of it.

3rd Science Student Reports Lab Study

Fluid dynamics, super-sonic speeds, air flows and reflection of light rays are some of the subjects Kurt Herzog, Burroughs High School senior, is studying under the supervision of Naval Ordnance Test Station scientists.

Kurt is one of nine students at Burroughs chosen for the "work experience" program which gives high school students practical application of scientific classroom theory. Edward Price of the Physics division of the Research department at Michelson Laboratory is supervising Kurt's study which involves learning the operation of wind tunnels and how to test super-sonic models.

The program of study and research will continue for the remainder of the school year, and it is hoped to be continued and enlarged next year.

Kurt is the son of Mr. and Mrs. Stephen Herzog. Herzog is an engineer at NOTS. Kurt intends to major in physics and minor in astronomy and mathematics when he attends college next year. Although he has chosen the general area in which he wishes to study, he points out that he will have to narrow his interests in physics to a more specific category. Kurt feels that students should be encouraged to think of fields of specialization while they are still in high school. "We don't need men who know physics as much as we need men who are specialists in, say, brass or ceramics," Kurt stated.

Parents and educators are concerned with the science and math programs in the nation's high schools, and Kurt feels that the education is probably satisfactory, but that even college graduates are not certain of or trained in fields of specialization.

Among his other interests, Kurt is an announcer for a local radio station and a ham radio operator whose contacts have included Hawaii, Japan, Argentina and Alaska.



JGA GRADUATES—Certificates are earned for successful completion of the Station's Junior Government Assistant trainee program by (l. to r.): Gerald A. Bagley, Yvonne Treadwell, and Joseph E. Doucette.

JGA Trainees Graduate After Completing Six-Month Course

Certificates for satisfactory completion of the Junior Government Assistant (JGA) program were presented to three Station employees at graduation ceremonies held in the Community Center on Thursday, March 6.

Recipients of the certificates presented by Captain F. A. Chenault were: Yvonne Treadwell; Gerald A. Bagley; and Joseph E. Doucette. Roland C. Reider, a fourth trainee to complete the program, was not present at the ceremonies. These trainees have completed

an intensive six-month program which included orientation and work assignments in all of the support departments on the Station, as well as a one-month tour in one of the Station's technical departments. Mrs. Treadwell, a Station employee since 1952, has worked as a secretary in Aviation Ordnance, Department, and in the Office of the Associate Technical Director. Her educational background includes one year at Long Beach Junior College and numerous Bakersfield and UCLA extension courses.

Since completing the JGA training program, she has been working as Education Specialist in Employment Development Division of the Personnel Department. Her duties include coordinating the training programs for the JGA classes and Station technical lecture programs.

Joseph Doucette came to the Station from the state of Wisconsin to enter the program in July, 1957, bringing with him his wife and five children.

A Navy veteran of both the Korean conflict and World War II, Doucette studied engineering and social science in Wisconsin colleges. He has had 15 years experience in the Boy Scout movement and is presently active in both Cub and Boy Scout work. He is presently assigned to one of the Personnel Service teams as Personnel Specialist.

Gerald Bagley transferred to NOTS in November, 1953, from the U.S. Bureau of Reclamation in Fresno. Before entering the JGA program, he worked at the Salt Wells Pilot Plant and the Security Police.

He was formerly an Intelligence Specialist with the U.S. Air Force for five and one-half years, and has completed four years of law study with LaSalle Extension University. Bagley has been assigned as a Management Analyst in the Management Engineering Division, Central Staff.

Roland Reider, selected for the JGA program when he came to NOTS in July, 1957, had a master's degree in history from the University of Michigan. Reider left a few days prior to the graduation ceremonies to accept a position with the Chemical Engineering Department for the Michigan State Board of Agriculture.

He has also been offered an instructorship at Escuela Nacional de Antropologia e de Historia in Mexico City for the year 1959.

The collier JUPITER was the first electrically powered U.S. Navy ship, the first to transit the Panama Canal, and was converted and renamed as the first aircraft carrier, the USS LANGLEY.

National Library Week

"Wake Up and Read" is the motto of National Library Week, March 16-22.

What's Doing IN RECREATION

By Jean Cone, Recreation Director

The St. Patrick's Day celebration at the Community Center tonight will probably be one of the gayest adult St. Patrick's Day dances of the year.

To get the evening off to a lively start, there will be community singing from 8:30 'till 9 p.m. If you enjoy singing those lovely airs from Erin or the all time hits, join us in this song session.

The people of the Emerald Isles are recognized as having originated one of the oldest dances in history—the famous Irish jig. This along with the hornpipe and the reel, will be exhibited by the Desert Dancers about 10:15 tonight. These lively dances are exciting to watch with the intricate choreography, gay costumes, and spirited music.

As you probably know, St. Patrick broke the power of the Druid priests and drove the snakes from Ireland. He explained that the little shamrocks of the field were symbols of the Christian faith and stood for the Holy Trinity. This symbolism continues as a popular tradition by wearing something green and using shamrock decorations on St. Patrick's Day.

In addition to these obvious and

expected signs, there will be decorations of obvious interest for those of you who have Irish names.

Don't forget to get there early for the singing and for the first downbeat of the Wally Webb orchestra!

Las Vegas Tour

A tentative date of April 11 to 13 has been set for the first tour of the season. The tour will go to Las Vegas on Friday and return on Sunday. Details will be available at a later date. However, if you're interested in such a trip, you may leave your name on a reservation list at the Special Services Office (71791) so we can plan on the number of people wanting to attend.

Film Society

Next week, on the 19th and 20th, the fourth of the Film Society spring series will be shown at the Anchorage at 8 p.m. The film will be "Mr. Hulot's Holiday" which was made in France in 1953. Jacques Tati is featured in this slapstick comedy about a vacation at the seashore. This pantomime is reminiscent of Charlie Chaplin and won a grand prize at the Cannes Film Festival.

Southland Recreation

Santa's Village March 1 - April 6
Easter Bunny, March Hare, Alice in Wonderland, and other storybook characters will come to life at Santa's Village. There are daily egg hunts, an Easter Bunny Parade, and Easter gifts for children. Santa's Village is located on state highway 18 at Skyforest, near Lake Arrowhead, in the San Bernardino mountains and is open every day.

Desert Circus - March 12-16
For the 22nd year, Palm Springs will stage its annual desert circus at which time this famous resort goes western. There will be a parade, street dances, and a kangaroo court for those not dressed in western style.

Board of directors candidates include: Mrs. Sid Brooks, Director of Organization; LCDr. James McGlothlin, Director of Public Welfare; Mrs. Carlos Elmer and LCDr. Frank Johnson, Director of Education; Mrs. Nick Kleinschmidt, Director of Health and Recreation; and Mrs. Wallace Knobloch, Director of Home Service.

Following the elections, a program pertaining to the science curriculum in the elementary schools is being coordinated by Mrs. Wanda Schomate for the parents of grade school students.

Little League Tryout Slated Tomorrow

Tryouts for 11 and 12-year-old boys interested in playing in Little League baseball this season will be held at 9 a.m. tomorrow morning at Little League Diamond No. 1, corner of Richmond and Forrestal. On March 22, tryouts will be held for 10-year-olds and younger.

The purpose of the tryouts is for managers and coaches to look over the prospective baseball players in action.

Every boy who desires to play shall have an opportunity to do so at some level of play. The League is made up of three levels: the "A's" or majors; the "AA's" and "AAA's" or minors, with "AAA's" being mostly 8 and 9-year-olds. Managers will contact the boys personally or by postcard to notify them of the time to report for practice.

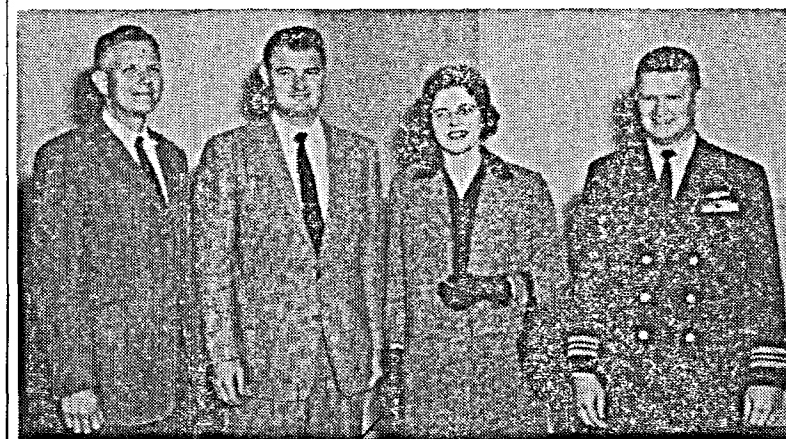
A signed application is a must for all players.



Your Benny Sugg cash award could buy her that mink stole!

Navy Incentive Award Program

News from Pasadena



B-I-E DAY—Participating in B-I-E Day activities at NOTS Pasadena on Friday, March 7, (l. to r.) are: J. H. Jennison, Head of Product Engineering Division; Richard Busik, a mathematics teacher at Marshall Junior High School; Dorothy Alley, Spanish-French teacher at Pasadena High School; and LCDr. W. H. Robinson Jr., Technical Officer.

Business-Industry-Education Day Observed; Host Local Teachers

Participating in the fourth annual Business-Industry-Education Day, NOTS Pasadena last Friday was host to 16 teachers of Pasadena public schools.

The event was sponsored by the NOTS host, and heard talks by J. H. Jennison, Head of Product Engineering Division, Underwater Ordnance Department, and LCDr. W. H. Robinson Jr., Technical Officer.

Their tour included a station film, the hydrodynamic simulator, the model laboratory, the gage laboratory, manufacturing shops, and a general discussion period with station officials.

Teachers visiting NOTS were Loreta Henrichs, Herbert Bullard, Calvin Stark, and Axel Kvorning, all of Pasadena City College; Fredrick Purdy, Richard Busik (brother of John Busik, P8094), and John Campbell, of Marshall Junior High School; John Venable and Walter Mack of Muir High School; M. Elizabeth Collins, Garfield Elementary School; Margery Clark, Webster Elementary School; Alphonse Cechvala, Washington Junior High School; Robert Magee, LaCanada Junior High School; Carol Melten, McKinley Junior High School; and Stanley Gunstream and Dorothy Alley, Pasadena High School.

A group of 16 teachers arrived at Foothill at 2 p.m. They were welcomed by E. J. Jones Jr., Deputy for Administration, their official

Personnel Statistics

Supply—Catherine M. Livermore from typist, GS-2, to clerk-typist, GS-3.

Public Works—Thomas C. Byrne from laborer (heavy) to auto mechanic.

UOD - Maurice R. Marchesini from chemist, GS-7, to chemist (physical), GS-9; Robert Larson from supervisory ordnance technician, GS-11, to supervisory engineering technician (general), GS-12; and John LaBosky from metallurgist (foundry), GS-11, to launch design engineer, GS-12.

New Employees
Latest member to join the Professional Development Program is Thomas F. Pascoe. His first assignment is in the Missile Development Division, Underwater Ordnance Department.

Pascoe holds a B.S. degree in electronic engineering from Loyola University.

Public Works Division, Pasadena, has two new employees. They are Walter J. Rode, a general engineer, and Robert L. Clark, a welder (combination).

The president, vice-president, and chief metallurgist gave talks on the operations of the company.

Agnes Tittermary and W. S. Hawkins of the Engineering Department, NOTS, arranged the tour and Mr. Hawkins accompanied the group.

The tour is part of the educational plan of the Professional Development Program.

Ten Seats Open On European Trip

The NOTS Overseas Club's trip list will be closed soon, according to a recent announcement by Leonard Semeyn, chairman.

There are only ten seats open on the Club's chartered airplane, leaving for Europe on May 28, landing at Amsterdam, Holland, and returning to Los Angeles on June 26.

To obtain a copy of the itinerary, call Nova Semeyn, Extension 35.

Annex Vacancies

Machinist (Experimental, or Machinist. Two vacancies, located in the Underwater Ordnance Department, Pasadena Machine Shop.

Interested persons contact Madge Davis, Extension 103.

RAT Display Will Be Shown At Open House

The Navy's Rocket Assisted Torpedo (RAT), recently receiving national acclaim, will be on display next Sunday, March 16, 2-4:30 p.m. in the Building 7 conference room. NOTS employees are invited to bring their families and friends to see the display.

In addition to the RAT exhibit, a short film of an actual firing will be shown throughout the afternoon.

The open house is sponsored by the Underwater Ordnance Department, instrumental in the development of the missile, and personnel of the department will be available to answer questions.

Guests of NOTS employees will not require a gate pass. Cameras are not permitted aboard the station.

Production Methods Are Studied by JPs At Industrial Plant

Recently visiting Consolidated Western Steel of Los Angeles were 25 Junior Professionals—18 from the Underwater Ordnance Department and 7 from Engineering Department.

Consolidated Western, a subsidiary of U. S. Steel, conducted an outstanding tour for the JPs, showing them a complete production line for the NIKE-HERCULES launchers, a new method and Hydrospro machine for making large seamless missile motor chamber tubes, railroad car manufacture, foundry, experimental forging, launcher tubes for large missiles, and methods of welding.

The president, vice-president, and chief metallurgist gave talks on the operations of the company.

Agnes Tittermary and W. S. Hawkins of the Engineering Department, NOTS, arranged the tour and Mr. Hawkins accompanied the group.

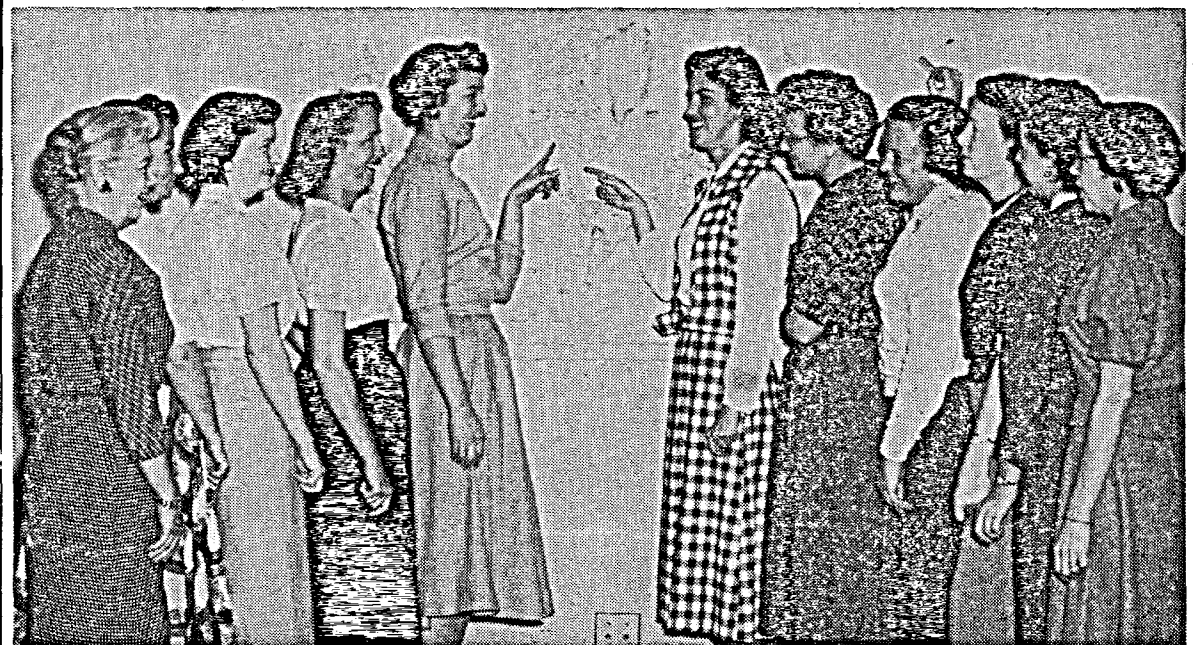
The tour is part of the educational plan of the Professional Development Program.

Family Camp Life Will Be Subject At Noon Show Wed.

Family camp life at Crested Butte, Colorado, will be depicted at the noon-time entertainment program on Wednesday, March 19, 12-12:30 p.m. in the Building 7 conference room, presented by Carl A. Kuhn.

The weekly programs are sponsored by the Employees Service Organization.

Persons having suggestions for future programs are asked to contact Fred Eaton, chairman of the noon-time programs.



EX-GIs—Reminiscing of places stationed while in the service during World War II, NOTS Pasadena's ex-service women and their branch of service (l. to r.) are: Dena Moody, Army; Bertha Walsh, Navy;

JoAnn Gorz, Marine Corps; Ruby Todd, Army; Shirley Greenly, Navy; Doreen Reddick, Navy; Nova Semeyn, Army; Virginia Banister, Navy; Clara Fluke, AF; Betty Butler, AF; and Cathy Caves, AF.

America's Press Tells of 'RAT' System

STAR-NEWS
UTHERN CALIFORNIA'S FINEST EVENING NEWS
PASADENA, CALIFORNIA, TUESDAY, FEBRUARY 11, 1958
XX

Journal American
LOS ANGELES
No. 25,507
EVENING

CHICAGO DAILY NEWS
LOOK OUT BELOW!
The U.S. Navy today took the wraps off a new anti-submarine weapon, the RAT (Rocket Assisted Torpedo), revealed at the Naval Ordnance Test Station, which is being studied and developed by these four men, who helped produce this Navy's newest and longest submarine weapon shown with them. Left to right are Douglas Wilcox, Naval Ordnance Division of the Annex; Capt. W. W. Hollister, China Lake; Capt. Jack J. O'Brien, Station Commander; and Dr. Wm. B. McLean, Station Technical Director.

Washington Post
MISSILE CALLED ANSWER TO RUSS UNDERSEA THREAT
The U.S. Navy today took the wraps off a new anti-submarine weapon, the RAT (Rocket Assisted Torpedo), revealed at the Naval Ordnance Test Station, which is being studied and developed by these four men, who helped produce this Navy's newest and longest submarine weapon shown with them. Left to right are Douglas Wilcox, Naval Ordnance Division of the Annex; Capt. W. W. Hollister, China Lake; Capt. Jack J. O'Brien, Station Commander; and Dr. Wm. B. McLean, Station Technical Director.

The Philadelphia Inquirer
New Navy Rocket-Shot Torpedo Anti-Sub M Unveiled by Parachutes to Sea to Hunt F

San Diego Union
The Rat is a Bargain
RAT provides an immense tactical advantage at relatively low cost. We don't have to build new ships to accommodate RAT, it fits into

New York World-Telegram
Missile Made in No. Cal.

The New York Times
"All the News That's Fit to Print"

San Francisco Examiner
MONARCH OF THE DAILIES

NOTS Develops 'RAT' - - Potent Killer

NOTS Newest Concept Is Scourge of the Sea

A basically new concept of anti-submarine warfare has been developed by the Navy's Bureau of Ordnance—the rocket-thrown torpedo weapon system, RAT. Its speed and mobility defies the methods of defense and counter attack used during World War II. This automatic weapon system can detect a submarine at long range, compute its course and speed, aim a launcher, and fire a missile.

What It Does
In order to appreciate the importance of the RAT weapon system we have to imagine the combat situation in which the system will be used. Let us assume a destroyer is steaming at sea screening a convoy of merchant ships. Its sonar continuously searching for submarines, suddenly picks up a signal and starts tracking. Before the alarm has stopped sounding, the object has been identified as a submarine and its position, course, and speed have been determined. Before RAT existed the ship had only two alternatives: It could call for aircraft assistance and direct the pilot to the target; or the destroyer could pursue the submarine and attack at close range. If the destroyer pursued the submarine it had to leave its station and expose the convoy to a potential attack from other submarines. In either case the submarine had ample time to launch its own torpedoes against the convoy and against the destroyer itself, and a good chance to get away.

New Attack Method
RAT has changed all this. As soon as the ship's sonar begins tracking the submarine it starts feeding the information to the fire-control system. Within less than a minute fire control has computed the aim point, the launcher swings into firing position, the launcher door opens and the missile roars into the air. The airframe separates from the torpedo, carrying the rocket shell with it, while the torpedo continues on its trajectory to enter the water at a point where it has the best chance to detect and attack the submarine. All this time the submarine commander, deep below the surface, doesn't even realize that he is being attacked.

When he detects the torpedo, it is usually too late to escape. And the destroyer did not have to leave its screen station, exposing the convoy, and to chase after the submarine, exposing itself. If more than one submarine is present, the destroyer can fire another missile immediately and two more within a few seconds; reloading the launchers takes less time than locating the new target. RAT kills subs without exposing its mother ship.

RAT Is a Bargain
RAT provides an immense tactical advantage at relatively low cost. We don't have to build new ships to accommodate RAT, it fits into

the ships we already have. Equipment for target detection and tracking is already aboard. The RAT fire-control system is merely a modification and extension of existing fire control. The launcher is new, but its cost is relatively modest. And the missile itself is inexpensive too; it carries out the NOTS trademark of simplicity of design and maintenance.

The increased anti-submarine warfare capability which the destroyer gains from the RAT Weapon System installation is obtained without requiring removal of any weapons or equipment already aboard.

RAT requires no additional personnel; the normal crew of the ship can operate and maintain the RAT weapon system after brief training. How little maintenance it needs became evident during a recent six-month cruise of a RAT equipped destroyer in the West Pacific.

Who Developed RAT
The Bureau of Ordnance assigned the design, construction and installation of the launcher to the Puget Sound Naval Shipyard, Bremerton, Washington; the torpedo was developed by Clevite Research Corporation, Cleveland, Ohio; the development and production of the fire control system to Librascope, Inc., Glendale, California; and the design, development and testing of the missile to NOTS. The detection system was already in existence, provided by the Bureau of Ships.

In addition, NOTS was charged with the technical direction of the entire program and with organizing and supervising the testing of the first installation of the weapon system aboard ship. In this latter task NOTS was assisted by Librascope, who was awarded a prime contract late in the development phase and who, in addition to furnishing the fire-control system, coordinated the documentation and assisted in the procurement of the hardware and its installation aboard ship.

This installation, except for the launcher, was made at the Long Beach Naval Shipyard. The credit for successfully completing the program on schedule is due to the effective cooperation of all the naval activities and private contractors and subcontractors involved.

RAT was first revealed to the public at a Pasadena press conference held on February 10, which was attended by 60 newsmen representing 40 news media.

The Wilcox Story
Deep in Wilcox's philosophy is a firm belief in the effectiveness of a governmental laboratory staffed with outstanding scientists and engineers and working in close coordination with Fleet officers assigned to provide insight on the Navy needs.

This ability to work in creative harmony is rooted in mutual respect and acceptance between the military and the scientific community. It is evidenced in the informality of the relationship, the acceptance of new ideas advanced by either group, and the ability of members of each group to share either responsibility or credit as the development moves ahead or grinds to a halt.

Douglas Wilcox was born in 1921 and is a native of New York. After a year and a half at Cornell University, he served in the Army Ordnance Corps during World War II. He then resumed his studies at Cornell and received a Bachelor of Mechanical Engineering Degree in 1948.

He is the first Head of the Underwater Ordnance Department to make his career entirely within the organization. Moving swiftly from an entry level of P-2 (presently GS-7) to his present position of Physical Science Administrator

(GS-16) he demonstrates that Civil Service can provide dynamic leadership in contrast to the stereotype. His expressed view is that we must attract the "high-energy molecule" from the universities across the nation, give them challenging and inspiring work, and then be willing to see some move on to the attractions of other laboratories in and out of the government.

Further, he feels that this process will provide us with a resource of dynamic talent and that a good portion, having seen the achievement of the government laboratory, will choose to remain. Events have supported the validity of this belief.

Wilcox has made it clear that RAT is not merely a product of the Underwater Ordnance Department nor Pasadena nor the Station but of the whole Navy.

Hicks Analyzes System
A key to the successful development of a weapon system is competent systems analysis. For RAT, the major contribution in this area was made by V. E. Hicks.

Hicks prepared a comprehensive analysis, taking each major component of the proposed system and subjecting it to intensive study. From this analysis, he established the probability that the weapon system would be effective. Specifically how effective, he was able to predict to within a few percentage points of the final performance.

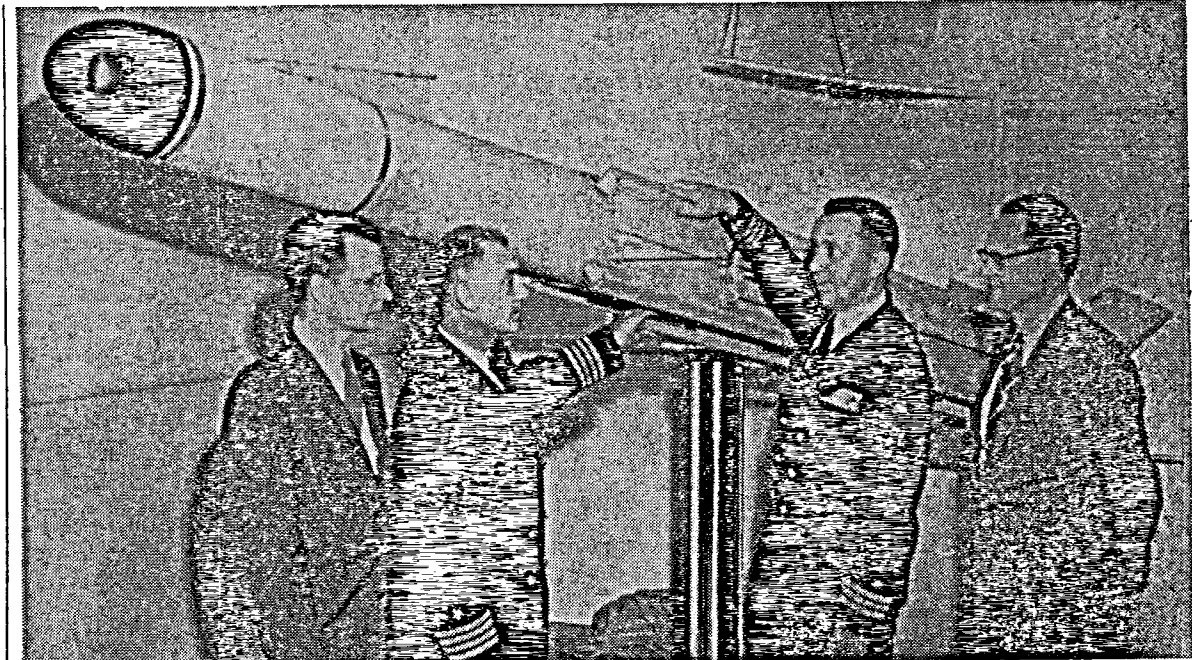
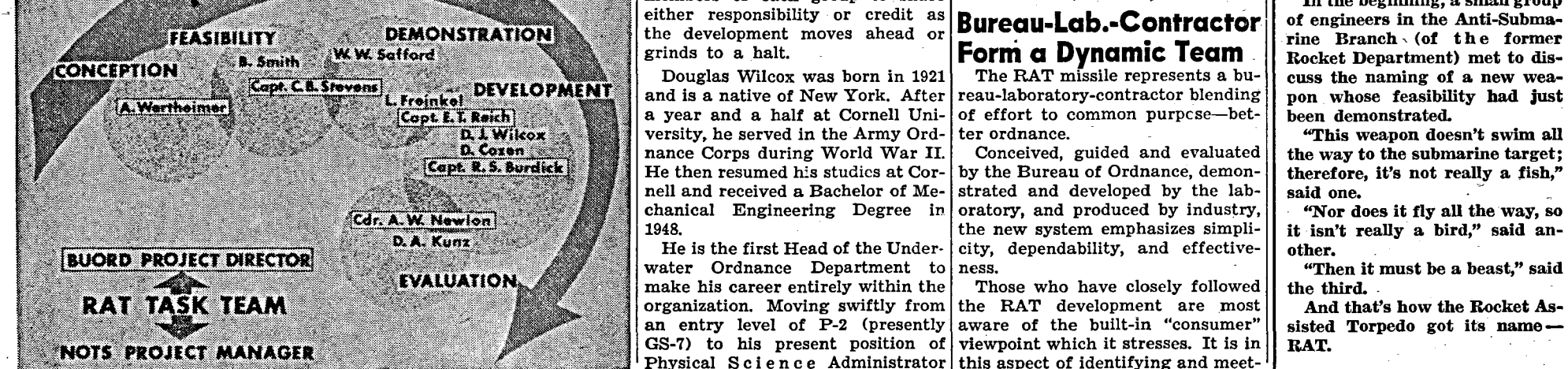
By his analysis, Hicks highlighted the critical system performance factors and was able to advise on the probable effect of a proposed design change or component modification.

D. J. Wilcox has observed that the prompt and reliable data and accurate predictions provided by Hicks and his group throughout the development enabled the department to meet the tight schedule and performance requirements for RAT.

Bureau-Lab-Contractor Form a Dynamic Team
The RAT missile represents a bureau-laboratory-contractor blending of effort to common purpose—better ordnance.

Conceived, guided and evaluated by the Bureau of Ordnance, demonstrated and developed by the laboratory, and produced by industry, the new system emphasizes simplicity, dependability, and effectiveness.

Those who have closely followed the RAT development are most aware of the built-in "consumer" viewpoint which it stresses. It is in this aspect of identifying and meet-



RAT UNVEILED—Posing by the RAT missile at a recent press conference (l. to r.) are: D. J. Wilcox, W. W. Hollister, Station Commander; Cdr. J. J. O'Brien, Officer in Charge, Pasadena; and Dr. Wm. B. McLean, Station Technical Director.

'RAT' Weapon System Development Follows The Wilcox Integrated Task Team Approach

Now that the rocket-thrown torpedo has been acclaimed as a major advance in underwater weaponry, it is well to stop for a moment and look into the organizational climate in which this advance became reality.

RAT is a weapon system conceived and developed through a series of interlocking teams, joined for a common purpose, and led by a man whose trademark has become the successful system task team.

As a piece of ordnance, RAT may well become even more famous for its role in bringing effective systems engineering to the underwater field than for its ASW implications.

There are many names—Wertheimer, Smith, Bartling, Freinkel, Cozen, Kunz, etc.—that come quickly to mind when thinking of RAT's development. Contributions of significance have been made by the Bureau of Ordnance and at every level in the NOTS organization. However, the man who best symbolizes the system's effective merger of concepts, components, and skills is Douglas J. Wilcox.

Deep in Wilcox's philosophy is a firm belief in the effectiveness of a governmental laboratory staffed with outstanding scientists and engineers and working in close coordination with Fleet officers assigned to provide insight on the Navy needs.

This ability to work in creative harmony is rooted in mutual respect and acceptance between the military and the scientific community. It is evidenced in the informality of the relationship, the acceptance of new ideas advanced by either group, and the ability of members of each group to share either responsibility or credit as the development moves ahead or grinds to a halt.

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In the beginning, a small group of engineers in the Anti-Submarine Branch (of the former Rocket Department) met to discuss the naming of a new weapon whose feasibility had just been demonstrated.

"This weapon doesn't swim all the way to the submarine target; therefore, it's not really a fish," said one.

"Nor does it fly all the way, so it isn't really a bird," said another.

"Then it must be a beast," said the third.

And that's how the Rocket Assisted Torpedo got its name—RAT.

UOD Plays Lead Role In 'RAT'

Missile Development Division

Early in the RAT program, the experimental and developmental effort was focused in two branches—the analysis branch, headed by W. E. Hicks, and the engineering branch, headed by Don Cozen.

These branches, working together, integrated the development of components into the missile system. Key personnel also assisted in the areas of fire control, timer, and data analysis, until the evaluation had been completed.

Layout of the missile and compatibility of missile components airframe design, and coordination of environmental tests of the missile and its components were accomplished by Paul Reichert and Tom Boyle, with the analysis branch specifying built-in physical and operational characteristics. Involved here, also, was coordination on development matters, and incorporation of necessary modifications.

Timer development for the project was conducted by Robert Beresford and involved contracts with Bulov Watch Company and Be-lock Instrument Corporation for electronic and electro-mechanical mechanisms respectively.

Concurrent with development of the missile and component hardware were the system performance analyses and, later, laboratory tests and range firings to establish the ballistic characteristics of the missile. The analysis branch coordinated this program with the fire control system effort (of which Librascope was prime contractor), sonar, and other shipboard equipment. Determining fire control requirements and providing technical direction to Librascope was Ed Perry, assisted by Tom Cloer, Frank Ludwig, and Ina Squire.

Libason was maintained with the Naval Proving Ground, Dahlgren, Virginia, for fire control range calculations. Concurrently, for ballistic accuracy, Charles Black monitored the firing rounds.

Assisting in evaluation of the torpedo payload in the RAT environmental tests were Robert Bickel and Steve Gaspar.

John Bascom designed, built, and modified the China Lake and San Clemente Island range launchers for the RAT missile.

John Fogarty, under guidance of Paul Reichert, and later Jesse Rowe, acted as range project engineer for Pasadena during the China Lake development and ballistic round firings.

Coordination of missile-launcher interface design with the Puget Sound Naval Shipyard was handled by Robert Hudson. Both mechanical design and shipboard electrical control circuits were established by joint action of NOTS and Puget Sound.

Cdr. Hickey and Messrs. Hoffman, Bishop, and How of Puget Sound built and installed the launcher on the USS DEHAVEN for evaluation tests at the Long Beach-San Clemente area.

The analysis branch also provided the instrumentation requirements for the system evaluation, and later participated in the BuOrd evaluation.

Assistance in data reduction and film analysis of various type tests was rendered by Bea Humason, Eunice Schweitzer, and Alice Anderson.



MISSILE DEVELOPMENT DIVISION—Collaborating on the RAT program (l. to r.): Paul Reichert, Head, Engineering Branch; Ed Perry, Head, Fire Control Branch; John Fogarty, engineer; Don Cozen, division head; Robert Beresford, electronic scientist; and Tom Cloer, mathematician.



TEAMWORK—Key personnel in the RAT program at NOTS Pasadena (reading clockwise) are: Cdr. J. J. O'Brien, Officer in Charge; D. J. Wilcox, Head, Underwater Ordnance Department; D. A. Kunz, Head, Systems Operations Division; L. Freinkel, systems

engineer; C. G. Beatty, Head, Torpedo Development Division; J. H. Jennison, Head, Product Engineering Division; and W. E. Hicks, systems analyst. Absent are J. A. Smith, Associate Head, Torpedo Development, and D. Cozen, Head, Missile Development.

Torpedo Development Division

C. G. Beatty and J. A. Smith, Head and Associate Head respectively of the Torpedo Development Division, carried out the development, design and test of all the missile accessories required for the RAT weapon.

The accessories for the weapon consist of a two-stage parachute stabilization system, a parapak, a velocity-actuated parachute deployment mechanism, and a torpedo nose cap. This program was under the direction of C. C. Wheeler, head of the accessories branch, and E. B. Osuch, head of the mechanical design section at the time.

Development of the deployment mechanism for the two-stage stabilizing system, under Waldo Bemis as Project Engineer, enabled the use of an existing torpedo, with very little modification to withstand parachute opening loads, and provided a closely controlled and predictable trajectory for the weapon.

The torpedo nose cap development, under Project Engineer Earl Howard, employed new techniques to absorb water entry shock forces.

The development program required the design and development of special test devices, instruments, and techniques. Members of the division who ably supported the main areas of effort, in addition to those persons mentioned above, were Fred Eaton, A. Livingston, and A. Blaemire.

Guidance and Control Division

Seven extensive simulation analysis programs were conducted on the RAT payload. Over 7000 simulation homing runs, each equivalent to a water run against a submarine, were made. Numerous significant technical changes were made in the weapon based on these analyses. Utilizing the simulation homing facility provided a means of establishing required performance criteria that could not have been established without very extensive and costly sea-run programs.

The hydrodynamic characteristics of the payload were determined by Tom Lang and Louis Lopes. Under their direction, the hydrodynamic performance was determined analytically and sea-run tests were defined to confirm this analysis. The hydrodynamic and simulation homing analysis greatly reduced the development time and cost required, in addition to providing an improved weapon system.

Personnel directly responsible for the simulation analysis are as follows: James Grell, Lloyd Maudlin, Hiroshi Mori, Robert Schroeder, Kenneth Simmons, Julius Stegman, Jay Adler, and Lester Frysile.

Propulsion Division

The propulsion Division contributed to the RAT program by performing supporting research and offering consulting services. The Applied Mechanics Branch determined a rational water-entry shock specification for the torpedo by analyzing the response spectra to actual shocks recorded in the field. An additional analysis was made of the problem of parachute release during the water-entry.

Product Engineering Division

Engineering for production has paid off in RAT. Harry Humason and other engineers and production specialists working with him produced many workable ideas. These practical improvements helped make RAT relatively easy to produce.

The most striking improvement was in the airframe where cost was reduced 50 per cent. The fins are an example. Replacing the internal aluminum framework with plastic foam poured into the fin shell reduced cost 64 per cent and eliminated 164 blind rivets. Then a very difficult seam weld was replaced by a simple spot-weld construction.

Later the cost was cut in half by substituting a styrofoam wedge cemented into the fin for the poured plastic. The final result of product engineering was an airframe which had good producibility and weighed 25 per cent less than the early development models.

Dom Veronda and others working with him in Materials and Process Branch specified materials and worked out corrosion protection.

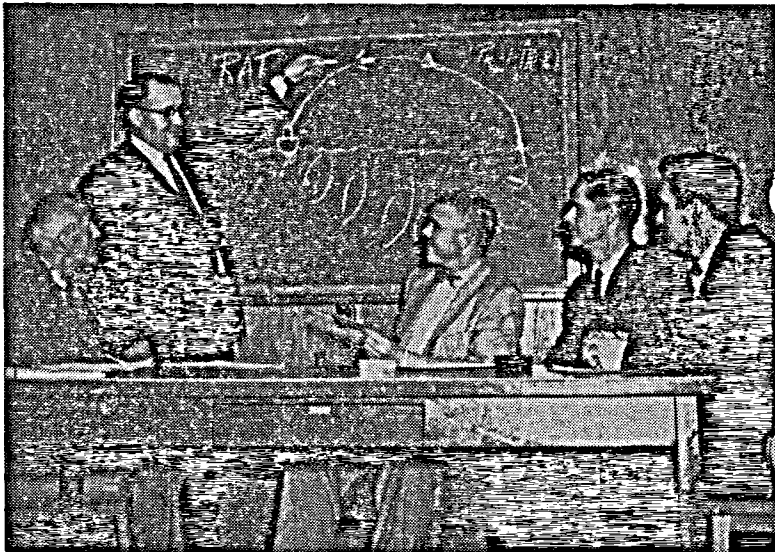
Fred Anderson and his Manufacturing Branch kept up with the demand for airframes for development testing, ballistic firings, and BuOrd and OpDevFor evaluations, despite last-minute design changes.

Ken Leisge made experimental airframes as a metalsmith, and later took the lead inspecting the airframes made by two industrial firms.

Shipping containers for service use were developed by Norman Horn and his Packaging Section. Of the twelve containers used for RAT, the large coffin container for the assembled weapon was the toughest problem. It had to be rugged and light weight to permit transfer at sea from ammunition ship to destroyer. The welded aluminum container weighs only 316 lbs. and protects the missile against weather exposure and rough handling.

Good documentation is essential in a big development project. In addition to producibility and packaging.

(Continued on Page B-3)



SYSTEMS OPERATIONS DIVISION—Shown at a division conference on RAT (l. to r.): Milt Blatt, Head, Laboratory Branch; D. A. Kunz, division head; R. Heller, engineer; M. Van Reed, assistant division head; and Frank White, Head, Field Branch.

Systems Operations Division

One of the first assignments of the Systems Operations Division was to complete development of the RAT Weapon System and to evaluate its potential.

D. A. Kunz, heading the division, was assigned as RAT Project Manager and Frank White as Assistant Project Manager. Under their direction, the design and development was completed and the planning and conduct of the Bureau of Ordnance evaluation was performed.

As a result of the task team concept employed, the design and installation of the first complete RAT system was accomplished aboard the USS DEHAVEN by the precise day scheduled. This date, set more than a year earlier, was met despite a number of critical problems that developed in the final months of the project.

Frank White, head of the field branch, planned the development and evaluation test program. Project Engineers Dick Heller, Gleb Spassky, Dale Willhite, John Phillips, and Gene Rowden, planned tests, designed equipment, and guided the final development and evaluation program.

John McCool, head of the electronics and instrumentation branch, and Bill Squire provided the design concept for the RAT timer, changing it from an AC to DC circuit.

The instrumentation systems were conceived and operated by Joe Vetter. He was assisted by Don Davey, Bill Schneider, Dick Hamilton, and Sam Wolfe.

Jim Taylor and Jack Sayre were responsible for the launcher and missile compatibility and the design of handling equipment.

Cliff Stock, head of the range branch, completed the installation of the system at the Long Beach Naval Shipyard and conducted the BuOrd evaluation aboard the USS DEHAVEN. He was assisted by Ed Carpenter, Ray Musgraves, Jerry Nelson, Louis Marquez, and the crew at the Long Beach Naval Shipyard.

Joe Taber, also of the range branch, took the heart of the RAT—the torpedo—and conducted development tests making it a suitable payload for RAT.

Handling the missile assembly were Frank Millard, Herman Torkelson, Jack Zaun, and Lament Shinn.

In charge of photography were Harold Gnad, Pat Patterson, and Bill Macy. Milt Blatt, head of the laboratory branch, performed comprehensive environmental tests on the missiles. Howard Wheeler tested the components of the missile in the environmental laboratory, and Frank Baldwin and Clark Albin instrumented the missiles and launcher aboard ship taking environmental data on vibration and shock.

H. A. P. Smith was the expert on timers in the missile and developed the brake in the timer servo unit.

The Bureau of Ordnance accepted the evaluation results, recommending that the RAT System was technically acceptable and ready for operational evaluation.

At the present time, Milt Blatt is responsible for the functions of technical direction of the RAT program.

'RAT' Is a Product of All Station Teamwork

Weapon Development Department

Project RAT is an example of the vision and foresight to be found at the Bureau of Ordnance and its field stations.

Albert Wertheimer of the Bureau of Ordnance, assisted by Harry Silk, recognized the need for a new anti-submarine weapon. Wertheimer reasoned that if and when sonar detection devices were improved, a new weapon with a very short transit time would be needed to exploit this new sonar potential.

His new idea of projecting the torpedo aerially was contained in a very general way in the task assignment sent to NOTS called "Improvement of Ahead-Thrown Weapons."

With no specifications or requirements, other than the mission of the weapon, the Anti-Submarine Branch of the Rocket Department (now Weapons Development Department) undertook to demonstrate its feasibility and within a year after active work was started, successful full-scale demonstrations were completed.

Those members of the Anti-Submarine Branch who helped prove the feasibility as well as maintain the NOTS design philosophy of simple, reliable, maintenance-free ordnance were Barney Smith, Jim Bartling, and Jerry Saholt.

Special note should be made of Harold Johnson, an employee of the former Explosives Department, who made a valuable contribution to the design of the first test vehicles.

Also, the Aeroballistics Division, Research Department, and the Manufacturing Division, Engineering Department, made a very significant contribution to the project in those trying early days.

It is with pride of accomplishment that the men of the Anti-Submarine Branch review the early days of this project that has been so successfully brought to conclusion by the Underwater Ordnance Department.

Weapons Planning Group

Early in the program, the Central Evaluation Group (predecessor to the Weapons Planning Group) undertook a study to estimate the effectiveness of the small ASW torpedo when rocket projected against submarine targets, which had been detected at extended ranges.

This study indicated that the rocket-projected torpedo would provide one of the most effective means of taking full advantage of the improved submarine detection capability of new shipboard sonar equipment.

On the basis of this and other studies, together with favorable results obtained from field firings at China Lake, the Bureau of Ordnance decided to undertake a full-scale development program.

Test Department

From the beginning of the RAT program, the Test Department helped in the development of the missile by conducting tests at China Lake for evaluation of the missile, its components, and launching system. These tests were concerned mostly with the timer, rocket booster motor, airframe, air-stabilizer, parachute, torpedo, dud jetison, launcher, and weapon ballistic evaluation.

In addition to range facilities, the Test Department provided the photographic and special instrumentation to acquire the test data, and provided data assessment services.

The testing at China Lake was handled by the Project Engineering Division, Test Department. Project engineers for the tests were E. D. Simmons and C. H. Wilson.

Aviation Ordnance Department

Early RAT tests on the Aviation Ordnance Department's "Charlie" range provided data collection and furnished valuable aerodynamic information leading to design changes, improvement in the airframe and the parapak can.

One important development improved the parapak's reliability by locking the parachute release mechanism through the use of an arm-joint device.

As a result of these field tests, it was further determined that the two-stage parachute system used in the RAT might prove useful for torpedo releases from high performance jet aircraft.

The Technical Officer was part of the RAT team, creating and reviewing design concepts for the RAT weapon system and insuring compatibility between the technical design and fleet requirements.

In particular, LCDR. R. G. Douglas made significant contributions to the transfer at sea system and the launcher loader design.

Research Department

Early designs for RAT were simulated on the Reeves Electronic Analog Computer by personnel of the Research Department. Predictions of the performance were made by ballisticians for the design engineers as they continually sought to improve the RAT.

REAC also allowed the ballisticians to simulate the way in which the RAT would be launched from aboard ship.

The wind created by the moving ship plus the actual winds that are blowing over the sea at the instant of launching can change the path which the RAT follows and, hence, have a direct influence on where the RAT will enter the water. Since it is desired to place the RAT in the water near the target, the wind effect must be known before launching so that appropriate corrections can be made within the fire control equipment. In this phase of the work, the aerodynamic characteristics of the RAT were furnished by the aerodynamicists of the Research Department.

These purchases represent a considerable volume of work on the part of the Purchase Division, Pasadena—a large percentage were open market purchases of less than \$1,000 each; many were negotiated purchases up to \$5,000 each; all the preliminary work on contracts in excess of \$5,000 was done in Pasadena prior to final action by NPOLA.

A great many tons of RAT material, both incoming and outgoing, was handled by the Supply Department's traffic, shipping, receipt control, and delivery organization both at China Lake and Pasadena, including large NORD contracts issued by the Bureau of Ordnance.

Public Works Department

Normally routine construction problems were greatly magnified at the San Clemente Island test ranges due to the remote location, limited transportation, and rugged terrain. The facility and support requirements for RAT were achieved by the combined, concentrated efforts of Public Works personnel at China Lake and Pasadena.

Functioning as an organized task team, they planned, built, and rehabilitated new and existing roads, obtained necessary water and air transportation of materials, erected new buildings and structures, provided and maintained necessary land transportation of personnel, provided essential electrical power, and performed a miscellany of other duties in the area of general support to the complex test program.

The Product and Production Engineering Division contributed to the refinement of the design of the RAT system including the airframe and related equipment. Inspection of components for RAT was performed by the Quality Engineering Division. As a result, the development tests had that necessary validity which comes from using components of known characteristics.

Technical Information Department

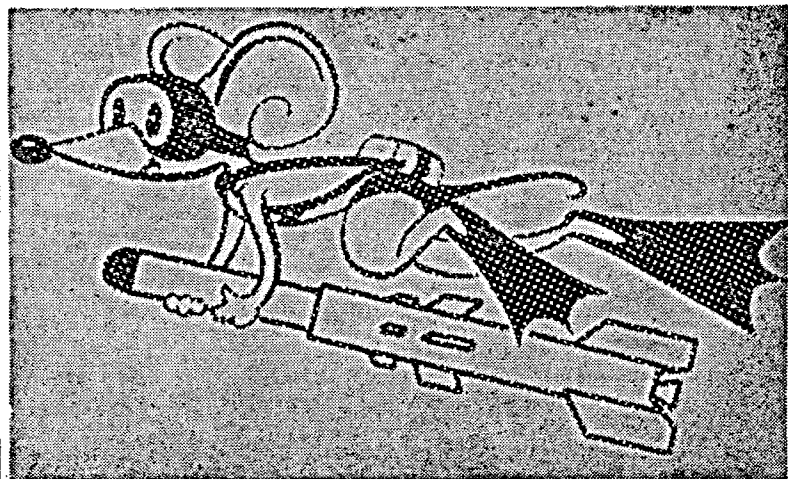
As anyone in a weapon development organization knows, more than hardware goes into the development of an effective weapon system like RAT. The effective prosecution of such a program requires written reports, film reports, library services, patent coverage, project presentations, and other informational services. In this connection, the Technical Information Department was able to assist the Underwater Ordnance Department in providing the Fleet with this important contribution to American anti-submarine defenses.

The Personnel Department's role in the RAT program was one of directly supporting the technical effort. Since the principal line organization involved was the Underwater Ordnance Department, the Personnel Division in Pasadena was the servicing personnel group, providing advice and assistance on employment, position classification, and utilization of personnel.

Operations and Technical Officers

The Operations Division, under LCDR. William T. Waters Jr., contributed significantly to the development and BuOrd evaluation of the RAT weapon system. Fleet liaison, including obtaining the assignments of the USS DEHAVEN, USS RAZORBACK, USS REMORA, USS PICKING, USS LEONARD F. MASON, and USS PARACUTIN, was the responsibility of this division.

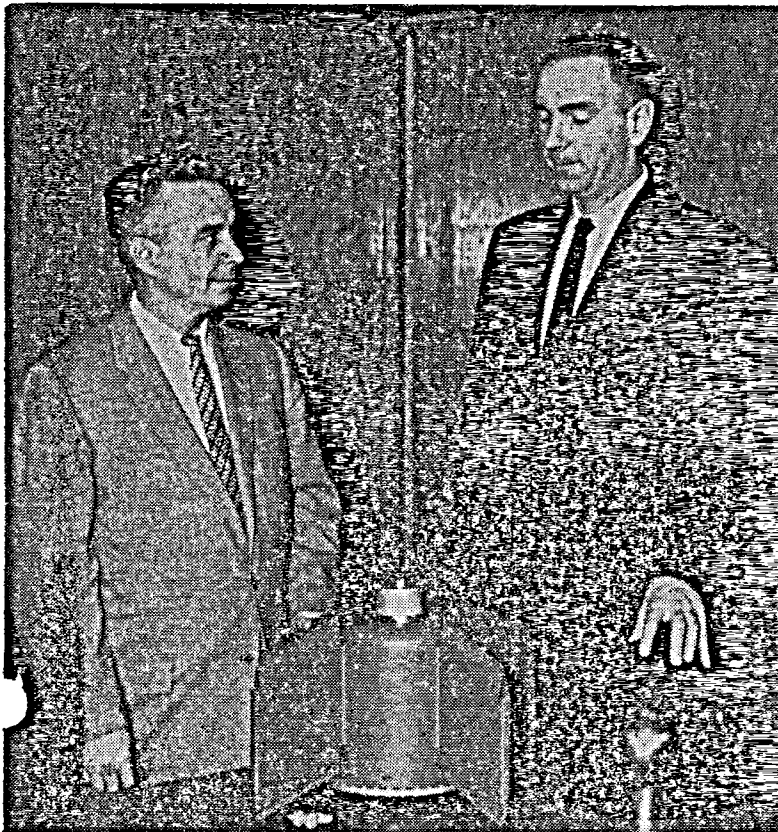
LCDR. Waters' small boat crews



ROCKET EXPERTS—Viewing RAT display and model are personnel who served together in the Anti-Submarine Branch of the Rocket Department during the early phases of the RAT development program. They are (l. to r.): Bernard Smith, Head, Central Staff; Donald Stoehr, Bombardment Weapons Branch; and James T. Bartling, Head, Surface Weapons Division. Another contributor was Frank H. Knemeyer.



PRODUCT ENGINEERING DIVISION—Discussing production aspects of the RAT airframe (l. to r.): Fred Anderson, Head, Manufacturing Branch; J. H. Jennison, division head; and Harry Humason, engineer.



TORPEDO DEVELOPMENT DIVISION—J. A. Smith (left), associate division head, discusses RAT nose cap and parapak design with Waldo Bemis, who was in charge of deployment mechanism development.

Product Engineering Division . . .

(Continued from Page B-2)

Prince, step-by-step photographs by Arthur Block, and illustrations and visual aids by Richard Frederick. Other documentation came from Dr. Catherine Campbell's Publication and Photography Branch, particularly progress reports by Martin