

Rodeo, Barbecue Highlight Gold Rush Days Festivities

Residents of the Indian Wells Valley will "strike it rich" during the third observance of "Gold Rush Days," which will begin Monday and continue through Sunday, May 6.

A wealth of entertainment will be provided during the week-long celebration, culminating in a parade and rodeo to be held on May 5 and 6.

Eight local girls are vying for the title of rodeo queen. The contest winner will be crowned on Thursday, May 3, at the Ridgecrest Plaza Shopping Center. The contestants are Susan Bryant, Beverly Glass, Nancy Grams, Jan Hines, Carol Miller, Judy O'Connor, Wendy Roberts and Laren Salisbury.

The girls' horsemanship will be tested tonight at the Bottom Acre Stables, beginning at 7 o'clock. Each girl will be judged on her skill as a rider in the Western Pleasure class.

Earlier, the rodeo queen candidates were judged on their personality and poise, and attractiveness. In addition, the candidates are selling queen contest tickets for \$1 each that will be counted as a vote for them in the contest.

Participants in the rodeo parade will assemble at the corner of

Balsam St. and Las Flores by 10 a.m. on Saturday, May 5, and head south on Balsam St. to Ridgecrest Blvd. The procession will then turn west on Ridgecrest Blvd. to Warner St. and disperse at the Ridgecrest park area.

The parade is the opening event of the rodeo, which is to be held at the Desert Empire Fairgrounds arena between 2 and 5 p.m. on both Saturday and Sunday, May 5-6.

The entertainment planned for Gold Rush Days will begin on Tuesday with an old-fashioned box supper at the Elks Lodge, 201 E. Church St. The festivities will get under way at 6 p.m.

Other events planned include a public gathering at the Ridgecrest Plaza Shopping Center, beginning at 7 p.m., on Thursday, May 3. Barbershop singing, band entertainment, a square dance exhibition, the first eliminations in the costume contest, and the crowning of the rodeo queen will take place that evening.

More barbershop singing, a professional fiddlers' exhibition and country and western music program, plus the second eliminations of the costume contest will take place at the Sierra Vista Shopping Center on Friday, May 4, beginning at 7 p.m. The newly-crowned rodeo queen will make



READY FOR GOLD RUSH DAYS — Capt. D. W. Alderton, NWC Deputy Commander, gets into the spirit of the upcoming western emphasis week in Ridgecrest by purchasing a "Strike It Rich" Gold Rush Days button from Ray Sinnott (at left), president of the Burros Booster Club. Ridgecrest merchants are joining in a week-long Gold Rush Days sales promotion, which begins Monday and will merge into the seventh annual Desert Empire Rodeo on May 5-6.

her first appearance at this get-together.

On Saturday, May 5, there also will be a barbecue at the fairgrounds. Residents will be able to eat all they want for \$2.50 per person. Musical entertainment will be provided during the barbecue, and the finals of the costume contest will be held at that time.

Gold Rush Days is the theme of a week-long sales promotion, sponsored by Ridgecrest merchants. Persons who purchase a "strike it rich" button will be eligible to

receive gift certificates from "gold rush marshalls," which are redeemable in participating stores.

Representatives of the Chamber of Commerce, the Desert Empire Fair and the Burros Booster Club, are already selling the buttons at \$1 each.

The Gold Rush Days campaign will kick-off at 3 p.m. tomorrow when the Golden Knights, a precision parachute team of the U.S. Army, will stage a free-fall demonstration of their skill at the Desert Empire Fairgrounds.

SHOWBOAT

MOVIE RATINGS
The objective of the ratings is to inform parents about the suitability of movie content for viewing by their children.
(G) - ALL AGES ADMITTED
General Audiences
(PG) - ALL AGES ADMITTED
Parental Guidance Suggested
(R) - RESTRICTED
Under 17 requires accompanying Parent or Adult Guardian
CS - Cinemascope
STD - Standard Movie Screen
Regular starting time — 7:30 p.m.
Matinee — 1 p.m.

FRI. "PETE 'N' TILLIE" 27 APRIL (5C 101 Min.)

Walter Matthau, Carol Burnett (Comedy) Carol Burnett relates her story as Tillie. She meets Walter Matthau (Pete) in the early '60s through a friend. The outspoken Matthau and the repressed Burnett don't exactly hit it off right away. Eventually they have an affair which leads to marriage. Burnett gives birth to a son, Lee Harcourt Montgomery, and contends with Matthau's philandering. Matthau brings up Lee as a partner in his enjoyment of life. Tragedy strikes when the son, Lee, dies. This seriously affects the marriage of Pete and Tillie, and almost ruins it. (PG)

SAT. —MATINEE— 28 APRIL

"MAJOR DUNDEE" (STD 122 Min.)

Charlton Heston, Richard Harris (G)

—EVENING—

"BURRO" (STD 112 Min.)

Marlon Brando, Evaristo Marquez (Historical Drama) A British agent foments a revolution on the Caribbean island of Quelimada to further his country's commercial interests (PG)

SUN. & MON. "THERE'S A GIRL IN MY SOUP" 29-30 APRIL (STD 96 Min.)

Peter Sellers, Goldie Hawn (Comedy) Kookie girl moves in on a sophisticated gourmet columnist and disrupts his life. (R)

TUES. & WED. "TREASURE ISLAND" 1-2 MAY (STD 95 Min.)

Orson Welles, Walter Slezak (Adventure Drama) Orson Welles as the most colorful one-legged scorpion of a sea devil-pirate "Long John Silver" adds an entirely new dimension to Robert Louis Stevenson's classic adventure. Walter Slezak plays the "Squire," Lionel Stander as "Billy Bones" and young Kim Burfield as "Jim Hawkins." Everything is here — the death mark of Black Spot, the voyage to Treasure Island and the mutiny of Silvers' blood-thirsty crew (G)

THURS. & FRI. "SUMMER TREE" 3-4 MAY (STD 96 Min.)

Michael Douglas, Jack Warden (Drama) Reality confronts a college-age couple when their idyllic romance is interrupted by the war in Vietnam. (PG)

Advisory Bd. . . .

(Continued from Page 1)

employees who demonstrate exceptional creativity through significant inventions that are patented.

The awards will be presented during a luncheon to be attended by Advisory Board members, their special guests and the honorees that is to be held on May 3 at the Commissioned Officers' Mess, starting at 11:30 a.m.

Reservations which will be required for attending the luncheon may be made by contacting the office of the Technical Presentations Coordinator, phone Ext. 2634.

W. E. Fromm, executive vice-president of AIL, a division of Cutler-Hammer, will serve as chairman of next week's Advisory Board meeting.

In addition to the 11 Advisory Board members who are scheduled to attend, there will be two special guests. They are Rear Admiral L. A. Hopkins, Assistant Commander for Research and Technology, Naval Air Systems Command, and his Technical Director, Dr. F. I. Tanczos.



MUSIC MAKER — The Art Depew Quartet will play for the annual WACOM Spring Dance, set for Saturday, May 5, at the Commissioned Officers' Mess. Reservations will be required. All those interested should call Mary Clinton, 446-7123, as soon as possible to insure getting a ticket. Tickets are priced at \$8 per couple.

From _____
TO _____
PLACE STAMP HERE



LAW DAY PROCLAIMED — A joint proclamation designating Tuesday, May 1, as Law Day was signed this week by Rear Admiral Henry Suerstedt, Jr., Commander of the Naval Weapons Center (seated, at left), and by Kenneth Smith, Mayor of the City of Ridgecrest. Present for the occasion were (standing, from left) Cdr. H. O. Brickson, NWC's Staff Judge Advocate, and G. E. "Tommie" Thompson, judge of the Indian Wells Judicial District Court. Law Day U.S.A. is set aside annually by both a Presidential proclamation and by a joint resolution of Congress. Theme of this year's observance is "Help Your Courts — Assure Justice." The proclamation signed by RAdm. Suerstedt and Mayor Smith places emphasis on this nation's legal heritage and the role of the courts in safeguarding individual rights.

nwc rocketeer

Naval Weapons Center
China Lake
California

New Instruments Developed To Aid Optical Evaluation Work

By Dr. Jean Bennett
The Physical Optics Branch, headed by Dr. Harold Bennett, has been developing new instrumentation with which to better characterize optical surfaces, in particular mirrors used in high energy laser systems and sensitive optical seeker systems. With these new instruments, extremely small amounts of light scattered by the mirrors can be measured (both in the infrared and visible regions of the spectrum), the properties of mirror coatings can be studied, and small changes measured when the coatings are subjected to different kinds of contamination. Finally, the actual mirror surfaces can be observed using a TV scanning system, and differences in height on the surfaces, which are only a very small fraction of a wavelength in size, can be measured. These are much smaller than can be observed directly with an electron microscope.

Optical Evaluation Facility
The Optical Evaluation Facility was designed by Dr. Harold Bennett of the Physical Optics Branch, and most of the parts of the instrument were built in the shops of Michelson Laboratory. Various members of the branch, particularly Phil Archibald, have assisted in its assembly and testing. The instrument uses a large hemispherical mirror, called a Coblentz sphere, to collect all the light scattered from the sample, (Continued on Page 5)

Next NWC Advisory Bd. Meeting Slated May 3-4

The semi-annual meeting of the NWC Advisory Board has been scheduled next Thursday and Friday, May 3-4. W. E. Fromm, executive vice-president of AIL, a division of Cutler-Hammer, will serve as chairman of next week's Advisory Board meeting.

In addition to the 11 Advisory Board members who are scheduled to attend, there will be two special guests. They are Rear Admiral L. A. Hopkins, Assistant Commander for Research and Technology, Naval Air Systems Command, and his Technical Director, Dr. F. I. Tanczos. Among highlights of the NWC Advisory Board meeting will be the presentation of the L. T. E. Thompson and William B. McLean Awards. The L. T. E. Thompson Award is the Center's highest recognition for outstanding individual achievement. It is presented to NWC employees who have demonstrated extraordinary dedication to the Mission of the Center, in addition to fulfilling other demanding qualifications. The William B. McLean Award is complementary to the Thompson Award and is presented to the NWC (Continued on Page 12)

Question of School Unification Will Be Decided on Tuesday

Voters will go to the polls next Tuesday to decide whether or not public schools in this northeast section of Kern County will be combined into one unified district for grades kindergarten through twelve. Polling places located at China Lake, in Ridgecrest, Inyokern and the Rand District will be open May 1 from 7 a.m. to 8 p.m. Registered voters have been sent a pamphlet containing information about the school unification plan that has been prepared by the Kern County Committee on School District Organization, the Office of the Kern County Superintendent of Schools, and the Kern County Counsel.

In addition, this same pamphlet carries an argument against unification of schools in the Burroughs attendance area that was submitted by L. J. Osborn, a trustee of the Rand School District, and arguments in favor of unification signed by trustees of the China Lake, Indian Wells Valley and Rand School Districts.

Also prepared for mailing to registered voters are some 4,500 copies of the summaries of reports prepared by a citizen's fact-finding committee that was organized to look into all aspects of the school unification question and come up with impartial information on all phases of this complicated subject.

Differences of Opinion
The issue has brought out sharply divided differences of opinion between spokesmen for the China Lake Elementary and Indian Wells Valley Union School Districts, who favor unification and initiated the action bringing the current proposal to a vote, and representatives of Burroughs High School and the Rand School District who are opposed to such a move. As far back as last October, the board of trustees of the Kern High School District (which includes Burroughs High) went on record in opposition to the proposed unification of schools in this part of Kern County. High school trustees are critical of a piecemeal approach to

unification of the 13-member Kern High School District, while Rand School District representatives have expressed a desire to retain the status quo rather than see their lone elementary school (which they now control) become part of a larger, unified district. **Debate Warms Up**
The proponents of school unification see both economic and administrative advantages, as well as benefits to the educational programs that could be provided by the planning and administration of a continuous curriculum from kindergarten through twelfth grade. Public discussions about unification have warmed up principally on the question of financial feasibility of such a move. Key figures in this debate have been John Cissne, principal of Burroughs High, lined up against Dr. Marvin Heinsohn, acting superintendent of the Indian Wells Valley Union School District, and Grant Pinney assistant superintendent for business of the China Lake Elementary School District. Cissne has steadfastly maintained that operation of the local high school is subsidized by tax funds from outside this area — (Continued on Page 4)

Date Set For Hearing On Annexation

The Kern County Board of Supervisors has set Monday, May 14, as the date for a public hearing on the proposed annexation of a portion of the Naval Weapons Center housing area to the City of Ridgecrest. A total of 1,370 acres of Navy land, including Desert Park and the Bennington Plaza commercial area, are in the parcels being considered for annexation to Ridgecrest — a move that has been under consideration for a number of years. The wheels were set in motion for proceeding with this proposal last November, when a letter urging affirmative action on the annexation was presented to the City of Ridgecrest by the China Lake Community Council.

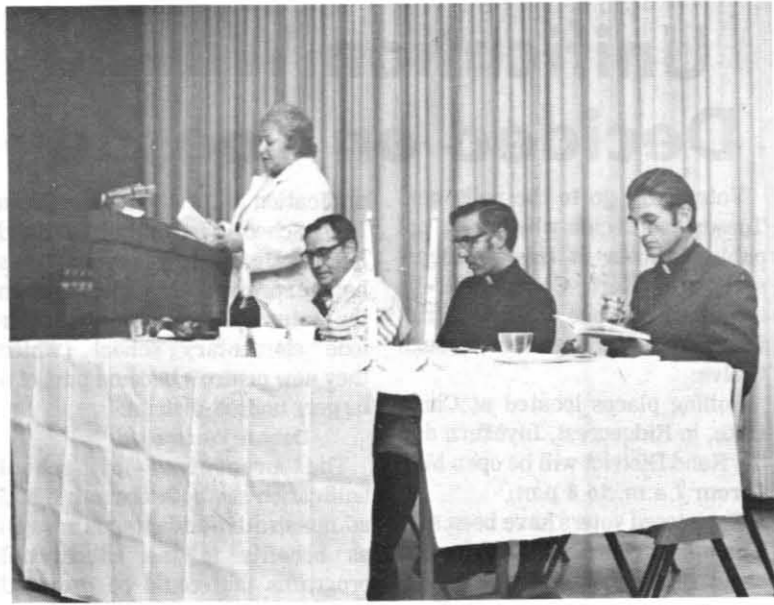
Since then, the proposed annexation was reviewed and recommended for approval by the Kern County Local Agency Formation Commission and, earlier this month, the Ridgecrest City Council petitioned the Board of Supervisors of Kern County for approval of this addition to the city. Eventual annexation of Desert Park homes, the Bennington Plaza shopping complex, the Burroughs High School campus and access road and vacant Navy land east of the Sandalwood Homes development would enable tax revenue that now goes to Kern County to be channeled instead to Ridgecrest. Such tax money is earmarked for use on development of the 106-acre regional park located adjacent to the Burroughs High School access road and campus, as well as for improvements to and policing of the high school access road.



JEAN BENNETT adjusts the interferometer to obtain sharp FECC interference fringes of a mirror surface. These fringes contour the micro-irregularities on a surface, and show details only a small fraction of a wavelength in size.



WILDFLOWER MURAL — Ida Davis, president of the Desert Art League, stands beside a three-panel, 8 x 12 ft. mural that she painted for the annual WACOM Wildflower Show. The painting depicts a sunrise over "B" Mountain, as seen from Sand Canyon. The Wildflower Show will take place tomorrow and Sunday at the Community Center. Other murals have been painted for the show by five other Desert Art League artists. They are Beth Allen, Vinnie Bodenburg, Maxine Booty, Ruth Mayer and Mary Polk. Hours of the show are from 1 to 10 p.m. Saturday and from 10 a.m. to 8 p.m. on Sunday.



INTER-FAITH EXPERIENCE SHARED — A Jewish Passover supper, sponsored by the Catholic congregation of the All Faith Chapel, was held at the Community Center on Holy Thursday (April 19) as an educational ecumenical event.

Library Lists New Books

LIBRARY HOURS: Monday - Friday: 2-9 p.m. Saturday: 10 a.m. - 6 p.m. Readers are reminded that all employees, regardless of residence are most welcome to use the Center Library.

PROMOTIONAL OPPORTUNITIES

Applications for positions listed in this column will be accepted from current NWC employees and should be filed with the persons named in the ad.

Clerk-Typist, GS-323-3/4, PD No. 7150112, Code 5043 — This position is located in Development Division II of the Fuze Department.

Administrative Officer, GS-341-13, PD No. 7270023, Code 7002 — This position is Head of Staff for the Public Works Department and head, Administrative Division.

Supervisory Production Controller, GS-1152-11, PD No. 7370011, Code 7083 — This position is head of the Work Reception and Control Branch, Maintenance Division.



REMINDER — Daylight Saving Time will begin at 2 a.m. Sunday and the staff of The ROCKETEER has taken over the office clock to remind local residents of the event.

Local Musicians To Solo In Annual Youth Concert

The annual Youth Concert, sponsored by the Desert Community Orchestra Association, will be held on Sunday at the Burroughs High School Lecture Center.

Naval POW Tribute Day To Be Observed

Naval Prisoner of War Tribute Day will be observed locally by a formal dinner this evening for military officers assigned to the Naval Air Facility.

Man From Lox Keeps On Winning 1st Place Honors

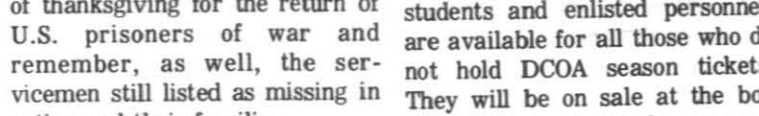
'Man From Lox,' the motivational safety film on the proper handling of liquid oxygen, produced by the Film Projects Branch of the Technical Information Department's Film Projects Division.

Yard Beautiful Contest Still Open to NWC Tenants

Entries are still being accepted for the 'Yard Beautiful' contest, sponsored by the China Lake Community Council in conjunction with the annual Clean-up, Paint-up, Fix-up campaign.

Employee In The Spotlight

'I am probably the best example on the Center of a man who has progressed on the basis of educational support supplied by NWC.'



Dr. Robert L. Rockwell available to me that is necessary to complete this project.

Labs Must Take Strong Role In Cost Analysis

While designing to cost has always been a critically important consideration at NWC, recent policy statements coming out of the Department of Defense and Navy Headquarters have made it evident that the laboratories must take an even stronger role in cost estimating and cost analysis.

In particular, an in-house ability to develop useful cost estimates — total program cost, and production-unit flyaway cost — even before the conceptual system has reached the advanced development stage will be needed.

In recognition of this, Center Management has reaffirmed support for a cost estimating capability at NWC, and has directed that resources devoted to this area be augmented.

The cost estimating function will be built up in the Central Staff under the direction of M. B. Sorge, head of Central Staff.

Code 17 welcomes comment on the mission and staffing of the cost estimating group, particularly since this group will ultimately serve, and influence, most of the larger technical development projects at the Center.

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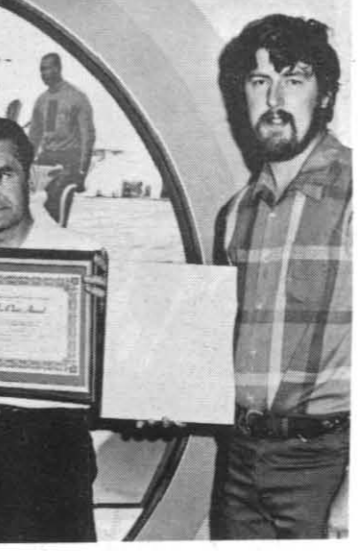
An entry blank is printed below for tenants of NWC housing to use in entering one of two categories — most improved yard, or yard beautiful.

Trophies and gift certificates from the IWV Lawn and Garden Center, Mean's Nursery and the Raintree Nursery, will be awarded to the first three places in each category.

Entrants in the most improved yard category must call either 446-3764 during normal working hours, or 446-2219 after 4:30 p.m.

ENTRY BLANK

YARD BEAUTIFUL CONTEST April 14 - May 25 Community Council, P.O. Box 5443, China Lake, CA Name of Resident Address Telephone Number Yard Beautiful Contest Most Improved Yard



AN 'AWARDING' EXPERIENCE — The four persons most responsible for making the prize-winning safety film, 'Man From Lox,' pose with some of the first prize awards the motion picture has garnered in the past year.

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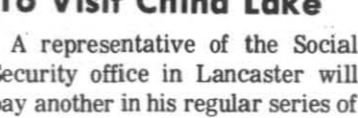
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The Rocketeer Official Weekly Publication Naval Weapons Center China Lake, California



DIVINE SERVICES

PROTESTANT 1015 Sunday Worship Service Dendel-Needleweaving. 0900

ROMAN CATHOLIC M.A.S.S. 1700 fulfills Sunday obligation 0700 0830 1130

BLESSED SACRAMENT CHAPEL M.A.S.S. 1135 Daily except Saturday 1635 Daily during Lent 1135 1700 First Friday Only

CONFESSIONS 1545 to 1645 0800 to 0825

CCD CLASSES 1015 Sunday Kindergarten thru 6th grades 1900 Wednesday Seventh and 8th grades

JEWISH SERVICES EAST WING - ALL FAITH CHAPEL 2000 Friday 1st and 3rd ONLY 0900 Sabbath Services

UNITARIANS CHAPEL ANNEX 95

DEADLINES: Tuesday, 4:30 p.m. Photographs Tuesday, 11:30 a.m. The Rocketeer receives American Forces Press Service material.

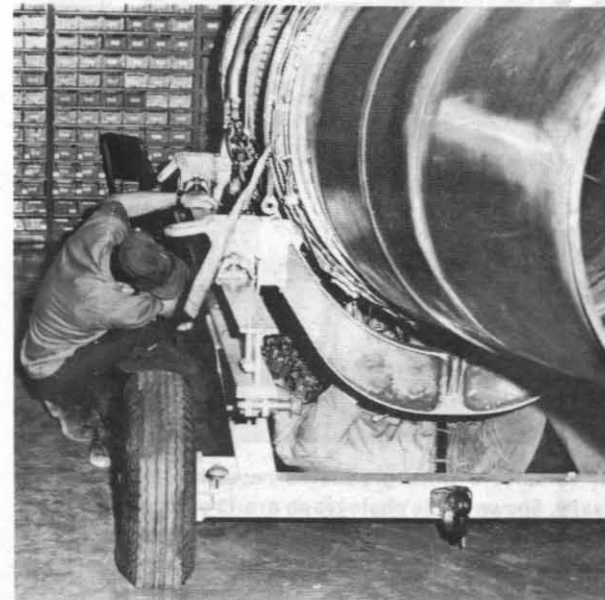


Don R. Yockey Editor Jack C. Lindsey Associate Editor

Jeanne Schreiber PH1 D. C. Manderscheid, PH2 R. D. Cox, PH2 D. W. Yaatts, PHAN Jerry Sizemore, ADJAN Bill Brooks, PHAN Shellee K. Reed, PHAN Joe Dunn Staff Photographers

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NAF Pilots Set 21,000 Hour Flight Safety Record



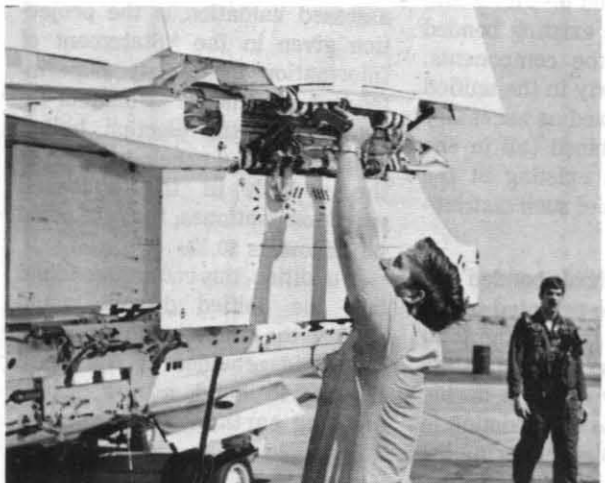
ADJ2 Robert Burch and ADJ1 Fred Mansfield (under engine) work on a jet engine in the Power Plants Shop.



Paper work is important in the Quality Assurance Shop. Here, AZAN Steve Mendenhall fills out some forms related to the shop's work.



AMS1 Larry Peck operates a lathe in the Airframes Shop. Structural damage is repaired at this facility.



ADJ3 Denny Callaway removes the wing locks on an A7 Crusader on the NAF Hot Line. Lt. Eric Vanderpohl, an NWC pilot, can be seen in the background after returning from a flight.



RECORD ESTABLISHED — Ens. Frank Santoni (in pilot's seat) is greeted by Capt. R. S. Moore, Commanding Officer of NAF, at the completion of the historic flight. ADRN Kenneth Bush, an A-4 plane captain, stands on the ladder.

On April 10, Ens. Frank Santoni, a pilot at the Naval Air Facility, took to the air in a TA-4F Skyhawk on a routine project flight.

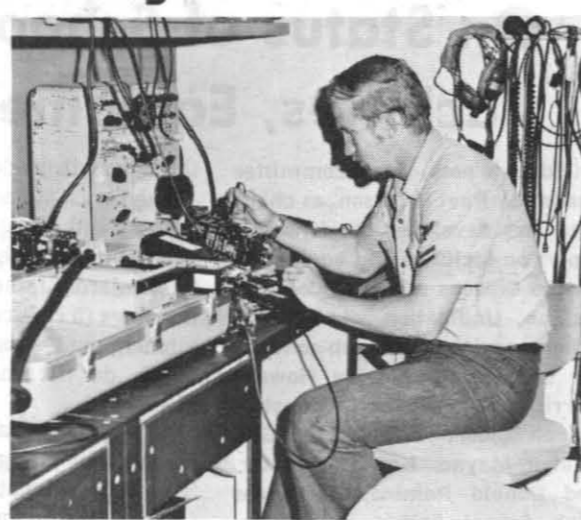
When he returned, he was greeted by Capt. R. S. Moore, Commanding Officer of NAF, and Lt. Truman D. Ware, NAF's Safety Officer. Ens. Santoni had flown the final increment of a 21,000 hour flight safety record that began in December 1970.

Since that time, NAF pilots, airborne between 600 and 700 hours per month, have flown their birds without a chargeable accident. According to an NAF spokesman, this is the highest number of accident-free flight hours yet to be compiled by personnel of the Naval Air Facility.

On this page are photographs taken in various shops (by no means, are all of the shops represented here) at NAF. According to Lt. Ware, the men who work in the shops are as responsible for the safety record as are the pilots, and it is these men and their supervisors that NAF salutes for this milestone safety achievement.



CELEBRATION CAKE — Ens. Santoni wields a saber to cut a special cake, baked for the occasion. Capt. Moore, left, and Lt. T. D. Ware, NAF's Safety Officer, look on.



AT2 W. B. Angle checks relays in electronic gear down for maintenance. Angle works in NAF's Electronics Branch.



ACAN Jeffrey Peterson gives landing instructions to an NAF pilot. Peterson's job in the control tower involves a knowledge of weather and ground conditions.



ADR3 D. R. Jones and ADJ1 Charles Malear (left and right, respectively) operate a tow truck, which pulls aircraft to parking positions on the apron.



AO3 Charles Souza (left) and AO3 Rodney Patterson mount a tail fin on a bomb in the NAF Weapons Shop. All ordnance for aircraft is handled by this shop.

New Program Encourages Civilian Exposure to Fleet

The Chief of Naval Material initiated a program last year for exposing volunteer CNM civilian employees to Fleet operations.

Called Face to the Fleet Cruises, the program was instituted with the concurrence of the Commanders-in-Chief of the Atlantic and Pacific Fleets.

"It is the intent of the subject program to give Naval Material Command civilian personnel with no previous exposure to the Fleet and its at-sea environment, the opportunity to observe and develop a basic knowledge in this area," states NAVMAT Instruction 5723.1A, which updates the program.

To date the program has been restricted to the Washington/Norfolk area, but expansion to the other areas is anticipated.

On the West Coast, the Commanding Officer of the Naval Supply Center at San Diego will aid as the CNM's West Coast liaison and control for the assignment of billets offered by the Commander, Third Fleet, who has been designated agent for the Commander-in-Chief Pacific Fleet for this program.

Volunteers are usually included on cruises of four to seven days in duration. During that time they are exposed to the daily workings of the ship. It is hoped that this exposure will give them an insight that may aid them and their commands to improve their support of the Fleet.

Since participants are volunteers, any travel is at no expense to the government and no per diem or other reimbursement is authorized.

NWC employees wishing to participate in a Face to the Fleet Cruise should contact Joan Taylor, Code 0232, for further information.

Talk on Auto Crash Safety Program Slated

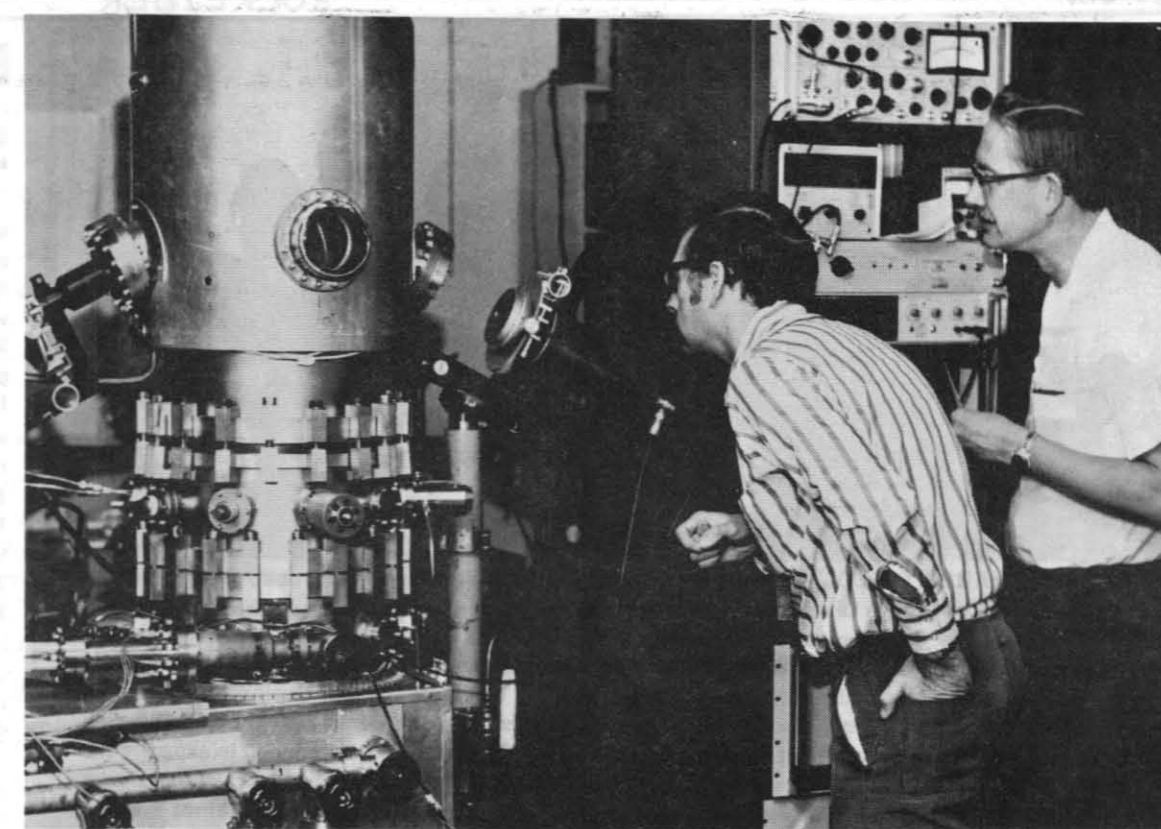
Don Friedman, president of MINICARS, Inc., Goleta, Calif., will be the guest speaker at the next meeting of the Institute of Electrical and Electronics Engineers (IEEE).

The luncheon get-together is set for next Friday, May 4, beginning at 11:30 a.m. in the Mojave Room of the Commissioned Officers' Mess.

Friedman will describe the automotive crash safety program conducted by his firm for the Department of Transportation. Because of MINICAR's extensive testing at their sled facility, the Department of Transportation has changed its emphasis from rigid, tank-type automobile protection to a softer, energy-absorbing structure which produces lower shocks and decelerations on properly restrained passengers.

This trend is particularly important in the case of very small cars. If time permits, Friedman will also discuss the stratified engine concept and electric development for environmental cleanliness.

All interested persons are invited to attend.



HAL BENNETT (right) and Dennis Burge examine the Modulated Ellipsometer mounted right and left on an ultrahigh vacuum system.

Optics Lab Gets New Instruments...

(Continued from Page 1)

microns in the infrared. Currently, measurements are being made at the 0.6471 micron red krypton laser wavelength. When fully operational the Optical Evaluation Facility should be a very versatile instrument and the most sensitive one of its kind in existence.

Since lasers are used as light sources, very small amounts of scattered light can be measured, making the instrument an extremely sensitive one.

In addition to being able to measure light scattered by very smooth mirrors, the Optical Evaluation Facility can also measure the amount of light reflected by the mirror being tested. In particular, extremely high reflectances can be measured very accurately.

Both the scattering and reflectance measurements can be made at a whole series of laser wavelengths ranging from 0.35 micron in the ultraviolet to 10.6

microns in the infrared. Currently, measurements are being made at the 0.6471 micron red krypton laser wavelength.

When fully operational the Optical Evaluation Facility should be a very versatile instrument and the most sensitive one of its kind in existence.

Another unique optical instrument, called a Modulated Ellipsometer, has recently been assembled and put into operation in the Physical Optics Branch. The original version was developed by Steve Jaspersen, a consultant at NWC who is currently teaching at Worcester Polytechnic Institute in Massachusetts.

The present instrument has been modified and improved by Dennis Burge and Bob O'Handley of the Physical Optics Branch, in consultation with Jaspersen.

The Modulated Ellipsometer automatically analyzes the state of polarization of a beam of light reflected from a sample. When this is compared with the known state of polarization of the light before reflection, the effect of the sample can be deduced. Thus, valuable information about the optical properties of the reflecting material can be obtained.

The ellipsometer is mounted on an ultrahigh vacuum system so that it can make measurements on mirror coatings in situ, before they are exposed to the atmosphere.

The principal advantage of this new instrument is that once it is properly aligned, none of its parts have to be moved or adjusted. In conventional ellipsometers, at least one component has to be set in order to obtain the necessary information.

Because of a unique design employing a quartz transducer, the changes necessary to make two independent measurements are built into the light itself by modulating its state of polarization. This is part of the reason why the precision of this system is an order of magnitude better than that of unmodulated ellipsometers, and its accuracy is comparable.

Currently the Modulated Ellipsometer is being used to study the effects of small concentrations of contaminants (such as oxygen,

water vapor, hydrogen and carbon dioxide) on the reflectance of a freshly prepared mirror surface such as silver. Preliminary results of these studies suggest that even small amounts of water vapor may have quite a harmful effect on the reflectance of silver when the highest reflectance is desired.

The system is presently being modified to allow heating and cooling of the mirror either during or after the deposition of the reflecting coating. This modification will extend the capability of the system, particularly enabling studies of annealing and quenching effects to be made. Also, studies of the temperature dependence of the optical properties of materials, surface plasmon effects, and oxidation effects in amorphous semiconductors can be undertaken.

In order to quantitatively characterize the microroughness on mirror surfaces, the FECO Scanning Interferometer has been developed by Dr. Jean Bennett, of the Physical Optics Branch. With this unique instrument, multiple beam interference fringes, which contour the irregularities on mirror surfaces, can be observed visually or recorded using a special slow scan TV camera.

The data from the TV camera are fed into a minicomputer and automatically processed. When fully operational, this instrument will yield the root mean square roughness, height distribution function, mean slope, and other statistical properties of mirror surfaces.

This system can detect extremely small amounts of roughness. For example, the root mean square roughness of the best polished fused quartz mirror surfaces produced by the bowl feed polishing process (also developed at NWC) is about 8 angstroms — less than one five-hundredth of a wavelength of light.

Dr. Bennett has found that the infrared reflectance of mirrors can be decreased for roughnesses as small as 20 angstroms rms, and typical commercially polished mirrors range from 20 angstroms to 80 angstroms rms depending on the mirror material and polishing techniques used.



INTEREST SHOWN IN NWC PROGRAMS — Two State of California officials were at China Lake earlier this week for a briefing on possible civilian applications of military know-how. Information about weather modification, fire protection and anti-pollution programs, as well as research on geothermal power was presented to A. Earl Davis (at left) Science and Technology Coordinator for the State of California, and Dr. Gordon Snow (second from left), assistant to the state's Secretary of Agricultural and Services Agency. The visitors are shown with Dr. G. W. Leonard, head of the Propulsion Development Department, and George Linstead (at right), head of the Technology Utilization Branch in Code 45. The arrival here of Davis and Dr. Snow followed up a recent visit to see Gov. Ronald Reagan in Sacramento that was made by Rear Admiral Henry Suerstedt, Jr., NWC Commander, in order to acquaint the governor and his staff with activities currently being carried out here that have a potential for civilian use.

