

Optics Lab Researchers Follow Tradition

(Continued from Page 4)
puscles of the blood. The absence of this particular constituent in the whole blood used for transfusions has proved lethal at high altitude in hospital planes returning from Vietnam.

One of the components required for the ATR unit is a polarizer in the whole blood region of the spectrum where at present no high performance polarizers are available. Members of the Branch have designed such a polarizer which shows promise of being at least one hundred times better than existing infrared polarizers. A test model showed very promising performance and the actual polarizer is scheduled to be built next month.

One technique used by members of the group is similar to that used so successfully by A. A. Michelson. It involves the interference of light waves and is extremely sensitive to small steps on smooth surfaces and small amounts of surface roughness. Using a special form of interferometer, the thickness of evaporated films can be measured with an accuracy of one or two thousandths of a wavelength of light. When one realizes that a wavelength of green light is about one five-hundred-thousandth of an inch, the accuracy of the thickness measurement is almost unbelievable.

The members of the Physical Optics Branch are continuing the tradition Michelson established for Navy scientists and are helping make Michelson Laboratory well known in the field of precision optical measurements. Their research is disseminated to the scientific community through the several papers published each year in scientific journals as well as by word of mouth, and members of the group are always happy to act as consultants for anyone who has an optical problem.



"SOUND OF MUSIC" — Nancy Hawthorne (Liesl), Teresa Jessburger (Marta), Joane Fragman (Gretl), and Lana Lee Kline (Maria), comfort one another during a thunderstorm, in a scene from the Rodgers and Hammerstein musical "Sound of Music." The CLOTA production will open tonight

at 8:15 at Murray School Auditorium, and will play again August 22, 28 and 29. Tickets may be purchased at the Station Pharmacy, the Gift Mart in Ridgecrest, from members of the cast, or at the door on the nights of production.

—Photo by Gene Edwards

Cor. Hendershot Joins NWC Supply

Cdr. Theodore R. Hendershot, who recently relieved Cdr. W. R. Guffy as Deputy Director of Supply at the Naval Weapons Center, brings a unique background to the supply functions of NWC.

Prior to taking up his duties at the Center Cdr. Hendershot served with the Organization of the Joint Chiefs of Staff from June 1968 to June 1970 as Logistics Officer, Operations Team One, National Emergency Airborne Command Post (NEACP), based at Andrews Air Force Base in Washington, D.C. As the Senior Logistics representative he was responsible for maintaining the documentation and presenting information concerning crisis management of logistics units at the National level, and he was responsible for coordinating all logistics and damage assessment actions for the Command

Post.

Logistic problems of the "airborne environment" of NEACP are atypical, and Cdr. Hendershot was recently awarded the Joint Service Commendation Medal by the Joint Chiefs of Staff for "... (his) high degree of initiative and imagination in solving problems unique to the airborne environment." Also the citation stated that: "he made significant and continuing improvements in data base content and currency. The excellent rapport and staff liaison established for NEACP by Cdr. Hendershot with supporting elements of the Organization of the Joint Chiefs of Staff led to significant improvement in support of the Command Post mission."

The medal, certificate and citation were presented by Capt. M. R. Etheridge, Commander of NWC, during ceremonies

held in the Commander's office and attended by Capt. E. M. Wieseke, NWC Director of Supply.

Cdr. Hendershot also served with the Joint Chiefs of Staff from September 1966 to June 1968 in the Office of Special Assistant for Strategic Mobility. Shipboard tours he considers as outstanding in his Naval career were as Supply Officer on U.S.S. F. B. Parks (DD-884), U.S.S. King (DLG-10), and U.S.S. Topeka (CLG-8). His tour here on the Mojave Desert will contrast sharply with a previous duty — Operation DEEP FREEZE II and III—where he was Cargo Officer on the Staff of Commander, Naval Support Forces, Antarctica, a billet that was especially interesting.

In addition to attending the Universities of Rochester (N. Y.) and Washington (State), he has completed courses at the Navy Postgraduate School and the Navy School of Systems and Logistics (AFIT); he has an MS degree in Logistics.

Born in Victoria, B.C., Canada, Cdr. Hendershot claims Seattle, Washington as hometown. He is a "do-it-yourself" hobbyist in radio and television repairing and locksmithing. He and his wife, Anna Lee, have two children, Leslie, age 17, and Lynne, age 15.

Meals - on - Wheels need a volunteer driver to take a meal from Ridgecrest Community Hospital to an elderly Inyokern resident Monday through Friday at 5 p.m. For more information, call 446-7513.

SHOWBOAT

MOVIE RATINGS FOR PARENTS AND YOUNG PEOPLE

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

GP ALL AGES ADMITTED
Parental Guidance Suggested

R RESTRICTED
Under 17 requires accompanying Parent or Adult Guardian

X NO ONE UNDER 17 ADMITTED
(Age limit may vary in certain areas)

ALL G, GP, AND R FILMS RECEIVE
THIS SEAL OF THE
MOTION PICTURE CODE OF SELF-REGULATION

FRIDAY AUGUST 21

"THE PINK JUNGLE" (104 Min.)
James Garner, George Kennedy,
Eva Renzi
7:30 P.M.

(Adventure/Comedy) Jet set photographer and a pretty model go to Africa for an ad campaign and wind up in a diamond smuggling plot. Wisecrack-a-minute story is filled with gags and comic opera adventure (G)

Shorts: "Flying Fisherman" (9 Min.)

SATURDAY AUGUST 22

—MATINEE—
"MAYA" (91 Min.)
Jay North
1:00 P.M.

Shorts: "A Feud With A Dude" (7 Min.)
"A Missed Fortune" (16 Min.)

—EVENING—
"THOSE DARING YOUNG MEN IN THEIR JAUNTY JALOPHIES" (124 Min.)
Tony Curtis, Walter Chiari
7:30 P.M.

(Comedy) Hilarity shifts into high gear at the Monte Carlo Rally where all nations compete in a road race over impossible roads with ancient cars. Also has Terry-Thomas and Gert Fröbe in the zany cast. (G)

SUNDAY-MONDAY AUGUST 23-24

"THE DETECTIVE" (114 Min.)
Frank Sinatra, Lee Remick
7:30 P.M.

No synopses available.

TUESDAY-WEDNESDAY AUGUST 25-26

"CACTUS FLOWER" (104 Min.)
Goldie Hawn, Walter Matthau,
Ingrid Bergman
7:30 P.M.

(Comedy) Wild force of a middle-aged dentist (Matthau), who has evaded marriage to his kooky young mistress (Hawn) by pretending to be married, but decides to marry her though secretly loved by his assistant (Bergman). (GP)

Shorts: "Sports A-Go-Go" (10 Min.)

THURSDAY-FRIDAY AUGUST 27-28

"TO COMMIT A MURDER" (91 Min.)
Louis Jourdan, Santa Berger
7:30 P.M.

(Spy/Adventure) Down-and-out author is forced into the spy game to watch a husband and wife team suspected of trying to lure a scientist to China. Made in France for true Continental settings. (GP)

Shorts: "Swinging Brazil" (18 Min.)

Bluejacket . . .

(Continued from Page 1)

enjoy living in the Indian Wells Valley area. The Broussards frequently take family fishing trips to Lake Isabella and spots north of China Lake.

Broussard is an avid athlete and participated in Navy flag football and softball leagues at former duty stations.

From _____

PLACE
STAMP
HERE

TO _____



Vol. XXIV, No. 33

Naval Weapons Center, China Lake, California

Fri., Aug. 21, 1970

Wilson Named To Lead NWC

Confirmation of Haskell G. Wilson as Technical Director of NWC, effective August 14, 1970, has been received this week from the Office of Civilian Manpower Management in Washington, D.C.

Wilson reported aboard the Center in July 1950 from the Research and Development Division of the Bureau of Ordnance. He has held a wide variety of positions since that time, beginning as Scientific Staff Assistant in the Office of the Commander.

This assignment was followed by three years as Associate Head, Test Department. After that, Wilson managed Central Staff, and has served as the Associate Technical Director since 1955. In addition, he has served in the capacity as Acting Technical Director for the Center for extended periods.

The new Technical Director received the L.T.E. Thompson Award in 1957 from the U.S. Naval Ordnance Test Station (now NWC) for outstanding technical and administrative ability in advancing the Weapons Programs of the U.S. Navy. The award, which is the highest honor bestowed for individual achievement at NWC, was presented Wilson for "... exceptional effectiveness in fostering understanding and cooperation between the civilian and military components of the Station's research and development organization."

In 1958 he was appointed as a Member of the California State College Advisory Committee, and is presently serving his second term on that board.

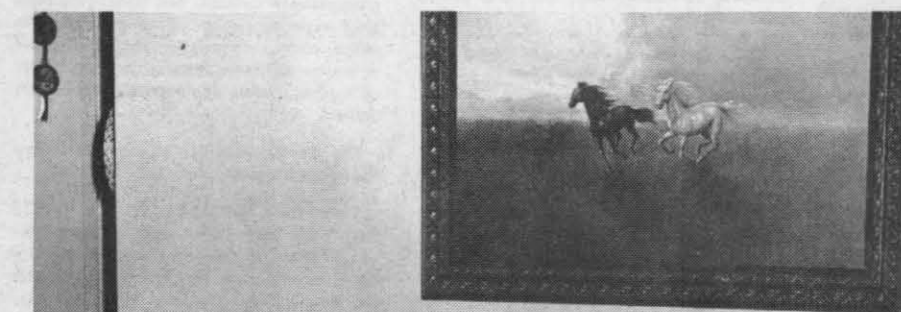
In addition to his many other duties, Wilson is the Area Coordinator of the Civilian Defense and Disaster Control Council for the communities of Inyokern, Ridgecrest and China Lake.

He is a member of RESA, AOA, ASPA, AAAS and is an Associate Fellow of AIAA.

Wilson is a graduate of the University of Arkansas, in Fayetteville, where he received a Bachelor of Science Degree in Chemical Engineering, later becoming a registered Professional Engineer.

Haskell G. "Hack" Wilson and his wife, Jane, reside at 701 Essex Circle, on the Center. The couple have two married daughters: Mrs. Marvin Coffland and Mrs. Paul McGibbons.

Rene Broussard Selected August Bluejacket



AUGUST BLUEJACKET — AMS-1 Rene Broussard, of NAF, chosen "Bluejacket of the Month" for August, relaxes at home with wife Yvonne, and five children: Rene, Jr.,

Michael, Silvia, Deborah and Cynthia. Broussard and his wife will journey to Bakersfield for a leisure weekend, as a result of his selection.

Airframes Supervisor Wins Weekend Trip

Aviation Structural Mechanic First Class Rene Broussard, Target Airframes Supervisor at the Naval Air Facility, has been named August's "Bluejacket of the Month" for his outstanding leadership and on-the-job performance.

In recognition of his professional dedication, Broussard and his wife Yvonne will be entertained in Bakersfield as guests of the Greater Bakersfield Chamber of Commerce, and participating merchants.

After being greeted by Bakersfield C of C members and interviewed at KERO-TV, the Broussards will be supplied room and meals at the Sands Inn, and other courtesies by Bakersfield merchants, during their weekend. Prior to leaving the local area, Doug Butler, of Desert Motors, will gift Broussard with a new Ford to use on the trip.

The 33-year-old Broussard entered the service in July, 1955, and during his 15-year Naval career has attended mechanics schools for the F-8, F-9 and F-4, as well as Corro-

sion Control "B" School.

AMS1 Broussard reported to the Naval Air Facility last fall after serving as airframes petty officer with VF-151 aboard the USS Coral Sea. In addition to his duties with NAF's Target Division, Broussard is a collateral inspector for the F-9 and T-33 aircraft.

Among his professional awards are the Navy Achievement Award, Vietnam Service Award, Republic of Vietnam Expeditionary Medal, National Defense Service Medal, Good Conduct Awards and the Navy Unit Commendation.

Broussard and his wife reside aboard the Center at 407 Ranger with Rene Jr., 13; Cynthia, 11; Deborah, 10; Michael, 8; and Silvia, 4.

The Broussards were childhood sweethearts in New Orleans, where Broussard attended Joseph S. Clark High School before joining the Navy.

Both have adjusted well to the drier climate of China Lake, however, and find they

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Inside . . .

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See And Be Seen



SAFETY TESTS—On the left, bicycles at 150 feet with bright headlights. On the right, same distance, low beam headlights. Larger reflector and reflective material on



the rider and bike at left in each photo, with reflective material at belt height show up best. Chrome on bike at right caught light, but small reflector can hardly be seen.



APPRECIATION AWARD TO OGILVIE—Upon his retirement, Herbert Ogilvie was presented a letter of appreciation and the NWC plaque by Capt. M. R. Etheridge, NWC Commander, during ceremonies held in the Commander's Office this week. Ogilvie, a gardener in the Grounds Structures Branch of Public Works since 1951, had been the principal caretaker of grounds in the NWC administrative residential area of Enterprise Road for the past 10 years. Ogilvie executed his gardening with the kind of personableness and diplomacy that has earned him much admiration and appreciation. Ogilvie's immediate plans are a trip to England to visit relatives and to check into an inheritance.

CENTER LIBRARY LISTS NEW BOOKS

A complete list of new books is available in the library.

Fiction
Amado—Home Is the Sailor.
Brodeur—The Stunt Man.
Dipper—The Paradise Formula.
Disney—Two Little Children and How They Grew.
Fast—The League of Grey-eyed Women.
Gold—Sick Friends.
Litwak—Waiting for the News.
Mayer—Follow the River.
Non-Fiction
Buck—The Kennedy Women.
Denlinger—The Gentle People.
Gauquelin—The Scientific Basis of Astrology.
Gell—The Black Badge.
Kaplan—Marijuana: Now Prohibition.
Leighton—Early American Gardens.
Staley—New Trends in Table Settings.
Terhune—Mastering Your Emotions.



NAF CHAPLAIN REPORTS—Lt. E. C. Middleton of Timmonsville, South Carolina, his wife Ann, two year old son Edward, and four year old daughter Elizabeth, reported aboard the Center last week. Middleton, who attended South Eastern Baptist Theological Seminary and Mississippi College, is assigned as Chaplain at NAF. He comes to the Center from chaplain duty with Destroyer Squadron Nine.



DIVINE SERVICES

Protestant (All-Faith Chapel)—
Morning Worship—10:00 a.m.
Sunday School—8:30 a.m., Chapel Annexes 1, 2, 4 (Dorms 5, 6, 8) located opposite Center Restaurant.
Thursday—Service at 5:00 p.m. (Organ Prelude at 4:45 p.m.)

Roman Catholic (All-Faith Chapel)—
Holy Mass—7, 8:30 and 11:15 a.m. Sunday.
Daily Mass—11:30 a.m. in Blessed Sacrament Chapel, Saturday, 8:30 a.m.

Confessions—7 to 8 p.m. Saturday, and 8 to 8:25 a.m. Sunday.

NWC Jewish Services (East Wing All-Faith Chapel)—8 p.m. every first and third Friday.

Sabbath School—10 a.m. to noon, every first and third Saturday.

Unitarian Fellowship—(Chapel Annex 95, 95 King Ave.)—Sundays, 7:30 p.m.

The Rocketeer

Official Weekly Publication
U. S. Naval Weapons Center
China Lake, California

Capt. M. R. Etheridge, USN
NWC Commander

H. G. Wilson
Technical Director

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PHCS C. E. Bruce, PH2 Delmar E. Hart,
PH2 Michael F. Krause, PHAN Ronald G. Mills.
Staff Photographers

DEADLINES:
News Stories Tuesday, 4:30 p.m.
Photographs Tuesday, 11:30 a.m.

The Rocketeer receives American Forces Press Service material. All are official U. S. Navy photos unless otherwise identified. Printed weekly with appropriated funds in compliance with NAVEX P-35, revised July 1958. Office at Nimitz and Lauritzen. Phones 3354, 3355, 2347

PROMOTIONAL OPPORTUNITIES

Employees are encouraged to apply for the positions listed below. Current applications (SF-171) or Standard Form 58 bringing your work history up-to-date should be forwarded as described below. The fact that positions are advertised here does not preclude the use of other means to fill these positions. Part of the ranking process of those rated as basically qualified will be a supervisory appraisal form that will be sent to the employees present and most recent previous supervisor. Selection shall be made without discrimination for any non-merit reason and without favoritism based on personal relationships or patronage.

Safety Engineer, GS-803-9/11/12, Code 22—Responsible for facilities design review for the Center. Technical review of potentially hazardous operations. **Qualification Requirements:** Experience as specified in CSC Handbook X-118. Bachelors degree in one of the engineering or scientific fields. Ability to deal effectively with people is necessary. **Job Relevant Criteria:** Experience working with explosive and toxic materials or ordnance. Varied design experience desirable.

File above applications with Pat Gaunt, Bldg. 34, Rm. 202, phone 2723.

Clerk (Dictating Machine Transcriber), GS-316-3 or 4, PD No. 240066-1, Code 4037—This position is that of secretary to the Weapons Technology Branch, Air-to-Surface Weapons Division, Weapons Development Department. Incumbent will be responsible for the typing of official correspondence and memoranda; preparation of travel orders and stubs, filing, receiving telephone and office calls, receives and distributes incoming mail and other duties as may be required to maintain an efficient office.

Minimum Qualification Requirements: One year general experience for GS-3 and one and one-half years general and six months specialized for GS-4 in accordance with X-118. **Advancement Potential:** GS-3 may be promoted to GS-4.

File applications for above with June Chipp, Bldg. 34, Rm. 204, phone 2676.

Clerk-Typist, GS-322-3, Code 8411—This position is located in the Internal Security Branch, Security Operations Division of the Security Department. The major responsibilities of this Branch are the processing and bagging of Civil Service, Military, Contractor and Support Facility personnel. Duties include: Assisting the Receptionist, interviewing applicants for badge and fingerprint card data, typing, posting and miscellaneous duties. **Qualification Requirements:** 1 year of general typing experience or requirements of CSC Handbook X-118.

File applications for the above with Carole Cadle, Bldg. 34, Rm. 204, X-2925.

Fire Protection Inspector, GS-081-06 (1 vacancy), PD No. 17274, Code 842—This position is located in the Security Department, Fire Division. The major work elements of the position include fire prevention inspection, correction of fire hazards, submission of reports, fire prevention training, testing and servicing fire equipment, reading instructions, miscellaneous. Consists of a 40-hour workweek. **Minimum Qualification Requirements:** Three years of general fire fighting experience and one-half year of fire protection inspector experience.

File applications for the above with Carole Cadle, Bldg. 34, Rm. 204, X-2925/2676.

Supervisory Supply Technician, GS-2005-07, Code 25751—As Head, Purchase Material Section, Control Division, Supply Department, maintains liaison with vendors, Contract Administrators, Center codes, Navy Regional Finance Centers and Accounting Division to resolve any problems in connection with receipt of material and billing procedures. Reviews and analyzes documents for discrepancies and to determine cause of same. Responsible for supervision of subordinates. **Minimum Qualification Requirements:** One year of general clerical or office experience plus four years of specialized experience in supply work or closely related activities. Supervisory aptitude must have been demonstrated.

Supervisory Supply Clerk, GS-2005-05, Code 25753—In a supervisory capacity, insures prompt processing of receipt documents and delivery of material to meet established schedules. Trains subordinates in processing of documents and in key punch operations and procedures. **Minimum Qualification Requirements:** One year of general clerical or office experience plus two years of specialized experience in supply work or closely related activities. Job Relevant Criteria: Must have working knowledge of the key punch machine.

File applications for above with Naomi Campbell, Bldg. 34, Rm. 206, Ext. 3118.

Budget Clerk, GS-501-05, PD No. 7035050, Code 3502—This position is located in the Planning Staff of the Aviation Ordnance Department. Primary responsibilities of this position are controlling actual records, surveillance over expenditure rates and funding levels, and presentation of information.

Duties and responsibilities include reconciling ADP runs, preparing job orders, issuing auxiliary job orders and work requests and maintaining fiscal and related



OUTSTANDING PERFORMANCE—James L. Colson, c, is congratulated by Cdr. C. D. Brown, OIC, Corona Annex, following the presentation to him of an Outstanding Performance Rating and a Quality Step Increase in a ceremony at Corona recently. Colson has contributed much to the planning required in the transfer of various scientific functions to China Lake. Ray E. Draudt, Public Works Head, approves the presentation.

information files. The incumbent is also responsible for maintaining surveillance over allocations made and special deposits. The incumbent originates, cancels or revises work requests. She assists the Budget Analyst in the formulation and preparation of budget estimates and also prepares graphs and special reports. **Minimum Qualification Requirements:** 1 year general experience plus 2 years specialized experience. Combination of education and experience can substitute in accordance with CSC Handbook X-118.

File applications for above with Beverly Saiger, Bldg. 34, Rm. 212, Ext. 2514.

Electronics Technician, GS-856-9, PD No. 7055046-2, Code 5515—Calibrates microwave instruments such as attenuators, frequency meters, voltage standing wave ratio meters and noise figure meters. Designs, constructs and applies impedance matching networks to the output of wave form generating equipment. Alters existing test systems to meet applications of local R&D groups. Evaluates error sources in new techniques to assure accuracy and precision in final calibration reports. Performs research in Bureau of Standards manuals for local application. **Minimum Qualification Requirements:** As outlined in CSC Handbook X-118, 6 years of appropriate experience, one of which is directly related to the duties of the position. One year of experience comparable in difficulty and responsibility to the next lower grade. **Job Relevant Criteria:** Thorough knowledge of electrical and electronic theory, including a facility for use of algebra, geometry, trigonometry and differential calculus. Knowledge of Navy Calibration program. Knowledge of statistics adequate to evaluate test results in terms of standard statistical parameters.

File applications for above with Dora Childers, Personnel Bldg., Rm. 210, phone 2393.

Electronic Engineer, GS-855-9, PD No. 7030010, Code 3052—This position is that of a Project Engineer in the Electronic Warfare Branch of the Countermeasures Division, Systems Development Department. The principle functions of this position is to design and/or assist in the designing of tests; the overall scheduling of tests to be conducted and for their coordination with other Center ranges; monitoring test operations and make real-time decisions concerning flight operations; monitor data reduction; and serve as a consultant in the analysis of systems. **Minimum Qualifications:** Appropriate education/experience as specified in CSC X-118. **Job Relevant Criteria:** Familiar with tracking radars, aircraft operational characteristics, and with digital computing system capabilities. **Advancement Potential:** To the GS-12 level based on ability to fulfill position requirements.

File applications for above with Mary Morrison, Bldg. 34, Rm. 210, Ph. 2032.

Heavy Duty Equipment Serviceman, WG-58006-06, JD No. 303-1, Code 70762—Performs semi-skilled work on all types of Heavy Duty Equipment. Utilizes technical instructions, manuals and other publications which are applicable to the Heavy Duty Equipment to be serviced, repaired and maintained in order to keep this equipment in good operating condition. **Qualification Requirements:** Rating will be on the basis of the appropriate J-Element Standard in accordance with the CSC Handbook X-118C. **Advancement Potential:** WG-10.

File applications for above with Mary Morrison, Bldg. 34, Rm. 210, Ph. 2032.

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File applications for above with Mary Morrison, Bldg. 34, Rm. 210, Ph. 2032.



Rear Admiral Baldwin Visits China Lake

VISITS CENTER — Capt. M. R. Etheridge, Commander NWC, welcomes RAdm. Robert B. Baldwin and his staff at the Naval Air Facility Terminal August 14. During his

one-day stay, RAdm. Baldwin received a guided tour of China Lake facilities and technical briefings at NWC and VX-5. —Photo by PH2 M. F. Krause

Pay For Exposure Occupations Listed

The ROCKETEER edition of last week (August 14) carried an article "Part I—Payment for Actual Exposure" which listed conditions of the new Federal service-wide additional pay plan for employees in Trades and Labor (ungraded) occupations. This edition provides Part II of the plan, "Payment on Basis of Hours in Pay Status."

Differential Rate 50% Category for Which Payable

1. Duty Aboard Submerged Vessel. Duty aboard a submarine or other vessel, such as a deep research vehicle, while submerged.

8% 2. Explosives and Incendiary Material—High Degree Hazard.

Working with or in close proximity to explosives and incendiary material which involves potential personal injury such as permanent or temporary, partial or complete loss of any or all extremities; other partial or total disabilities of equal severity; and/or loss of life resulting from work situations wherein protective devices and/or safety measures either do not exist or have been developed but have not practically eliminated the potential for such personal injury. Normally, such work situations would result in extensive property damage requiring complete replacement of equipment and rebuilding of the damaged area; and could result in personal injury to adjacent employees.

Examples
—Working with, or in close proximity to operations involved in research, testing, manufacturing, inspection, renovation, maintenance and disposal, such as:

—Screening, blending, drying, mixing, and pressing of sensitive explosives and pyrotechnic compositions such as lead azide, black powder and photoflash powder.
—Manufacture and distribution of raw nitroglycerine.
—Nitration, neutralization, crystallization, purification, screening and drying of high explosives.
—Manufacture of propellants, high explosives and incendiary materials.
—Melting, cast loading, pel-

let loading, drilling, and thread cleaning of high explosives.

—Manufacture of primary or initiating explosives such as lead azide.

—Manufacture of primer or detonator mix.

—Loading and assembling high-energy output flare pellets.

—All dry house activities involving propellants or explosives.

—Demilitarization, modification, renovation, demolition, and maintenance operations on sensitive explosives and incendiary materials.

—All operations involving fire fighting on a artillery range or at an ammunition manufacturing plant or storage area, including heavy duty equipment operators, truck drivers, etc.

—All operations involving regrading and cleaning of artillery ranges.

—At-sea shock and vibration tests. Arming explosive charges and/or working with, or in close proximity to, explosive armed charges in connection with at-sea shock and vibration tests of naval vessels, machinery, equipment and supplies.

4% 3. Explosives and Incendiary Material—Low Degree Hazard.

Working with or in close proximity to explosives and incendiary material which involves potential injury such as laceration of hands, face, or arms of the employee engaged in the operation and possible adjacent employees; minor irritation of the skin; minor burns and the like; minimal damage to immediate or adjacent work area or equipment being used.

Examples
—All operations involving loading, unloading, storage and hauling of explosive and incendiary ordnance material other than small arms ammunition.

(Distribution of raw nitroglycerine is covered under High Degree Hazard—see Category 2 above).

—Duties such as weighing, scooping, consolidating and crimping operations incident to the manufacture of stab, percussion, and low energy electric detonators (initiators) utilizing sensitive primary explosives compositions where initiation would be kept to the limited amounts permitted to be present or handled during the operations.

—Load, assembly and packing of primers, fuzes, propellant charges, lead cups, boosters, and time-train rings.

—Weighing, scooping, loading in bags and sewing of ignitor charges and propellant zones charges.

—Loading, assembly, and packing of hand-held signals, smoke signals, and colored marker signals.

8% 4. Poisons (Toxic Chemicals)—High Degree Hazard.

Working with or in close proximity to poisons (toxic chemicals), other than tear gas or similar irritants, which involves potential serious personal injury such as permanent loss of faculties, partial or complete loss of faculties, and/or loss of life including exposure of an unusual degree to toxic chemicals, dust or fumes of equal toxicity generated in work situations by processes required to perform work assignments wherein protective devices and/or safety measures have been developed but have not practically eliminated the potential for such personal injury.

Examples
—Handling and storing toxic chemical agents including monitoring of areas to detect presence of vapor or liquid chemical agents; examining of material for signs of leakage or deterioration of equipment and work sites; work relating to disposal of deteriorated material; (exposure to conjunctivitis, pulmonary edema, blood infection, impairment of the nervous system, possible death).

—Renovation, maintenance, and modification of toxic chemicals, guided missiles, and selected munitions.

—Operating various types of chemical engineering equipment in a restricted area such as reactors, filters, stripping units, fractionation columns, blenders, mixers, pumps, and the like utilized in the development, manufacturing, and processing of toxic or experimental chemical warfare agents.

—Demilitarizing and neutralizing toxic chemical munitions and chemical agents.

—Handling or working with toxic chemicals in restricted areas during production operations.

—Preparing analytical reagents, carrying out colorimetric and photometric techniques, injecting laboratory animals with compounds having toxic, incapacitating or other effects.

—Recording analytical and biological tests results where subject to above types of exposure.

—Visually examining chemical agents to determine conditions or detect leaks in storage containers.

—Transferring chemical agents between containers.

—Salvaging and disposing of chemical agents.

tem, possible death).

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—Preparing analytical reagents, carrying out colorimetric and photometric techniques, injecting laboratory animals with compounds having toxic, incapacitating or other effects.

—Recording analytical and biological tests results where subject to above types of exposure.

—Visually examining chemical agents to determine conditions or detect leaks in storage containers.

—Transferring chemical agents between containers.

—Salvaging and disposing of chemical agents.

4% 5. Poisons (Toxic Chemicals)—Low Degree Hazard.

Working with or in close proximity to poisons (toxic chemicals) other than tear gas or similar irritating substances) in situations for which the nature of the work does not require the individual to be in direct contact with the more toxic agents as in the case with the work described under high hazard for this class of hazardous agents.

Example
—Handling for shipping, marking, labeling, hauling and storing loaded containers of toxic chemical agents that have been monitored.

8%
6. Micro-Organisms — High Degree Hazard. Working with

limited to recognized institutions.

In general charge of the archaeo-paleontological exploration will be Dr. Giles Meade, Director of the L. A. County Museum. Field archaeologist will be Dr. Emma Lou Davis, research associate, at the Los Angeles institution. Locally, members of the Maturango Museum-sponsored Mojave-Sierra Archaeological Society will work with the professionals in all phases of the exploration.

To date such extinct species as dire wolf, sabertooth tiger, mammoth, giant sloth and prehistoric camels and horses have been identified among fossilized bones found at various sites.

A few man-made tools found near these bones have led the experts to conjecture that man may have been here 10,000 to 20,000 years ago. These and other questions about the remote history of this region will spur a search for clues that is expected to take three years to complete.

LA Museum To Study Fauna Of Area's Past

Clues to the past, when China Lake was a large body of water, will be pursued this fall as the Los Angeles County Museum of Natural History resumes archaeological and paleontological investigations of portions of the former lake. With an endorsement from the Commander of the Naval Weapons Center, a permit has been issued to the Los Angeles institution to continue exploration and limited excavation of sites on the Center.

As Chairman of the NWC Natural Resource Management Board, LCdr. W. J. Schell, Assistant Public Works Officer, was active in assisting the local Maturango Museum and its affiliated organization, the Mojave-Sierra Archaeological Society, to coordinate the necessary approvals for the L. A. County Museum to carry on its exploration at China Lake.

All archaeological resources are protected by Federal Law, first enacted in 1906, explained LCdr. Schell, and under the Act for Preservation of American Antiquities, excavation is

limited to recognized institutions.

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—Direct contact with primary containers of organisms pathogenic for man such as culture flasks, culture test tubes, hypodermic syringes and similar instruments, and biopsy and autopsy material. Operating or maintaining equipment in biological experimentation or production.

—Cultivating virulent organisms on artificial media, including embryonated hen's eggs and tissue cultures where inoculation or harvesting of living organisms is involved for production of vaccines, toxides, etc., or for sources of material for research investigations such as antigenic analysis and chemical analysis.

4%
7. Micro-Organisms — Low Degree Hazard. Working with

or in close proximity to micro-organisms which involves potential personal injury such as death, or temporary, partial, or complete loss of faculties or ability to work due to acute, prolonged, or chronic disease. These are work situations wherein the use of safety devices and equipment, medical prophylactic procedures such as vaccines and anti-serums and other safety measures do not exist or have been developed but have not practically eliminated the potential for such personal injury.

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NWC Squad Ranks As MDISL Threat

China Lake will send its finest team in years to represent NWC in the Mojave Desert Interservice League softball tournament August 28-30 in Barstow.

The team boasts five of the top seven hitters during the recently completed China Lake intramural season, as well as All-Star pitchers Bert Andreason and Bill Brown.

"The team looks better this year than it ever has," said manager Dick Sullivan.

"For the first time in several years we'll have an organized team before we get to the tournament. We've got real good hitting and our bench is so strong, I wouldn't hesitate to put anyone in at any time."

Sullivan will field a team featuring league-leading hitter Jimmy Ayers at second base, No. 2 hitter and home run leader Dave Taylor at 3rd, and All-Star Jim Latta in left field.

Rounding out the starting lineup are Dick Braun at shortstop, Tom Sebastian in center, Bob Dixon in right and either Al Hyles or versatile Lowell Radcliff catching.

On the mound Sullivan can call on Andreason, 9-4 during the regular season, Brown (17-8) and hard throwing Steve Wittrock (14-11).

Completing the squad are third baseman Dick Simpson, first baseman Don Sichley, outfielder Lon Henke and utility men John Stortecky.

MDISL rules permit China Lake to include civilians on the team roster because of NWC's comparatively small source of military players.

The other seven teams, including defending champion Barstow, will field all-military teams.

ROSTER

	G	B	H	D	T	R	A	V.
Andreason, Un p	13	38	9	0	1	0	.247	
Ayers, T 2b	19	69	36	2	0	1	.522	
Braun, ER ss	19	58	20	1	1	7	.345	
Brown, ER p	25	76	18	3	0	2	.247	
Dixon, VX of-1b	17	55	17	3	1	0	.309	
Haus, VX 1b	25	68	23	3	0	11	.337	
Henke, NAF of	25	72	31	6	3	3	.431	
Hiles, ER c	19	64	27	3	1	8	.422	
Latta, NAF of	21	49	19	2	1	5	.388	
Radcliff, Un c	22	66	23	4	0	0	.348	
Sebastian, N of	22	55	16	1	0	5	.291	
Sichley, NAF 1b	23	64	16	3	0	1	.250	
Stortecky, N if	10	24	6	1	2	0	.250	
Taylor, Un 3b	18	57	26	1	0	12	.456	
Wittrock, NAF p	25	75	17	0	1	1	.227	

TOURNAMENT SCHEDULE

	First Round
August 28-9 a.m. George AFB vs. 29	
Palms, 11 a.m. Norton AFB vs. China Lake,	
1 p.m. Nellis AFB vs. Edwards AFB, 3 p.m.	
Irvin vs. Barstow.	

Football Registration Ends September 10

Team registrations are being accepted for the 1970 intramural football season.

Teams wishing to participate in the league this fall must submit team rosters to the Special Services Office, 76 Bard, by 4:30 p.m. September 11.

Rosters are to be limited to 20 players. All military and civilian employees of NWC are eligible to play in the league.

Wydra's Ace Spurs Three-Club Victory



THREE FOR THE MONEY—Ray Marsh (l) congratulates Gary Wydra on his sudden death victory for low net title in the 3 Club Tournament August 15. Wydra used a driver, 6-iron and putter on the front nine, but switched to a 3-wood, 7-iron and putter on the back to fashion his 69. Marsh used a 3-wood, 8-iron and putter all the way.

Dewing Farewell Draws 52 Golfers

Curt Bryan and Gary Wydra brought home top honors in the 3-Club Tournament held August 15 at the China Lake Golf Club.

Bryan fired a 1-over-par 73 to win the low gross championship, while Wydra defeated Ray Marsh on the first hole of a sudden death playoff to win the low net title. Both Wydra and Marsh had shot 69's over 18 holes. Wydra's score included a hole-in-one on the 188-yd. par 3, No. 6.

Pat McDonald finished second in the low gross competition with a 76. Leo Maki, Ed Nelson, Tom Short and Gary Castor rounded out the prize list in the net standings.

Stalwart Dick Bauers and J. J. Smith won the low gross and low net titles in the NAF Dewing Farewell Golf Tournament August 14 at the China Lake Golf Club.

Bauers led all 52 participants with a 75. Smith led the handicap scoring with a 42, followed by John Peterson with a 52 and Wayne Oxford with a 59.

Handicap scoring was done on the Calloway System, which allows a golfer to subtract multiples of his worst hole from his total score.

Other awards went to Stan Hess for the longest drive on the 9th hole and Darrell Buell for being closest to the hole on the 17th.

The final awards were a farewell gift to Capt. Dewing from the golfers of NAF and a plaque of appreciation to NAF's golf-minded skipper from Special Services.

IWV Swimmers Reign As Area Champions Again

Since its beginning in the summer of 1958, the Indian Wells Valley Swim Team has grown from a team with relatively no organization and few swimmers to one which is probably the most organized in the county. It has grown from 40 swimmers to more than 160 at the beginning of the 1970 season.

During its existence the IWV Swim Team has been under the direction of Head Coach Carol Chatterton, and in the first season, Carol and her husband, Dick, handled the team without any assistance, holding practices only a week at the Station pool.

The following year, sign-ups were held, and with the help of volunteers, practice was conducted twice a week during the winter and four times a week during the summer.

In 1961 a board of directors was formed and many parents volunteered to help in running various aspects of the team. Now such positions as meet manager, transportation chairman, awards chairman, team manager, team treasurer, and many others have become respected and necessary jobs. More volunteer coaches were also needed so parents and high

school aged swimmers volunteered to fill these positions.

The past season was initiated by a meet with the Aqua Aces team from Oildale. This meet was followed by two dual meets with the YMCA team from Antelope Valley and Tehachapi team from Tehachapi, all won by IWV.

The summer season started in March with a practice meet for all new swimmers, followed by the time trials to determine the 110-plus swimmers who would represent the team for the summer meets.

The summer season included dual meets with teams from Antelope Valley, Barstow, Delano, Bishop, (plus) the China Lake's Russ Bjorkland Memorial, the Apple Valley Relays and the Kern County Championships and Novice meets.

At the end of the season, IWV's record included only three losses, two to the hands of Antelope Valley and a 4th place finish at the Apple Valley Relays.

In all, 26 pool records were broken by IWV swimmers at the Station and Officers Club pools.

The season was brought to a close with the Annual Swim Team Banquet at which the

parents were honored.

Mrs. Chatterton gave gifts to honor her coaching staff, consisting of Roger Takabayashi, Barbara Sutherland, Jean Chatterton, Mary Heddel, Linda DeMarco, Rick Bjorklund, and Greg Moore. Charlie Lattig also received an award and a plaque from the older age groups for coaching them at night practices.

Others who were honored were Mrs. Charlotte DeMarco, Mrs. Louise Miller, Mrs. Gloria Randle, Mrs. Doris Dye, Mel Miller, Dick Chatterton, and Mr. & Mrs. Kirk Odencrantz.

The three graduating senior boys, Rick Bjorklund, Curt were honored for their outstanding accomplishments during the past two years. All three plan to attend college in the fall, and Rick will swim for Bakersfield College.

The IWV Swim Team has grown and matured steadily and has become respected by every recreation team that it faces. Known for its hardworking, enthusiastic parents and swimmers, it has always been an all-around team.

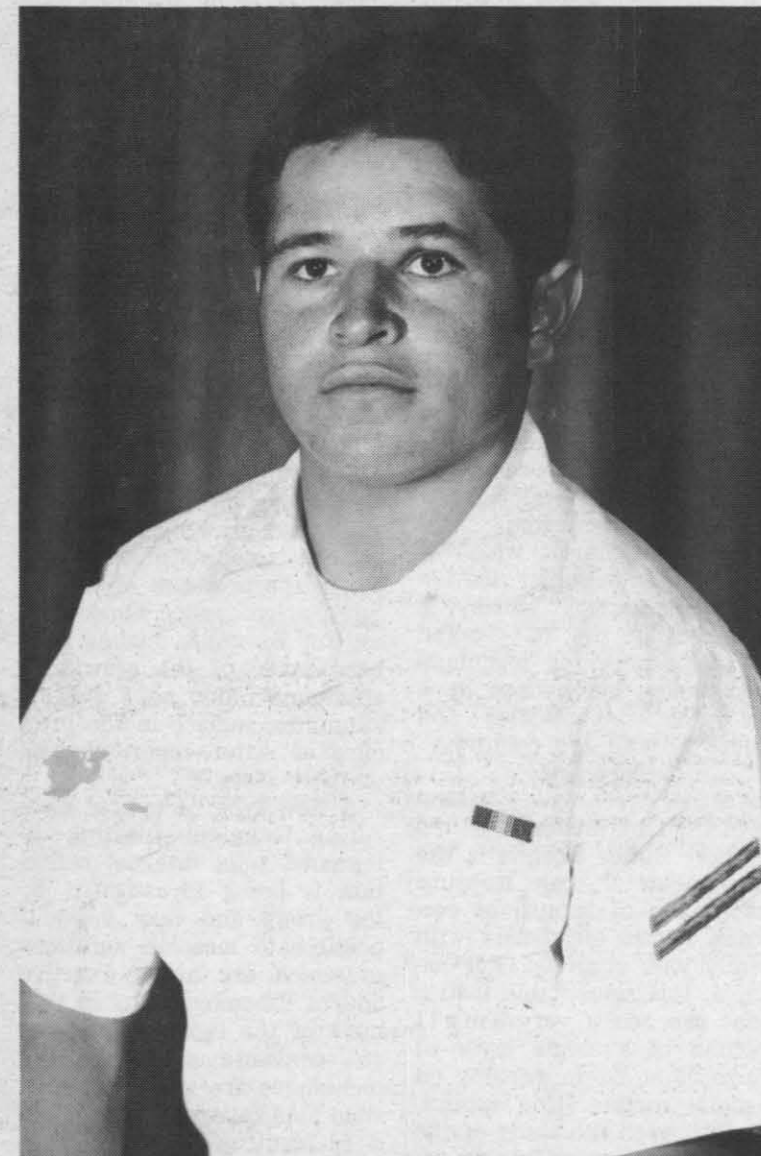
Carol Chatterton's champs will be around for a long time.

SCHOOL TURNSTILE GATE HOURS

	Aug. 26	Aug. 27	Sept. 1	Sept. 3	Sept. 4
OPEN	0645	0645	1600	1600	0645
CLOSE	1700	1700	2200	2200	1700

Commencing September 8 the turnstile gate between the NWC and Burroughs High School, located on Burroughs Avenue will be opened from 0645 to 2230 Monday through Thursday. On Fridays the turnstile gate will be opened from 0645 to 1700. The turnstile gate will be opened for special events as arranged through the Security Department. Organizations planning special activities at Burroughs High School are invited to make special turnstile gate arrangements with the Security Office, Code 84, at extensions 2892 or 2078.

July 'Bluejacket'



AN ANTHONY C. ORTEGA

VX-5's Ortega July Bluejacket

Capable. Reliable. Cheerful. Those are the qualities that prompted the selection of VX-5's AN Anthony C. Ortega as "Bluejacket of the Month" for July.

An A-4 plane captain from the VX-5 Line Division, Ortega has received high praise from pilots for his courtesy and meticulous devotion to duty.

In recognition of his performance, Ortega will be accorded a weekend stay in Bakersfield sponsored by the Greater Bakersfield Chamber of Commerce and participating merchants. He will also be interviewed by KERO-TV, in that city.

Transportation for Ortega's trip is being provided by Desert Motors, of Ridgecrest. He will stay at the Bakersfield Inn and receive meals at the International House of Pancakes.

Ortega was on leave at his home in San Luis, Colorado, at the time of his selection last

month and was unable to receive his free trip and other prizes at that time.

However, special arrangements were made with the Bakersfield C of C for Ortega to receive his trip and prizes at the same time as August "Bluejacket of the Month" — AMSI Rene Broussard.

Ortega entered the Navy in December, 1968, and went through boot camp in San Diego. After his graduation from boot camp, he was selected as a Company Commander's Aide and served in that capacity until August, 1969, when he was transferred to VX-5.

The 20-year-old native of southern Colorado enjoys outdoor recreational activities, particularly skiing, hunting, fishing and water skiing.

Ortega has received the National Defense Service Medal and a command letter of commendation.

He resides on the Center in Barracks Four.



LIGHT ATTACK WEAPONS SCHOOL—The most recent class from the Light Attack Weapons School gathered outside the VX-5 hangar after a briefing on VX-5 operational evaluations from VX-5 Fleet Liaison Officer LCDR. George Strohsahl earlier this week. During the two-day study trip from the school's headquarters in Lemoore, the pilots received information on current projects at NWC and VX-5. Members of the school are (left to right): Front row, LCDR. Warren But-

ler, VA-215; Lt. Jack Hezlep, VA-97; Lt. Roger Thompson, VA-93; Lt. Tom Williams, VA-27; LCDR. Gus Gudmunson, VA-125; Lt. Max Wike, VA-122; Lt. Ray Thomas, VA-125. Second row: Lt. G. M. Stoner, VA-212; LCDR. Larry Prize, VA-93; Lt. Jim Hicks, VA-97; Lt. Paul Good, VA-27; Lt. John Freitag, VA-56; Lt. Ron McKinney, VA-215; LCDR. Skip Leuschner, VA-125, and Lt. Fred Hansen, VA-56.

—Photo by PH2 D. E. Hart

Capt. Etheridge Calls Annexation Meeting

An "All Hands" meeting to discuss the possible annexation of a portion of the Naval Weapons Center by the City of Ridgecrest has been scheduled by Capt. M. R. Etheridge, NWC Commander. The meeting will begin at 1 p.m., on Tuesday, September 1, in the Center Theater. All interested people are invited to attend.

As discussed previously in the July 31, 1970 and August 14, 1970 issues of the Rocketeer (based on a Special Study Committee of the Community Council) Ridgecrest Mayor, Kenneth M. Smith, has proposed the annexation of a portion of the Center in order to gain state funds for Ridgecrest in an approximate amount of \$51,000 per year. These funds could be used for development of the County park, maintenance of the Burroughs High School access road (French Street), and increased police patrol in this area.

Also the previous articles ex-

plained that the Mayor had not yet officially requested the Ridgecrest City Council to propose annexation, and the Center had not been formally contacted to consent to the proposal.

The meeting is being held to discuss the proposal, to explain what effects annexation may have upon Center residents, and to answer questions resident may have. It is further reiterated that the opinions of Center residents will be an important consideration in the Command's final recommendation on the proposal when formally approached.

R&D Electronics Course Scheduled

A two-year Electronics Technician program—a "first" for the Desert Campus of Bakersfield College—will be offered this fall. The emphasis of this course will be on "research and development"—courses in radio and television will not be included.

Graduates of the program will receive a Certificate of Completion as an Electronics Technician. An Associate in Arts Degree may be obtained without completing all the electronics courses; however, 62 semester units are required for the degree.

The two-year program was developed through the combined efforts of instructors Claude Wood, E.E.; Edlin Patterson, M.S.; Richard Hughes, E.E.; John Denson, E.E.; and George Weir, A.A. They will be avail-

able for individual counseling during open registration on Tuesday and Thursday, September 1 and 3, from 5 to 8 p.m. in the Burroughs High School Multi-Use Room. Day registration will be held on Friday, September 4, from 9:30 a.m. to 3:30 p.m.

A recommended course of study beginning with the fall semester is as follows: Math 53A-Beginning Math for Electronics; 3 Units ET 54A-Fundamentals of Electricity; 4 Units ET 50-Shop Practices; 1 Unit Physics 10-Concepts in Physics; 3 Units.

Social Science 53A-Introduction to Social Science; 3 Units Health Education-Principles of Health Education Planning; ½ Unit P.E.; ½ Unit (If under 25 years old.)



LCDR. CHARLES F. STENDER has recently reported as Assistant Maintenance Officer and Project Pilot at VX-5.

A qualified test pilot and former A-7 Ordnance Project Officer at NATC Patuxent River, Md., LCDR. Stender received his commission in 1962 after he graduated from Penn State University.

Attached to VA-163 (Lemoore, Calif.) and VA-34 (Ce cil Field, Fla.), he flew 130 combat missions and received three Distinguished Flying Crosses.

LCDR. Stender and his wife Phyllis reside at 505B Saratoga.



NWC Physical Optics Branch Continues Research In Michelson's Tradition

American Optics Pioneer



The following capsule biography of Dr. Albert A. Michelson is gleaned from a biographical sketch of the famous Nobel Prize winner by Jean M. Bennett (assisted by D. Theodore McAllister and Georgia M. Cabe), which the NWC Research Physicist wrote for an Italian Encyclopedia on Nobel Prize Winners in Physics, due to be published later this year, in Italian.

Dr. Albert A. Michelson, the first American scientist to be awarded the Nobel Prize in Physics (1907), was born on December 19, 1852 in Strelino, a town of Polish population and tradition, but territorially then in Germany. In 1855 the Michelsons decided to emigrate to the New World because of the political unrest in Europe. In the late summer of 1856, they moved to the gold rush town of Murphys in Calaveras County east of Stockton, where Albert received his early education.

Michelson took the competitive examination to attend the U.S. Naval Academy at Annapolis on January 10, 1869, and tied with two other boys for the top honors; but the appointment was given to James W. Blakely, whose father was a Civil War veteran. Michelson was finally appointed to the Academy through an exception (he was the eleventh appointee after the 10 appointments at large had been made).

He was graduated from the Naval Academy on May 31, 1873 but received no academic degree, since the Academy was not authorized to grant the bachelor of science degree until many years later.

In November, 1877, while teaching at the Academy, Commander William T. Sampson suggested that Michelson prepare some lectures, one to be concerned with measuring the velocity of light. Michelson felt it would be interesting to have a demonstration, and a modification of Foucault's experiment "suggested itself." By using some pieces of equipment in the laboratory and spending \$10 of his own money, Michelson succeeded in measuring the velocity of light with considerably greater accuracy than had been obtained before. Encouraged by the success of this experiment, he improved his equipment and made an even more accurate determination. This was the start of his scientific career, which lasted over half a century and which began and ended with measuring the velocity of light.



THE NEWEST instrument in the Branch, the attenuated total reflectance unit, is being adjusted by Don Decker. When in operation, it will be able to measure materials which cannot be investigated using conventional optical methods.

The Physical Optics Branch of the Research Department is continuing the tradition started by Albert A. Michelson, America's first Nobel prize winner in physics, for whom Michelson Laboratory is named. Michelson was famous for his highly precise optical measurements, and the experiment that won for him the Nobel prize involved measuring the length of the standard meter in terms of wavelengths of the red line of cadmium. Michelson achieved an accuracy of one part in fifteen million, which would be considered excellent today and is even more remarkable considering that the experiment was performed prior to the turn of the Century.

In the Physical Optics Branch there are scientists Hal Bennett, Jean Bennett, Dennis Burge, Jim Stanford, Don Decker, Terry Donovan, and physical science technician Ed Ashley. All are making precise optical measurements in order to study the way atoms behave in very pure solid materials. This area of investigation is one branch of solid state physics.

In order to keep the group at the forefront of their field, special equipment was designed and built at Michelson Laboratory that will make more accurate measurements than can be made in other laboratories. For example, a reflectometer that measures the amount of light reflected from a mirror surface can make measurements at least ten times more accurately than with the usual commercial instruments. This particular instrument was finished in 1960 and, although numerous other laboratories have tried to duplicate it and a simplified version is now available commercially, only one other laboratory has completed an instrument like it at the present time.

Using this reflectometer and two other similar instruments, the group in Michelson Laboratory has the capability of measuring reflectance from the extreme vacuum ultraviolet

to the far infrared, a wavelength spread that is 100 times the range that can be seen by the human eye.

With these instruments the group has recently shown that a widely accepted theory concerning amorphous semiconductors is incorrect, at least for germanium. Once the properties of amorphous semiconductors are understood, it may be possible to use them in new transistors which are insensitive to radiation damage.

In another investigation, Branch members showed that a previously unnoticed phenomenon, optical excitation of surface plasmons, could significantly reduce the reflectance of mirrors in the ultraviolet and could increase the scattered light by plasmon reemission. To prevent this effect, mirrors should be much smoother than those commercially available.

To measure the roughness of very smooth mirrors, a special roughness analyzer has been built. With this unique instrument it is possible to distinguish between the polish on a commercially made optical flat and the supersmooth finish made by the special polishing method developed by members of the group. The supersmooth finish, which is three times smoother than a good commercial polish, is produced by the so-called bowl feed polishing technique that is now being used by a few other laboratories and groups around the country.

Ellipsometer
Another sensitive instrument used by members of the Physical Optics Branch is the ellipsometer. It can measure the growth of tarnish or corrosion layers on metals with tremendous accuracy. For example, this remarkable instrument can see a very small fraction of a single layer of atoms of an oxide growing on a metal surface. One application has been the study of the growth of silver sulfide on very clean silver surfaces. Out of this study came the discovery of ways to prevent the tarnish

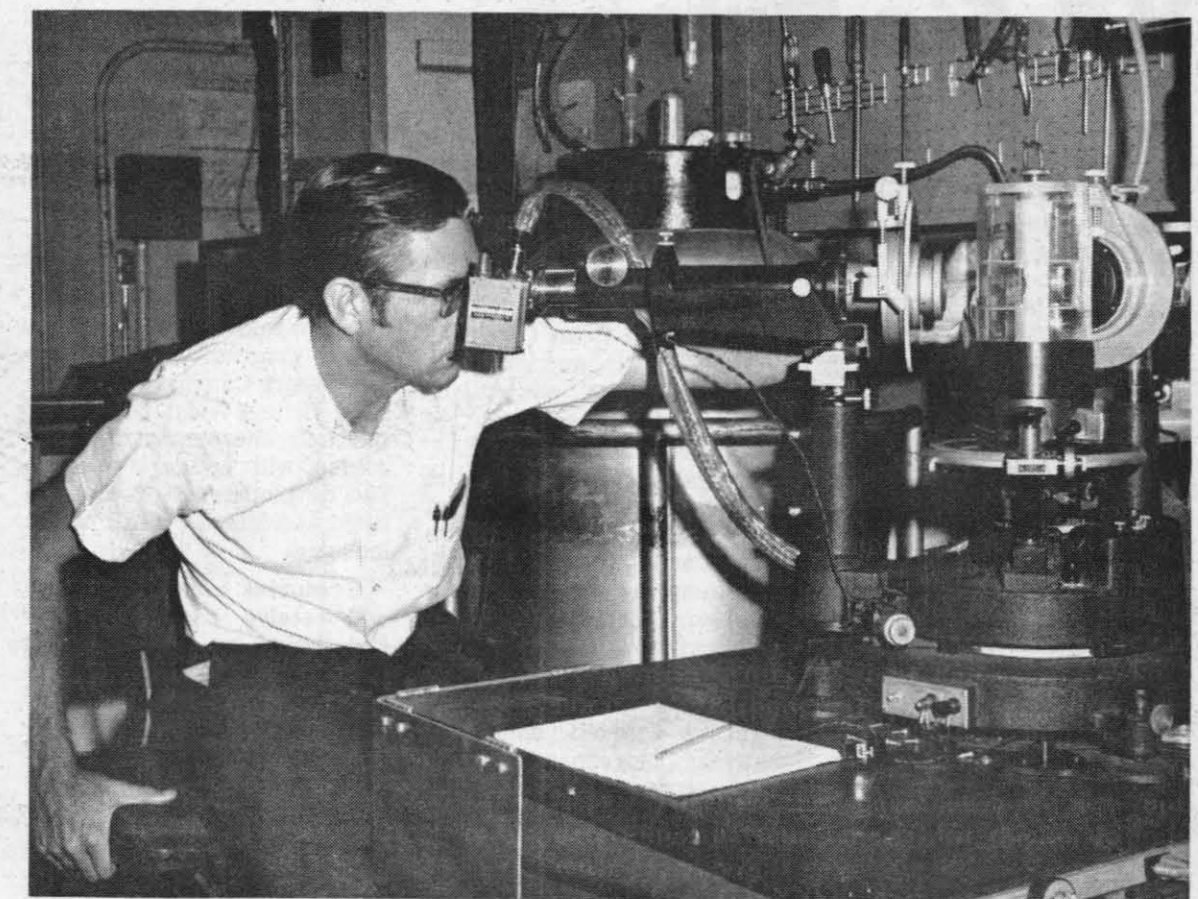
from forming and also the discovery that the tarnish does not appreciably affect the reflectance of mirrors used in the infrared. Since silver has the highest reflectance of any known material in the visible and infrared region, the efficiency of optical systems will be increased if nontarnishing silvered mirrors can be used.

A very important part of keeping the branch as a leader among groups doing similar work is the constant updating of the equipment and expanding into new but related areas of research. Along these lines, a new vacuum pump is currently being installed that will give the capability of producing better samples on which to make optical and electrical measurements. The evaporation system giving the best vacuum, 10-10 torr or ten thousand times better than most commercial systems, is currently being updated with the most modern design of Vacion pump, a pump that uses high speed ions to trap the air molecules and thus does not contaminate the chamber as oil vapor diffusion pumps often do.

The ellipsometer mounted on the system enables one to study the growth of extremely small amounts of oxide layers in the presence of various types of controlled atmospheres. For example, studies have been made of the growth of aluminum oxide on a fresh aluminum surface in the presence of water vapor, oxygen, or inert gases.

A new type of optical measuring technique utilizing attenuated total internal reflection is being investigated by the group and may make it possible to measure substances which are highly reactive and/or inhomogeneous so that most of the light is scattered if conventional measuring techniques are used. One possible application of this system is to identify one of the constituents of hemoglobin, the coloring matter in the red cor-

(Continued on Page 8)



BY LOOKING through the telescope of the ellipsometer, Dennis Burge makes a preliminary adjustment of the polarizer setting. He recently finished a study of the growth

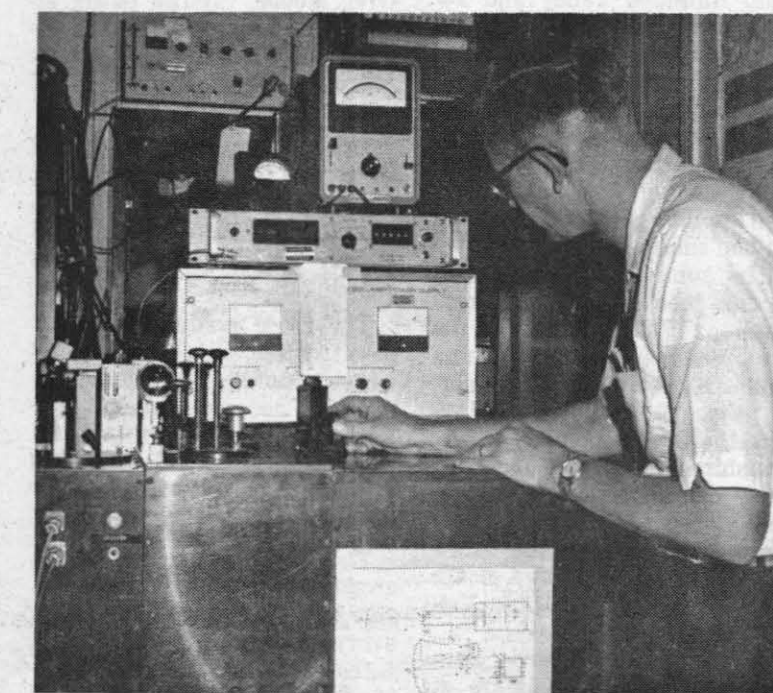
of silver sulfide films on silver in which he was able to detect changes in average film thickness of 1/50th of a monolayer.



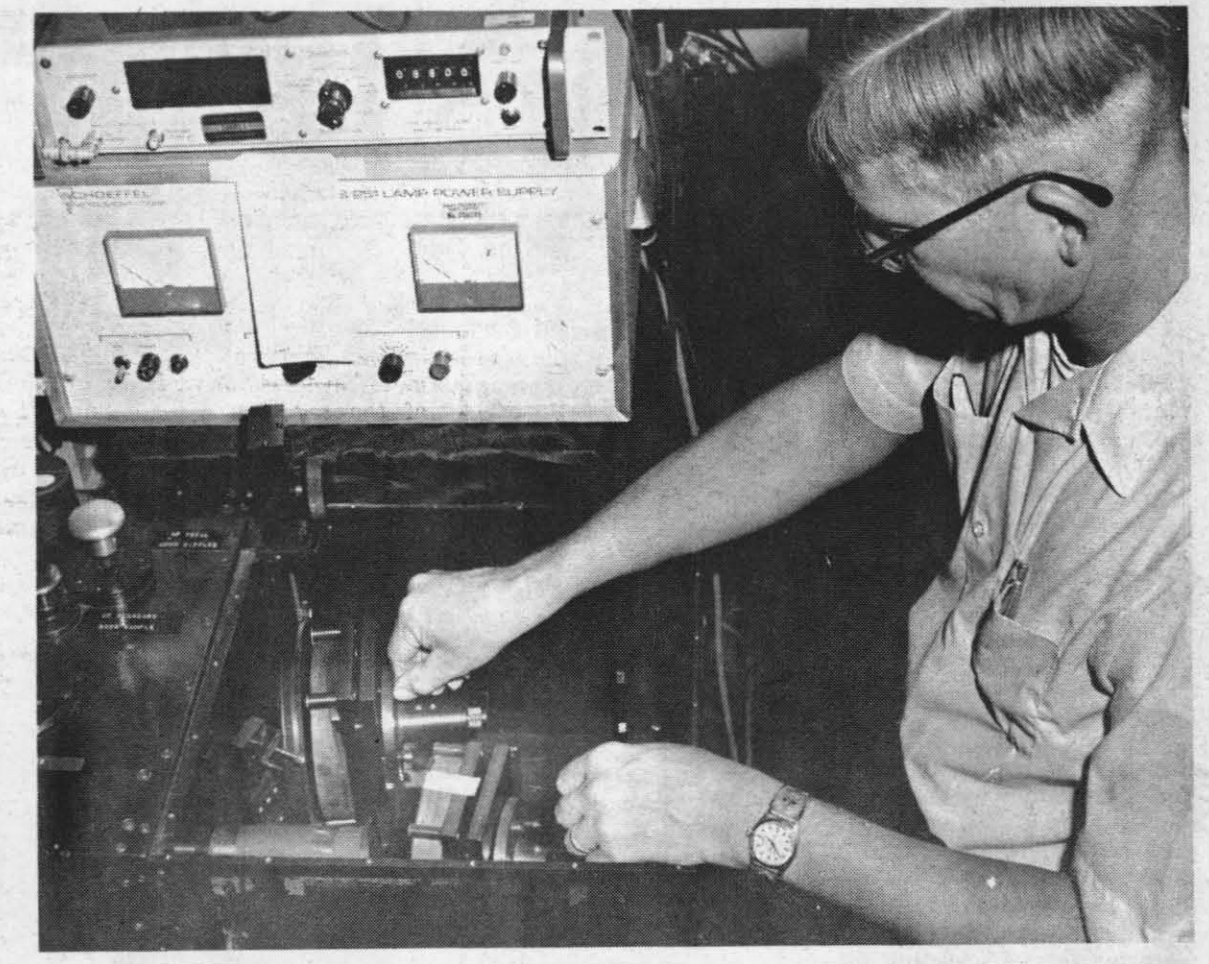
ED ASHLEY is finishing replacing the pump on the ultra-high vacuum evaporation tank. With this system, very pure materials can be prepared on which to make precision optical and electrical measurements.



JEAN BENNETT make a final wavelength setting while measuring the thickness of a very thin evaporated film. These interferometric measurements are made using the so-called fringes of equal chromatic order and are an extremely accurate method of measuring very small thicknesses.



WHILE TAKING measurements on the roughness analyzer, Hal Bennett adjusts a diaphragm to determine the amount of light scattered at different angles. The path of a light beam through the instrument is indicated in the diagram.



HAL BENNETT is adjusting one of the mirrors in the roughness analyzer, an instrument designed and built at Michelson Laboratory. This instrument, the only one of its

kind, measures the roughness and profile of small irregularities on very smooth optical surfaces.

—Photo by PH2 D. E. Hart

Story By Jean M. Bennett

Photography By PH2 D.E. Hart



Harold and Jean Bennett (above) are teamed in their careers as they are in marriage. Hal Bennett is Head of the Physical Optics Branch at NWC, and Jean is a Research Physicist in the Branch. Both received their doctorates from Pennsylvania State University and have worked together ever since, first at Wright Air Development Center, Wright Patterson Air Force Base, and now at the Michelson Laboratory. Although they have specialized in slightly different areas of optics, they often collaborate and are joint authors of several of the many papers which they have written.

Together they have developed new optical methods that make it possible to determine the reflectance, film thickness, and other optical properties of materials with precision.

Sometimes their interest is in an application of these measurements. More often, however, their interest is in knowledge for its own sake—basic research.

They're seeking to understand solids and their optical properties.

And they seek it well!