

the ROCKET

VOL. XXII; NO. 31
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Time is one of the
most precious things
we have so let's make
the most of it in '74.

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Note: Today's Army missile and rocket program involves thousands of men and women at Redstone Arsenal, at other government installations and in industrial plants throughout the nation. Forty years ago it consisted of exactly one man, Lieutenant Leslie A. Skinner. The following article, reprinted with permission from the December 1973 issue of ARMY magazine is about that man and his remarkable work that gave American soldiers their first effective rocket weapons.

Bad Music

Leslie A. Skinner And His Legend Named Bazooka

By David G. Harris

A curious visitor at Aberdeen Proving Ground in the mid-1930's might have noted an occasional odd noise punctuating the calm typical of a weekend on a Depression-era Army post.

Soldiers and their families who lived at the Ordnance Center had become accustomed to the unusual sound which now and then drifted faintly downwind from one of the idle firing ranges. Most of them knew it came from the rockets Lieutenant Leslie A. Skinner made in his basement workshop and fired during his off duty hours.

One afternoon, a visitor to Aberdeen heard the noise and went looking for its source.

Long afterward, Skinner recalled that he had just launched a rocket when he saw a man striding toward him. As the

man came closer, Skinner saw he wore the uniform of a German Army officer.

Their ensuing conversation went like this:

German officer: "That sounded like a rocket."

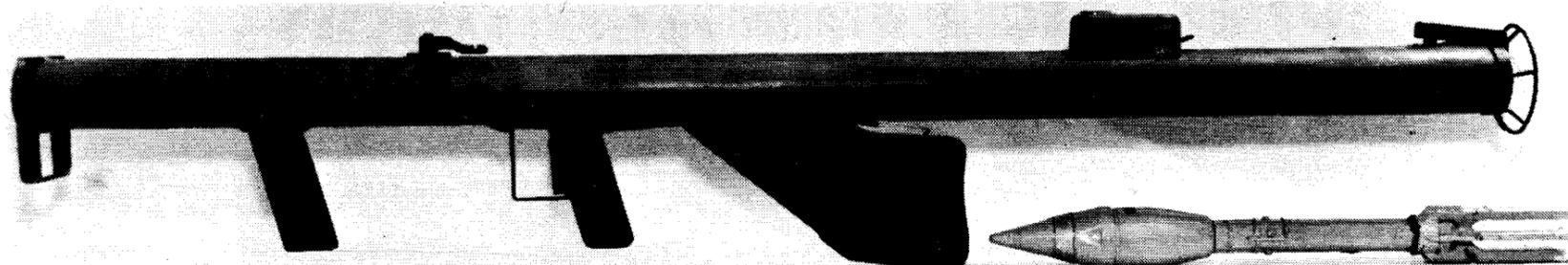
Skinner: "How do you know what a rocket sounds like?"

German officer: "Oh, we've been working on rockets for a long time."

So had Leslie A. Skinner, but he did not tell that to his inquisitive spectator. Instead he packed up his crude rail launcher and homemade instruments and walked off.

The German officer had just had a brief encounter with the U. S. Army's entire rocket development program.

Text Continued p. 8; Photos Explained p. 2



The Rocket

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EDITORIAL

It Could Happen To You

We regret that human nature is such that Birmingham City Council deemed it necessary to make illegal the carrying of more than three gallons of gasoline in a car trunk or more than 10 gallons in an open boat.

Common sense and safety should prevent dangerous practices of this kind, but far too many people ignore the warnings on the theory that disaster will strike somebody else, not them.

Gasoline is dangerous. The possibility of an explosion is always present. The possibility is greatly increased when gasoline is carried in a container which can roll around as the car travels down the road.

We hope that no one will get the idea from the council's action that it is safe to carry three gallons. It is not. Even an empty container which had gasoline in it at one time still contains sufficient vapors in it to create an explosion if it has not been thoroughly cleaned.

Extra gasoline, no matter how small the amount, should not be carried in a car except for emergencies or other short-term uses. And great care should be taken then.

Also, the amount of gasoline kept around the home for use in the lawnmower or other tools should be kept to a minimum and stored in a safe, well-ventilated space. The life you save may be your own, or that of your child.

(Reprinted from Birmingham Post-Herald, Dec. 28, 1973)

Heat With Oil?

Simon Says Cut Temperature

(Washington)—The nation's energy chief, William Simon, last week ordered a six-degree cut in oil-fired home heating.

The new regulation goes into effect January 15.

Buildings heated with gas, electricity or coal are not included in this order.

The order to lower thermostats differs from previous appeals in that householders or property owners now have a legal obligation to comply. Before, it was a voluntary matter.

For consumers, the legal penalty is that they will run out of oil but suppliers may be fined up to \$5,000 for violations.

Commercial buildings heated with oil must drop their thermostats 10 degrees.

The temperature reductions must be made below the thermostat settings used in the corresponding month of 1972.

ANSWERS

(Editor's Note: The MICOM Information Office conducts a question and answer program for job-related questions of general interest. Such questions may be telephoned to 876-4161 or 876-4400, or mailed to AMSMI-G. Some questions are selected for publication in the Rocket. Names are withheld. It is not intended that this program take the place of the usual supervisor-employee relationship which is the proper channel for specific job-related questions.)

QUESTION: Are there currently at MICOM any temporary appointees or promotees occupying continuing uncommitted positions in the GS-345 series (Program Analysts) in grades GS-12 and above? How many personnel at MICOM Grades GS-12 and above are considered excess in the GS-345 series (Program Analysts)?

Answer: There are no temporary employees occupying continuing positions in the GS-345 series in grades GS-12 and above. There are six (6) surplus MICOM employees at grade GS-12 and above in the GS-345 series.



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How Daylight Saving Will Affect Your Life

Nearly all Americans will be getting up an hour earlier starting Sunday, when daylight-saving time is brought back on a year-round basis for a two-year period.

Just how will this save energy—and what other effect is it likely to have in the process?

Here at Redstone it will be darker when most of us come to work and lighter when we leave—at least for awhile.

But, looking at it from a nationwide standpoint, hearings conducted by the Senate produced these answers:

Turning off most lights an hour earlier is expected to save "substantial" amounts of energy—the equivalent of about 150,000 barrels of oil a day by official estimate. The Senate report explains—

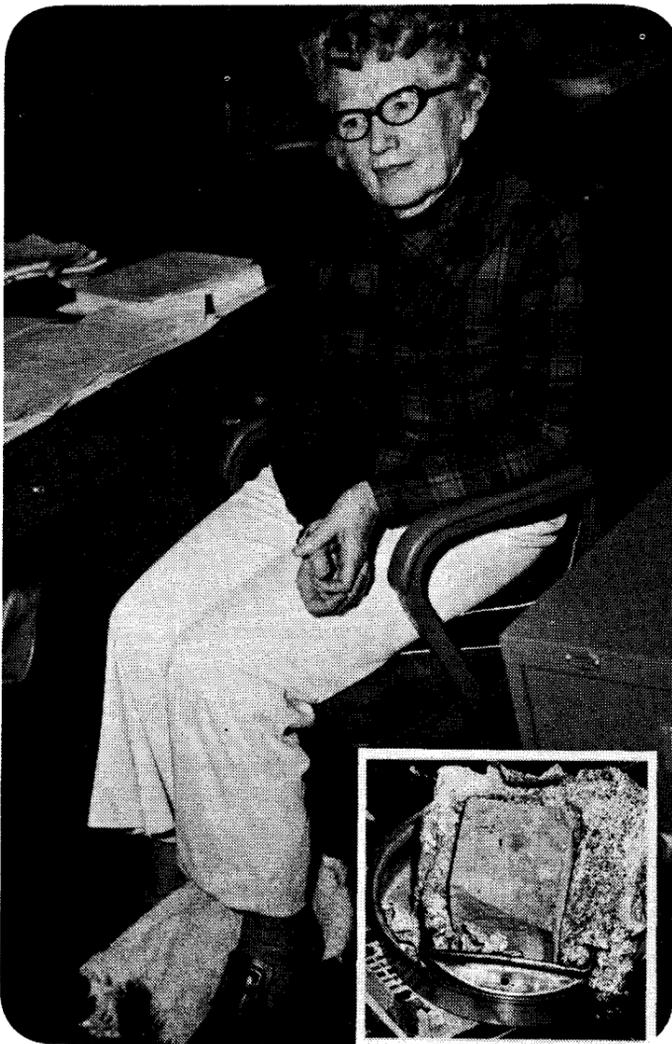
"By shifting an additional clock hour of daylight from early morning to early evening, when human activity is more concentrated, the total dependence on electrical power will be lessened."

In addition, Government planners expect a decline in the amount of home heating required this winter. They attribute this to "higher ambient temperatures in the early evening," with people retiring before temperatures drop in later hours.

As a bonus, added daylight during evening rush hours may reduce traffic fatalities "significantly," and additional light during evening hours downtown could reduce street crime as well.

Shoppers and shopkeepers are expected to benefit somewhat by the extra daylight after 5 p.m. in most areas. And some businessmen stand to gain from the increase in the number of hours of overlap between the U. S. business day and that of Europe.

Only one significant drawback from putting early time on a year-round basis was recognized in the Senate report. That is the "temporary" handicap to be experienced by some 346 daytime-only radio stations in the U. S., which are not allowed to start broadcasting before sunrise, because they are on the same frequencies as other stations in Canada and the Bahamas.



KEEPS WARM—Sarah Mathis in the Station Supply and Stock Control Division took a tip from her ancestors when temperatures were lowered in all arsenal buildings. She lives on sand mountain where the limestone is plentiful so she put rock in her fireplace and let it warm in the fire all night. Then she wraps it in asbestos and terry cloth and carries it to work. Her feet stay warm when the floor is cold. She used the same device when the heater went out in her car.

Page One Photos

TOP

A late production model bazooka being fired into an Okinawa cave, June 19, 1945. Note muzzle deflector, sling, wire frame stock replacing wooden stock of early models, single hand grip and reflecting sight. Use of aluminum in place of steel tube, other changes cut the weight of late model bazookas almost two and one half pounds from the M1 which weighed 12 pounds 14 ounces with steel tube.

LOWER

The first production version of the bazooka launcher and rocket, not, however the original launcher which had no sight. M1 launcher featured an ingenious double front sight and pivoted rear sight (on top of the tube left of second hand grip) which made it possible to fire the weapon from either shoulder. After 5,237 launchers had been built the feature was discontinued and all subsequent launchers were built to be fired from the right shoulder.

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Wage Survey Scheduled

Preparations have begun for the conduct of a wage survey in the Huntsville wage area, according to officials in the Civilian Personnel Division.

Scheduled to begin in April, the survey will cover wages paid by industrial firms in the Huntsville area for comparison with those paid to government wage employees at Redstone and other Federal agencies in the wage area.

Establishments to be visited will be selected by the Bureau of Labor Statistics. Jobs used in the survey will cover a wide range of occupations common in skill and responsibility in both industry and government.

The wage survey will be conducted in accordance with the Government-wide Federal Wage System, which provides for uniform application in fixing pay for wage employees.

A Local Wage Survey Committee will conduct a hearing to permit presentation of information, requests, and recommendations by local organizations and individuals concerning the area, industries, establishments, and jobs to be covered in the survey beginning at 8:30 a.m., Bldg T-3159, second floor, January 7.

Any group or individual wishing to appear before the committee should contact Mr. John A. Miklic,

Jr. of the Civilian Personnel Division, Chairman of the Local Wage Survey Committee at 876-1455 or 876-5824 not later than noon Friday for appointment.

Annual leave must be taken by individuals testifying before the committee.

Local No. 1858, American Federation of Government Employees has announced that it will present testimony to the committee from wage grade employees who are unable to attend this hearing.

Those desiring to present their views through the Local should contact an AFGE representative by calling 881-7431 prior to January 6.

Stinger's First

Guided Launch Good

A Stinger missile blasted a drone out of the sky just recently during the first guided firing of the Army's new man-portable air defense weapon at White Sands Missile Range, N. M.

"Our first guided launch was a complete success," said Colonel David Souser, Stinger Project Manager at the Army Missile Command who directs development of the plane killer for both the Army and Marine Corps.

Souser said the heat seeking missile was fired from a modified Chaparral launcher. The missile homed on the propeller-driven drone, flying at 200 knots more than a mile from launch site, and scored a direct hit.

"About 15 additional firings are planned in the current Guided Test Vehicle program," Souser said. Testing is expected to resume in February 1974.

Stinger is now in engineering development which means the Army and General Dynamics

prime contractor, are designing, fabricating, and testing a prototype system. This stage of development normally precedes production and deployment of an Army weapon.

Boasting the latest in infrared technology, Stinger will be able to counter more sophisticated aircraft threats.

Weighing approximately 32 pounds, Stinger will be fired from the shoulder and will be effective against everything from helicopters to high-speed, low level jet aircraft.

The weapon system will feature a device to identify friendly aircraft.

Prior to the first guided flight, the Army had conducted several unguided firings, and an intensive program of component testing, including launch and flight motors.

Stinger will be an all arms weapon and will give combat forces immediate air defense wherever they have to fight.

Martens Retires

Charles H. Martens retired after 38 years and ten months of Federal service, ten years of it in the Navy. He is a veteran of World War II and Korea.

Martens was an engineer in the stress division of the Propulsion

Directorate. He was presented a plaque which symbolized the work he has been doing since 1957 when he came to Redstone Arsenal from Wright Patterson Air Force Base.

The Martens plan to live in Paris, Texas.

Films Win Awards

Four Army films produced at the Missile Command captured top awards at the annual Film Festival of the Industrial Management Society, held recently in Chicago.

The award winning movies show several management improvement techniques of the Army's work simplification program. They are part of a series produced for the comptroller of the Army.

"Make Fewer Motions—Motion Economy" won first place in Group II, Management Techniques. The second place award went to the film "Roadmap to Less Effort—The Flow Process Chart".

Third place was awarded to "Take Fewer Steps—Layout Studies". All of the films were produced by Samuel K. Nesbitt, motion picture—television production specialist in the audio visual division of the Redstone Arsenal Support Activity (RSA).

A fourth film, "Aircraft Ground Safety", produced by Jean Walker, was given honorary mention.

The production contractor for the films was H.G. Peters and Co., Inc., of Primos, Pa., that operates a government owned facility at MICOM.

BATS

Local Firm Gets Contract

The Army Missile Command recently awarded Brown Engineering Company of Huntsville a contract for \$1,199,750 for continued production of Ballistic Aerial Target Missiles (BATS).

BATS is a low cost missile target used both in the United States and overseas for gunnery training.

Work will be performed in Brown's Madison Plant and the contract is scheduled to be completed by June.

Colonel A. A. Busck, Chief of the MICOM Target Office, has overall responsibility for the BATS program.

The contract was executed by the MICOM Procurement and Production Directorate headed by Colonel Paul A. Pencola.

Inspection Coming In '75

Vehicle inspection requirements for personal automobiles are about 18 months down the road for motorists entering the Arsenal, if not for all motorists in Alabama.

An Army regulation is requiring on-post vehicle inspection of privately owned cars in absence of state laws which provide for inspections. There are no such laws in Alabama. The Missile Command has requested, and won, a reprieve from performing inspections until the summer of 1975.

Alabama state officials expect legislation which will require inspection of automobiles within that time. One motivating reason for introduction of legislation would be the loss of federal highway funds to states not having inspections laws by 1975.

If no state legislation is forthcoming, the Missile Command will be faced with inspection of approximately 60,000 private vehicles now wearing decals. Additionally, there is an average of about 1,200 decals issued each month.

An inspection program staffed for operation throughout the year would cost the Missile Command more than \$400,000. The estimate does not include the cost of construction of inspection stations.

Commissary Has Council

A Commissary Advisory Council has been established to provide customer representation in the areas of stockage and item selection, product quality, hours of operation, adequacy of customer service and general degree of customer satisfaction.

Recommendations growing out of Council meetings are reviewed by the Commissary officer, with the installation commander having approval authority.

Anyone desiring to have a matter brought before the Council is encouraged to contact a Council member. Their names, preceded by their area of representation, are:

RASA - LTC Otto J. Hierholzer, 876-2186

MMCS - CW3 Charles E. Clayton, 876-4437

MICOM - CSM Arthur R. Senkewich, 876-1874

OWC - Mrs. Carlton E. Lowery, 837-4864

NCOWC - Mrs. Vickey O'Shea, 837-2046

RETIRED OFFICER - George M. Parker, 876-5231

RETIRED ENLISTED - James T. Stewart, 837-5242

The Council will not replace the Commissary Suggestion Program or direct customer inquiries to the Commissary Office; rather it is to be an additional source of customer input to help the Commissary better serve its patrons. Advisor to the Council is J.C. Bryan, Commissary Officer.

"The Christmas Story"



The Nativity Scenes will be shown again this Christmas season at Huntsville Memory Gardens. To help conserve energy, the Nativity Scenes will be lighted only until 12 midnight with smaller bulbs being used.

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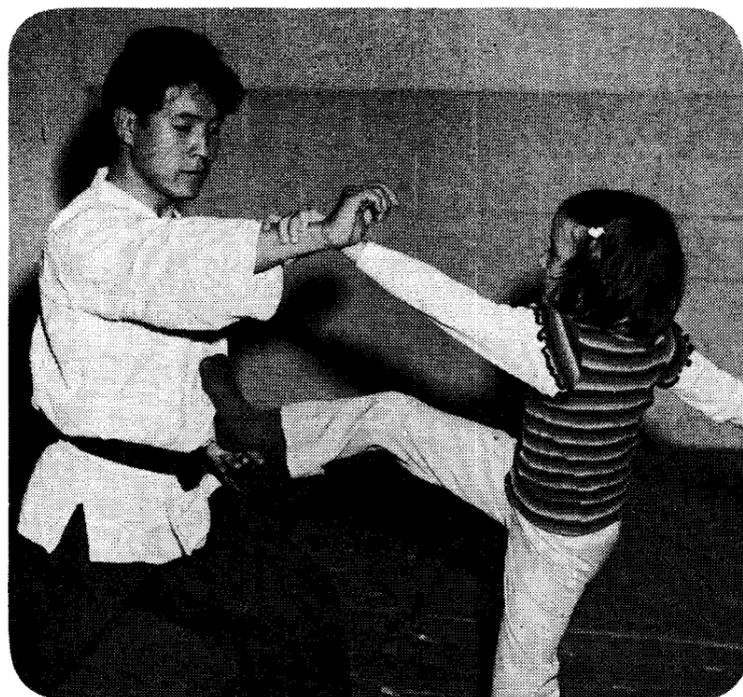
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New Youth Program At Special Services



... Joy Corbett takes a tip from Debbie Alexander on how to twirl a baton. She was less enthusiastic about a karate lesson from Hyon Brown until she discovered that karate is a means of self defense instead of a manly art. Hyon earned his black belt in karate while in the sixth grade; he's now a sophomore at Butler high. Phillip Manna aims for the basket and Kevin and Julie Berry watch Jan Osthus shape clay into a bowl. All this and more is included in the Youth Activities Program at Redstone.

Individual Enrichment

Cultural, Personal Development

The Redstone Arsenal Youth Activities Program has been expanded to cover cultural and personal development with sessions for individual enrichment under the leadership of Joleen Ingram, recently named director of YAP.

When the youth program was added to the Special Services

Office, the activities were expanded to cover other programs as well: Girl Scouts, Boy Scouts, Teen Club, and all the sports programs for both boys and girls.

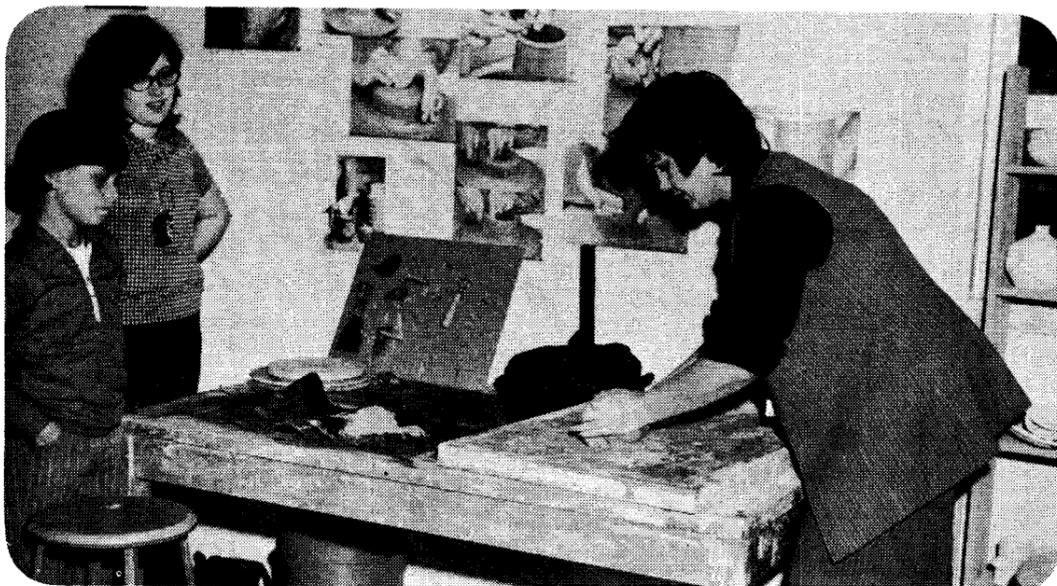
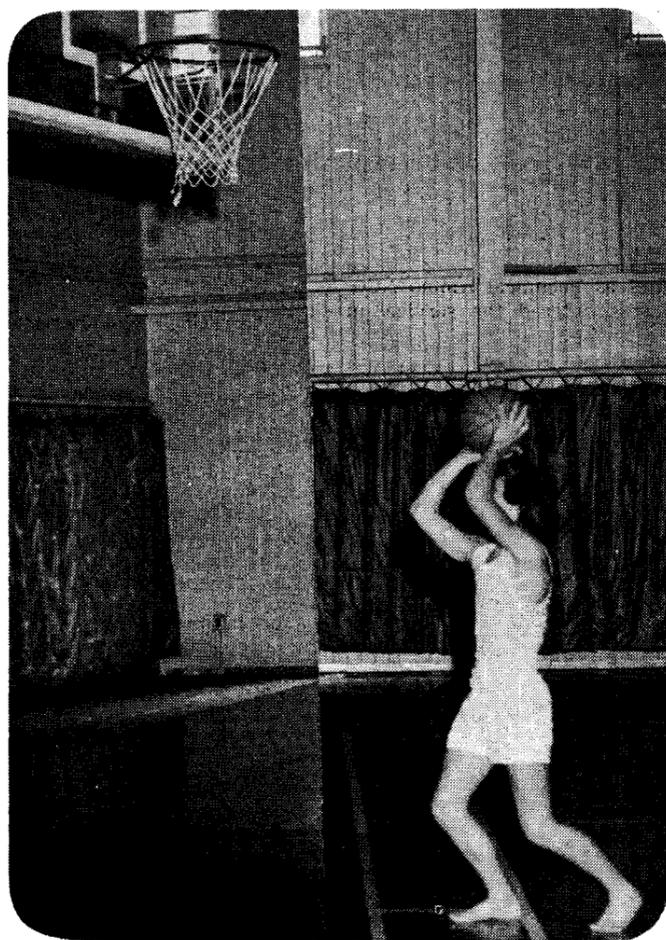
Mrs. Ingram hopes to interest the participants in arts and crafts, such as pottery making, ceramics, leatherwork, copper enameling and to introduce a

general arts and crafts program for the younger members.

Photography and drawing and painting are in this portion of the program. Demand will regulate instruction.

Baton twirling will be taught to those between the ages of 7 and 16 years. Karate is offered for 6 to 10-year-olds and judo classes will be open to those between 8 and 16-years-old. Judo and karate are taught at the old post gym. The initial class in judo had 20 members.

Mrs. Ingram has an office in the Teen Club building. She is the first director of YAP. She earned her degree as a recreation administrator at Georgia Southern.



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ARRIVALS

SGT Skippy Lane Tom has been assigned to the 1st ETC. The Oklahoma native is a 1968 graduate of Wright City High School and entered the Army in April 1969. His last assignment was with an infantry unit in Korea.

SSG Howard E. Kinch has been assigned to Company A with further duties as an instructor in the Conventional Ammo Branch. He entered the service in April 1953 and was previously assigned to the USA Ammunition Activities on Okinawa.

SSG Richard O. LaFlamme has been assigned to Company B with further duties as an instructor in the Conventional Ammo



TOM ROE

lor's degree in education and a member of Phi Sigma Epsilon social fraternity. He entered the service in August 1972.

Wooldridge is a 1972 graduate of Central Missouri State University with a bachelor's degree in biology and geology and a member of the Paleontological Society. He entered the service in August 1972.

AWARDS

PV2 Maxwell C. Lawson, 7th ETC, recently received a Letter of Commendation from the 2nd Battalion commander for his selection as Soldier of the Month for November.

The 7th ETC was awarded the Bloodmobile Trophy for best unit participation for November. A total of 55.3 per cent of eligible donors contributed 71 pints of blood.

The 1st ETC, commanded by Capt. Robert E. Whaley, was selected as 2nd Battalion's Honor Company for November. The selection was based on inspection of barracks, cleanliness and maintenance, area police, conduct of formations, response to operational requirements and unit administration.



KINCH LA FLAME

Branch. He entered the service in April 1954 and was previously assigned to the 3rd Ordnance Detachment EOD in Germany.

SFC Paul J. Burgess has been assigned to Company C with duties as Technical Ammo NCO. Burgess entered the service in



BURGESS WOOLDRIDGE

May 1955 and was previously assigned to the Eighth Army in Korea.

PROMOTIONS

SP4 Dan A. Roe and SP4 Bruce A. Wooldridge of Company B were promoted to their present rank on December 19. Both are instructors in the Nuclear Weapons Branch.

Roe, an Iowa native is a 1972 graduate of Northwest Missouri State University with a bache-

AMC Consolidates Maintenance Mission

The maintenance of all Army materiel has been consolidated into one new agency.

What used to be done at four separate sites will now be performed by the U.S. Army Maintenance Management Center in Lexington, Kentucky.

The center will be responsible for improving maintenance concepts, testing newly developed equipment and providing technical assistance to combat soldiers.

The center was established by the Army Materiel Command.

Drive Safely



THERE'S MONEY IN SUGGESTIONS—Henry W. Keith, (left) supply management representative, and Charles W. Spurlin, equipment specialist, get checks and citations from Colonel Louis Hergert, Director, Safeguard Project Office. Keith received a check for \$1,495 for his suggestion to remove two line items and reduce another in materials for the Safeguard PAR converter delay lines. First year savings were \$391,078. Keith and Spurlin shared a \$1300 suggestion award for their idea to consolidate two assemblies, and to change requirements in the number of others needed in the ultra sonic dispersive delay lines. Savings here were \$196,108.

Cold Cash From Cold Vapors

There was something about that cryogenics system that Sergeant First Class Jeriel Musselman didn't like. What he did about it earned him some cold cash—\$100.

Shortly after he was assigned to teach the cryogenics system to students at the Missile and Munitions Center and School, Musselman noticed what he thought was a safety hazard.

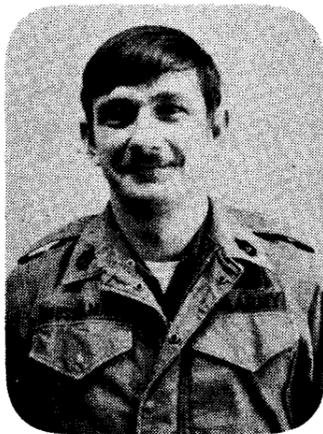
A pair of bleed valves from the system vented liquid nitrogen and cold nitrogen vapor directly toward the operator. Under pressure, the liquid nitrogen is cold—320 degrees below zero, at a pressure of 25 p.s.i.

The vapor shooting from the valves was about 150 degrees below zero.

Recognizing the possibility of injury from the cold nitrogen, Musselman modified the equipment so the relief valves were turned 90 degrees, left and right. He submitted a suggestion through

channels last April. He also telephoned the few other users of the equipment to warn them of the danger.

Last week, Musselman received a check and certificate from Colonel David C. Smith, Acting Commandant of MMCS.



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Problem Solving Agency Proposed

A decision could be made by Spring whether or not this country will establish an agency to solve civil problems such as energy, pollution, housing, transportation and health care.

And if legislation now pending is approved, there's chance that part of the agency could be established in Huntsville.

That's what Dr. Julian Kobler told a Redstone gathering recently at the Alabama Chapter meeting of the American Institute of Aeronautics and Astronautics.

"Obviously, such a civil agency is sorely needed," said the Director of the Missile Command's Redstone Scientific Information Center.

HUNTSVILLE HAS CHANCE

"If it's approved, that doesn't mean necessarily that Huntsville will get a technology center—but

we have a chance. We've done our homework... we've submitted to congress a proposal that a technology and research center be established here... and we have available manpower and facilities to do the job."

Kobler's remarks were made to approximately 50 representatives from universities, government and industry.

As explained by Dr. Kobler, a Civil Science Systems Administration (CSSA) is proposed to focus this country's top scientific talent and resources on the most pressing problems. It would function like the National Aeronautics and Space Administration but, instead of moving men to the moon, it would resolve national problems in such areas as energy, pollution, transportation, housing and health care.

The National Technology

Research and Development Center, proposed for Huntsville, would be one of two branches under the CSSA. The other branch would be a National Behavioral Systems R&D Center.

GOALS CITED

Goals of the technology center would include:

—Management of civil sciences R&D programs, including organization, planning and responsibility for contracts and technical management.

—Transition of technical manpower to priority programs, which might involve some training but could be done in Huntsville universities.

"Three main elements of the program would be the management agency, Huntsville universities and Huntsville industry," Dr. Kobler said.

"The problem now is to get the legislation before the House of Representatives for hearings."

The original Senate Bill, S-32, was introduced by Senator Edward Kennedy in 1971, Kobler said, and passed by the Senate by a 70-8 vote.

Upon Senate passage, Senator Kennedy said:

KENNEDY COMMENTS

"This act puts over \$1 billion into scientific research and development directed at meeting human needs. It established a new NASA-

like Agency which would contract with industry and universities for the design of innovative public services.

"I believe the Civil Science Systems Program can become the dramatic focus for science in the decade of the seventies, much the same way as the space program did in the sixties. But the results will be of direct benefit to our citizens here and now—not at some future date."

The Bill was then sent to the House in Sept. 1972 where it was referred to the Committee on Science and Astronautics.

That was the hearing attended by a Huntsville delegation composed of Dr. Kobler, Mayor Joe Davis, Edward Dobbins, David Ludwig and Earl Schmidt, all members of the City's Manpower Area Planning Council.

HUNTSVILLE IN PLAN

In voicing support for the bill, Davis also submitted a plan devised by Dobbins and Dr. Kobler, proposing that the technology and research center be established in Huntsville.

Although congressional sentiment toward the bill appeared favorable, the 92nd Congress adjourned before legislation was scheduled for consideration.

In February of this year, Congressman Bob Jones introduced H. R. 4385 to bring the legislation before the House.

"Congressional sentiment appears favorable to the bill," Dr. Kobler said, "and what now remains is getting the bill on the House calendar."

English Class Has International Quality

Where the community actively supports its churches, the churches in turn often support the community in secular matters.

In Huntsville, conversational English classes sponsored by the Madison Baptist Association have benefited newly-arrived local residents, including families of allied military students at the Missile and Munitions Center and School.

The 67 member churches of the association hold classes Thursdays from 9 a.m. to 1 p.m. to help adults improve their conversational skills.

Mrs. Charles Rawls directs the English classes, which the association holds in the First Baptist Church in Huntsville. At least 70 volunteers help keep the program going by providing transportation pools, classroom instruction and a pre-school

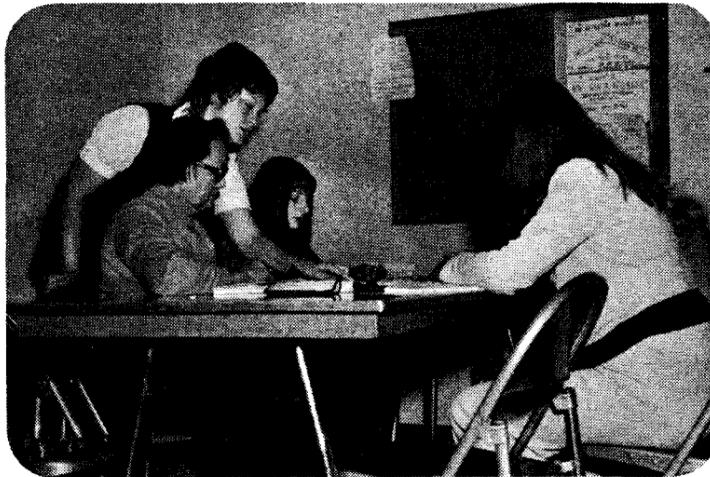
program for children up to five years in age.

The 160 adults studying under the program make up 19 classes. Because most of the students already have a working knowledge of the English language, most of the instructors don't need a second language.

Of the total adult enrollment, 95 percent are women; 65 percent of the total are wives of foreign students at MMCS, according to Mrs. Rawls.

The 80 children are divided into seven departments, each with lessons and entertainment breaks designed for each age group.

Those persons wishing to help in the program or enroll in the classes may contact Mrs. Rawls at 536-0015 any Thursday morning.



ENGLISH CLASS—Sandy Hadden, a volunteer instructor in conversational English at the First Baptist Church, gives personalized instruction to Rosie Missalla, wife of a German Air Force student at MMCS as other students listen attentively.



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SATURDAY, 5 January
Walt Disney's "One Little Indian"
(G)

One showing nightly at 7:00 p.m. 2-6
January

SUNDAY-MONDAY, 6-7 January
"The Mackintosh Man" (PG)

Two showings nightly at 6:00 and
8:30 p.m. 7-9 January

Project Office Helps Children

MICOM's 2.75 inch Rocket System Office has made a \$200 donation to the Harris Home for Children, thus continuing their tradition of charitable giving instead of exchanging cards at Christmas.

The money is to be used for visual aid equipment for the Home's 30 children, aged 6-18.

The Rocket System Office moved here September 1 from Pica-tinny Arsenal, Dover, N.J. and has 39 personnel.

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Bad Music: Leslie A. Skinner A

On the day they met in 1934, Skinner and the research he did on his own time and paid for from his own pocket probably constituted the sole American effort to explore the military potential of rockets. It was not a good time for new weapons programs. The Army just then was trying without much success to scrape together funds to modernize its World War I vintage artillery pieces. Congress had yet to be convinced that the Army should spend \$160 on each gun to mount it on rubber-tired wheels despite the service's claim that it would greatly increase artillery mobility.

Denied long range guns by the Treaty of Versailles after World War I, the German Army had no such problem. Its Weapons Office had established a special unit in 1930 headed by Captain Walter Dornberger to explore the possibility of developing military rockets, hopefully something with a range that would exceed cannons. After looking over the work of various amateur rocketeers and space flight enthusiasts, Dornberger in August 1932 began to recruit a staff of civilian engineers and scientists. The first man he signed on was a young engineer named Wernher von Braun. By the end of that year, von Braun and a few civilian colleagues working under German Army sponsorship had launched the pioneering development program, massively expanded through the next decade, which resulted late in World War II in the first ballistic missile.

They continued their work in the United States after the war and their creation—the V-2—became a part of the foundation upon which the U. S. Army built its missile and rocket program of today.

The lineage of modern anti-tank missiles and air to ground rockets, however, runs straight back to Leslie A. Skinner and the remarkable weapons he put together for American soldiers. The best known of Skinner's free lance projects, a shoulder-fired tank killer, cost less than \$10,000 to develop—omitting the salaries of the three men who worked on it—and became a legend during World War II.

The new weapon gave infantry the fire power of artillery at short range against tanks and fortified positions. Its combat debut in 1942 came as a severe shock to German soldiers who tagged it the "Shoulder 75" and paid it the ultimate compliment of copying it. GIs called the new weapon the "Buck Rogers Gun" until someone jokingly referred to it as the "bazooka" a name borrowed from a home made trombone made famous by a radio comedian of the era, Bob Burns. That name stuck, probably because the shoulder launcher resembled Burns' bazooka although one source contends it was because both bazookas produced plenty of bad music.

Whatever they called it, when American soldiers went ashore in North Africa they carried into combat the first rocket weapon used by the U. S. Army in almost 100 years. Unlike the Hale artillery rocket—little more than a king

sized skyrocket—which the Army tried during the War with Mexico and later abandoned, the bazooka worked. That surprised a great many people, but not Skinner, who believed then and knows today that with the bazooka he had a genuine breakthrough, an achievement that marked a milestone in the evolution of weapons.

Skinner remembers the bazooka so impressed the first general who saw it fired that he ordered it into pilot production on the spot. That moment had been preceded by many years of hard, solitary work by a stubborn man on an idea that refused to die despite massive technical problems, lack of funds and almost total official indifference.

Such men are called pioneers when their foresight pays off. Before they graduate to pioneer status, however, they often are called many other things. Skinner, who stepped on his share of official toes over the years, made that unpleasant discovery while a teenager, because of a fire on the roof of the post hospital at Ft. Strong in Boston Harbor. Skinner remembers the fire. He started it with a rocket.

Born in 1900, Skinner began experimenting with rockets at 13 when his father, an Army surgeon, moved the family to Ft. Strong. The Post Ordnance Sergeant let the boy use his shop and gave him small quantities of powder. Skinner's original rockets were loaded with black powder, first mixed into a thick paste with water and molasses, partially dried, then packed into bamboo tubes wrapped with cord and tape. Clay plugs with

"The lineage of modern anti-tank missiles and air to ground missiles runs straight back to Leslie A. Skinner..."

holes through them wedged into the base of the tubes served as the rocket nozzles.

The fin stabilized rockets achieved ranges of 400 yards. "Performance was spectacular and satisfying," Skinner says. His experiments terminated in 1915—by order—when an errant rocket started the fire on the hospital roof.

He served briefly in the Army in 1918, then spent a year at Harvard in a general science course before entering West Point. Commissioned in 1924, he served seven years in the Army Air Corps, held ratings as a pilot of free and captive balloons, military airplane observer and airship pilot and began to wonder why large and expensive airplanes carried such feeble armament, specifically one or two machine guns.

In 1931 he transferred to the Ordnance Corps, was assigned to automotive testing at Aberdeen Proving Ground and there began the long process of after hours study and trial and error testing that he followed doggedly for the next seven years trying to develop a rocket that could be fired from airplanes.

His first task involved finding a suitable rocket propellant. Aberdeen happened to be a good place to look for one. In addition to sample quantities of powders

"GIs called the new weapon the "Buck Rogers Gun" until someone jokingly referred to it as the "bazooka" a name borrowed from a home made trombone made famous by a radio comedian of the era..."

developed in America, Skinner had access there to munitions from other nations collected or captured during World War I and shipped to Aberdeen for testing and storage.

In the next 18 months, Skinner conducted some 900 test firings using every type of single and double base powder available at the proving ground. He bought a lathe, made his rockets in the basement of his home from empty carbon dioxide cylinders and metal scraps he picked up on the Aberdeen firing ranges or rescued from the dump. His superiors, particularly Col. H. H. Zornig, then deputy commander of Aberdeen, encouraged him, taught him what was known about the burning characteristics of available powders and let him use a range evenings and weekends.

By the time he left Aberdeen in 1933 to spend a year at MIT, Skinner's test rockets had achieved stabilized flight at ranges beyond 3,000 yards. He had concluded that a small lot of captured German double base stick powder originally used in howitzers came closest to the propellant characteristics he needed. When his limited supply ran out, Hercules Powder Company duplicated the powder for him free of charge, a gamble at best in 1932 that paid the company handsome dividends in World War II when it found itself in on the ground floor in rocket

powder production.

The formulation of the captured German howitzer powder was almost identical to that eventually used in the bazooka rocket.

Skinner had read with great interest in the post technical library, the official report of a rocket gun demonstrated at Aberdeen on November 10, 1918, by Dr. Robert H. Goddard and Dr. Clarence N. Hickman of Clark University. The two men had fired rockets weighing from 1.4 to 16.5 pounds from five and one half foot launch tubes of varying diameters supported on frail music stands to demonstrate the lack of recoil. The official report said the tests were successful in both trajectory and target impact moving one observer to comment: "It could be developed to operate successfully against tanks." World War I ended the next day, however, and the Army forgot about the rocket gun. Impressed by the report, Skinner began a correspondence with Dr. Hickman which continued until they become members of the same project team just prior to World War II.

Skinner resumed his experiments at Aberdeen in mid-1934. His master's thesis at MIT had been on the erosion of rocket nozzles. He followed it with several

technical reports documenting his research. He also tried to write for a magazine, but the Army refused to allow publication—for security reasons—of the article he prepared for "Army Ordnance."

Years later the editor of the magazine said he believed at the time that the real reason the Army killed Skinner's article was "fear of embarrassment if it became known to Congress that anything so scatterbrained was being worked on."

That may seem an extreme notion four decades later, but in the mid-30's most of the nation refused to take seriously grown men who played with rockets. Newsmen had derided Dr. Goddard—some called him "Mooney"—for expressing what to them was the patently absurd notion that men might one day send a rocket to the moon.

What encouragement Skinner got came from his wife and children and an occasional minor miracle such as the one Col. Zornig worked in late 1934, when he somehow found \$300 to fund some machine shop work for the rocket experiments. In the next four years, however, most of Skinner's work depended upon what he could pay for himself, cajole others into doing for him or accomplish with materials at hand. He made motor nozzles from searchlight carbons. His liquid fueled rocket engines used nitrous oxide which he got from the post dentist, or gaseous oxygen from the welding shop, as both an oxidizer and a means of pressurizing the gasoline burned as fuel, a combination guaranteed to give a safety engineer nightmares. Skinner notes: "A number of motors burned through but there was never an explosion during burning... not that pressurizing fuel with oxygen in direct contact is recommended, but it can and has been done."

He continued solid fuel research as well, later observed that one composition—powdered barium nitrate, finely ground rubber from a 155 MM gun tire, and rubber cement—worked about as well as the first commercial asphalt base propellant produced years afterward. He tried asphalt too, but found its high melting temperature "caused burning, including my eyebrows and hair, when the oxidizer was introduced into it."

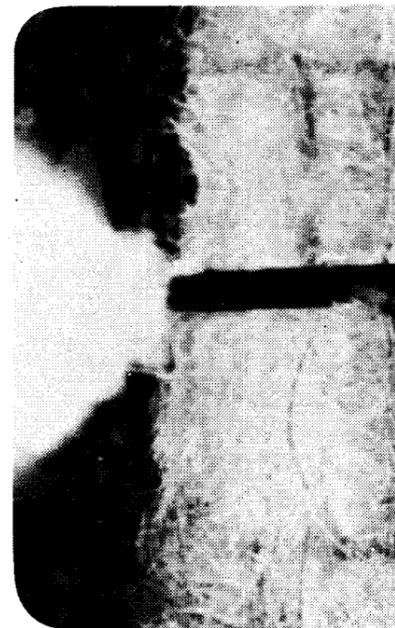
In 1938, Skinner moved to a new assignment in Hawaii, forcing a halt to the flight tests and experiments which by then had given him a working knowledge of rockets and their propulsion systems unmatched in the Army. He had little else to show for his seven year internship. No weapons had resulted from his research nor had his theories gained official

"...in the mid-30's most of the nation refused to take seriously grown men who played with rockets..."

support within the Ordnance Corps.

Yet he left Aberdeen convinced that rockets could find a home in the Army and not just as an aircraft weapon. She had, for example, proven in flight tests that he could extend the range of conventional weapons—such as trench mortars—by fitting the projectiles with small rocket motors. He had also begun to think carefully about ways to apply what he had learned to a shoulder launched infantry weapon. He had the practical know how to build such a rocket and its launcher, but no immediate solution to an obvious problem if it were to be effective against tanks.

His rockets were too slow to



... . . . To demonstrate that there is no on a bale of hay without stays and is fi back blast is on the left. A night photo at

punch through a tank's armor, too small to carry an explosive charge large enough to blow a hole in one. He kept turning the concept over in his mind looking for an answer, continued his correspondence with Dr. Hickman.

During the two years Skinner spent in Hawaii, war broke out in Europe and thoughtful men in the United States began to prepare for the American military commitment that by the summer of 1940 appeared to be inevitable.

Dr. Hickman became a member of the newly-formed National Defense Research Committee (NDRC), succeeded in getting the Committee to authorize the formation of a rocket research group. He asked that Skinner be assigned to the project.

Skinner got orders transferring him to the Office, Chief of Ordnance, reported for duty in Washington in November 1940, and learned he was to be a one man

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nd His Legend Named Bazooka

"Special Projects Unit." Although the word did not appear in the title, it was the first rocket development unit established by an American military service. Assigned to work with Dr. Hickman at the NDRC laboratory at the Naval Powder Factory at Indian Head, Maryland, he discovered upon arrival that the "laboratory" consisted of himself, Dr. Hickman, Lieutenant Edward Baker of the Navy and several acres of Maryland just then not

needed for more urgent tasks. There were no facilities, not even shelter from the weather. All work accomplished in the first winter had to be performed out of doors with improvised equipment. No propellant suitable for rockets could be obtained, none in fact was



coil in firing the bazooka, the weapon is placed d. The projectile is emerging on the right; the amp Roberta, Calif. in 1944.

being manufactured then in the United States.

Worse, the trio could find no one who should give them even broad suggestions on what weapons the military might want them to develop. The few dollars available for weapons research went elsewhere. The Army's total initial contribution to the laboratory's operating budget consisted of Skinner's pay check as a major.

Trying to arouse interest in his ideas, Skinner managed to get a few individuals in the Ordnance office to look over his sketches—among them the launcher he had designed for his proposed shoulder fired rocket. Not many could spare the time to hear him out. Time was in short supply that winter.

While massed German tanks spearheaded the breakthrough that crushed the French Army and drove the British into the sea at Dunkirk in the summer of 1940, the tiny American Army had held its first large scale maneuvers since 1918. Its cavalry still rode horses. Infantrymen carried rifles developed in 1903. Few had ever seen a modern tank. Their standard anti-tank weapon was the caliber 50 machine gun. Congress authorized the peacetime draft

that fall, and the Army began to expand. The Ordnance Corps somehow had to arm those new soldiers although it lacked modern weapons, money or sources of supply. Beset with problems, his

"The Army's total initial contribution to the laboratory's operating budget consisted of Skinner's paycheck as a major."

superiors gave Skinner a very cold shoulder.

Discouraging as it was, official indifference allowed him to do just about anything he wanted to do on his own.

He set up three "Army" projects for the laboratory: an aircraft launched rocket, an artillery rocket and a shoulder fired anti-tank rocket, determined to get to them as soon as he could and pitched in to help Hickman and Baker on the trio's first official project, a Navy program aimed at improving the armor penetration of bombs by speeding them up with rockets.

Skinner resumed after hours experiments in his basement workshop, concentrating on a small rocket for the anti-tank weapon. He had begun flight tests by June 1941, a month when, he later wrote: "the rocket unit of the Ordnance Department was increased by at least one hundred percent by the addition of Lieutenant Edward G. Uhl." Uhl turned out to be an imaginative youngster with a solid engineering background.

In early 1941, Skinner, with Dr. Hickman's help, had worked out the design of a rocket to be launched by aircraft against ground targets. The weapon that took shape on paper was solid propelled, weighed about 30 pounds, something far beyond the capabilities of Skinner's basement shop. Since the laboratory was not a recognized Army agency, Skinner could not get a priority for the materials, forgings, castings, and precision instruments needed to make prototypes for firing tests. Dr. Hickman solved that problem. He got the Navy to buy several dozen steel fire extinguishers and had the Naval Gun Factory in Washington do the machining necessary to convert the fire extinguishers to rocket motor cases.

Beginning in May, these crude projectiles, loaded with a double base powder provided by Skinner's old friends from his Aberdeen days, the Hercules Powder Company, were flight tested at Indian Head. Their performance exceeded all expectations. Skinner and Uhl reworked the design incorporating Hickman's suggestions and the results from the firing tests. The Dresser Manufacturing Company in Bradford, Pa., produced the initial order: 500 four and one half inch diameter rockets and 500 three and one half inch versions, the latter used as a flight test vehicle for the artillery proximity fuze then under development by another group of the National Defense Research Committee.

The four and one half inch rocket, its body diameter inherited

from its fire extinguisher ancestor, subsequently went into service as the M8 Folding Fin Aircraft Rocket. Stabilized in flight with tail mounted fins which popped out and locked into place after launch—a

technique Skinner had perfected in his Aberdeen tests years before—the rocket carried an explosive charge of about four pounds some 5,400 yards with reasonable accuracy. The original design went through several subsequent improvements.

Eventually millions were produced and the rocket saw combat service in both air and ground launched roles. At first, however, Army pilots were not eager to try the new weapon, an attitude which persisted until British pilots showed that air to ground rockets could be used effectively. The airmen's reluctance prompted Skinner to go to the Army Ground Forces with the idea that the rocket, although designed to be fired from an airplane, could be easily adapted for ground launching as a supplement to artillery.

What he really needed was someone in authority to order a large quantity because his invention had the Ordnance Corps in a bind. It could not gear up for large scale production of rocket propellant until someone asked for rockets. Responding to Skinner's none too gentle prodding, the Ground Forces ordered the rocket. A second production request came from the Air Corps. Then the Ground Forces asked for 750,000 of the three and one half inch version for targets. If further justification was required for large scale rocket propellant production, Skinner supplied it himself. One day in May 1942, he literally handed the bazooka to a startled group of high ranking officers.

More than a year before, he had heard of work underway on a new type of projectile, one that did not require high hitting velocity to penetrate armor. If true, he knew it could be the missing piece in the technical puzzle he had been trying to solve since his Aberdeen experiments first raised the possibility to him of a shoulder fired anti-tank rocket.

The Ordnance Corps in 1941, in great secrecy, was in the process of rediscovering the principal of the shaped charge. C. E. Munroe, a physicist, had found in 1888 that a hollow cone or cavity in the front end of an explosive charge tended to focus the explosive waves at a single point. Limited American

"Official indifference allowed him to do just about anything he wanted to do on his own."

efforts had failed to find a way to apply Munroe's discovery in weapons. Then in late 1940, a young Swiss engineer, Henry H. Mohaupt, turned up in Washington and offered the Ordnance Corps a projectile design using a rigid liner in the hollow cavity of the explosive charge. He had already disclosed his work to the British and French. Both had adopted it. The Germans, too, also found a way to exploit the same principal.

Brigadier General R. H. Somers of the Ordnance Technical Staff decided to give Mohaupt's design a trial, despite widespread disbelief in the Corps that his claims would stand up. To the amazement of the few men involved in the secret tests, projectiles made to Mohaupt's design did exactly what he said they would do. They punched holes through tank armor that

conventional explosives hardly denied.

The tests were enough to send Ordnance into crash production of a projectile designed around the lined shaped charge. Standardized as "Grenade, High-Explosive, Anti-tank M-10," it was a formidable weapon with one small drawback, discovered months later as the things were coming off the production line by the thousand. Its heavy recoil made the three pound M-10 almost impossible to fire from a rifle or even from a caliber 50 machine gun. Since that was the way it was intended to be launched in combat, the Ordnance Corps found itself the unhappy owner of a rapidly growing heap of useless M-10 grenades. There followed a frantic effort to devise some means of shooting the things without shattering shoulders, rifle stocks and machine gun mounts.

An experimental grenade launcher, similar to a conventional gun, proved impractical, primarily because of excessive weight and recoil. Accuracy vanished when attempts were made to fire the grenade—fitted with a small rocket motor—using a bayonet fixed to the muzzle of a rifle as a launch rail. Further attempts to find a way to use the M-10 were getting nowhere in the Spring of 1942 when Skinner combined the M-10, a rocket and a shoulder launcher.

He knew two things about the grenade. It weighed a little less than three pounds and it could punch a clean hole through three inches of the best armor. It was, in short, exactly what he needed to make his shoulder fired rocket an effective weapon.

He worked out the basic design for the prototype of the bazooka projectile, incorporating valuable suggestions by both Uhl and Hickman. Skinner made the first projectiles in his basement machine shop, using dummy M-10s he picked up on the Aberdeen firing ranges, adding rocket motors and stabilizing fins. He hand loaded each rocket with six sticks of double base powder.

To get a launcher he enlisted the help of Lieutenant Colonel W. T. Moore, who had one built at Frankford Arsenal to Skinner's original design. A simple steel tube, open at both ends, the first launcher—now in the museum at West Point—was fitted with two hand grips, a stock, sling, trigger and battery-powered electrical firing mechanism. It had no sight.

The launch tube had an inner diameter of 2.36 inches, a measurement determined by the width of the M-10 grenade head. The 54 inch length of the tube had been calculated to be the minimum which would safely insure that the

correct—successfully fired the first shot from his shoulder.

The next day, Skinner and Uhl turned up unannounced at Aberdeen intending to fire nine home made rockets with dummy heads using the shoulder launcher. They found a demonstration in progress involving a tank being used as a target for other experimental devices under development to fire the M-10 grenade. Unnoticed, they took a position at the end of the firing line some distance from the point where they could see a group gathered to watch the tests already underway. Skinner recalls what followed:



... Leslie A. Skinner in 1944. At that time, Skinner had been promoted to Colonel.

"It happened that the target tank came up our way to make a turn and we decided to fire it. Uhl devised a makeshift sight for the launcher on the spot with a piece of wire he picked off the ground.

"He hit the tank with his first shot. Then before it could complete the turn, I hit it with another rocket. By then, partly due to the unfamiliar noise of the rocket blast, the whole multi-starred audience was headed our way.

"General Barnes (Major General G. M. Barnes of Ground Forces Development) took a shot with it and made a hit. Then other staff people fired until all our rounds were gone.

"Right then the bazooka was ordered into pilot production and very shortly thereafter, even before statistical test, into full production."

The bazooka's unorthodox introduction to the Army marked a major turning point for the weapon and the man who created it. Today Skinner believes his real usefulness to the Army's rocket program began a steady decline almost as soon as the impromptu demonstration at Aberdeen broke up.

Whatever warm inner glow he may have had in the moment of success after his long campaign to sell the Army on rockets quickly turned to ice. When his superiors in the Ordnance Corps heard the Army Ground Forces urging immediate production of a weapon few of them had ever heard of much less seen, Skinner found himself the guest of honor at a private, very thorough chewing out covering all the bases from lack of loyalty to insubordination.

His personal woes, however, had no effect on the further career of the bazooka.

On May 19, 1942, by special order of the Army Chief of Staff, the Ordnance Corps contracted with

Continued p. 12

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Company A Cagers Quell MP Bid In National

Missilemen, Students Even In American

By DAVE COWAN

The verdict isn't in yet on Marvin Williams of Company A in the National division of the RSA Men's Basketball League, but his mere presence in the division haunts the mighty MPs. In a Tuesday night contest just before the Christmas recess, Company A, led by Williams, broke through the MP's barrier for a 55-52 victory.

Williams, who leads the league in scoring with an average of 35.5 points per game, grabbed 19 points, followed by Charlie Reese and Cal Done with 12 points each. Robin Sheets paced the cops with 22 biggies.

The turning point of the game came from the free throw line. The permanent party dwellers were 50 percent from the charity line, cashing in on 11 or 21 attempts, while the cops hit eight out of 20 throws for a dismal 40 percent.

Company A's win kept them tied with the Meddacs, along with Company B, with identical 3-0 records, while the MPs fell to fifth spot in the league with a 2-2 mark.

In other cage action, Company B, routed SSG, 57-32; while the 6th ETC nipped the Marines, 38-36. In the American division, the 8th ETC hammered the 7th, 65-40; MICOM defeated the 4th ETC, 75-62; and the 1st ETC

subdued the Marines, 45-32.

The Company B roundballers chalked up their third straight win as they routed the SSG cagers. Fred Harris led the permanent party with 28 points, followed by Mike Fields with 11. Jim Kennedy sparked the cellar-dwellers with 20 tallies, including a perfect night from the free throw line with six charity shots.

It was a personal victory for Winston Stephens and the 6th ETC squad with their win over the Marines. Stephens, who is runner-up in the league in scoring with 29.7 points per game, netted 17 points, but in a winning effort as his team nabbed their first win of the roundball campaign.

Contributing to the students win was George White with 11 tallies, while the Marines were paced by R. G. Grant and P. Green with 13 and 10 points respectively.

American League

The students from the 8th ETC and the missilemen from MICOM won decisive battles just before the Christmas recess in the RSA Men's Basketball League with both teams remaining deadlocked at four wins each.

Bobby Ripley paced the students to a win over the 7th ETC, grabbing 16 points, followed by Kim Devita with 11. Frank Flanagan and Milt Grubbs also had eight points each for the students, while Chestnut, Altepeter and Holtan netted 10, eight and eight points respectively for the 7th.

The missilemen used a 1-2-3 punch in their 75-62 win over the 4th ETC. MICOM's leading scorers were Raymond Smith and Arthur Perrin with 21 biggies each and Gene Howey with 15. The students combo consisted of Willie Banks and Steve Scott with 29 and 21 points respectively.

The missilemen will be tested following the holidays, when they clash with the 8th ETC in a game to determine first place in the American division. Presently, both teams are sporting

4-0 records.

The 1st ETC unit evened their record at 2-2, defeating the Marines, 45-32. Harvey Andres and Gerald Roberson paced the students with 16 and 10 points respectively, while C. B. Foutz and D. A. Skelton had 16 and 11 tallies respectively for the Marines.

UNIT LEVEL BASKETBALL Standings National

	W	L
Meddacs	3	0
Company A	3	0

	3	0
Company B	2	1
5th ETC	2	2
29th MPs	1	2
9th ETC	1	3
6th ETC	0	3
SSG	0	4
Marines I	0	4
American	4	0
8th ETC	4	0
MICOM	2	1
Company C	2	2
4th ETC	2	2
1st ETC	1	2
3rd ETC	0	4
Marines II	0	4
7th ETC	0	4

World Of Sports

By Dave Cowan

The new year is now here, but the glamour, upsets and stars of the 1973 sports program, both national and local, will remain in the hearts of many sports enthusiasts for some time.

December 31, 1973, not only marked a time for resolutions, "auld lang syne" and hope for a prosperous new year, but it also represented the end of an era, the conclusion of one of the most fascinating time spans ever to take place in sports history.

It was the year when the mighty Military Police defeated the missilemen from MICOM for the RSA Men's Basketball championship; Company A's Marvin Williams captured the first One-On-One Basketball Tournament at Redstone; the MICOM II softball team, led by ace pitcher Ron Lockwood, went undefeated in capturing the softball crown; Navy seal Al Ashton directed the Meddac Detachment to the RSA Men's football crown and in the youth sports program, the RSA Redskins went undefeated in the Ft. Campbell National Football League; the Rams and Raiders, both teams from the Arsenal, captured their respective crowns with undefeated records in the Brindlee Mountain Football League. And finally, it was the year when ice hockey became prominent among the youth in the South, especially in Huntsville.

NATIONAL SPORTS

On the national scene, it was the year when Secretariat, a three-year colt, became the first triple crown winner in 25 years; male chauvinist Bobby Riggs became a common household word among the American women as Mrs. Billie Jean King butchered the "pig" in a pro tennis match; Atlanta's hammering Henry Aaron fell one home run short of tying Babe Ruth's record of 714; the "miracle" New York Mets, a team that had been dormant throughout most of the baseball season, missed winning the World Series by one game to the Oakland A's, which had a season highlighted by several no-hitters; the Alabama Crimson Tide were named the national champs in college football by United Press International as well as being ranked No. 1 in the Associated Press Poll; New York Knicks winning the National Basketball Association's championship while the Montreal Canadiens captured the Stanley Cup in the National Hockey League and as usual the UCLA Bruins continued their unparalleled trend by winning their ninth NCAA basketball title in the last ten years.

The year 1973 also had its sad moments with the loss of baseball's great Roberto Clemente of the Pittsburgh Pirates.

Readiness Group's Sparks Dies

A funeral and burial services for Major Melvin Leon Sparks were held at Lineville, Alabama, December 19. Memorial services had been held the day before at the Redstone Post Chapel. He was 37 and death was attributed to a heart attack.

Major Sparks had been assigned to the Armor Team of the Redstone Readiness Group since August.

He and his wife, son and

daughter, lived on post at Redstone.

Other survivors include his parents, Mr. & Mrs. Leon Sparks, Lineville, a sister, Mrs. Richard Knight, Auburn, and a grandmother, Mrs. D. W. Sparks, Lineville.

Before coming to Redstone Major Sparks was a National Guard advisor at Calhoun, Georgia.



END

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Not too long ago when people wanted to go fishing, they got a pole and headed for the nearest body of water. The tackle ranged from a section of cane to an expensive rod and reel, but they got the job done.

Ben Thomas, an engineer with the SAFSCOM Test and Systems Engineering Directorate, makes fishing rods for a hobby. He has found that many of his customers have their own ideas of how they want their rods made . . . and some of them are a little unusual.

"When someone wants a custom made rod they tell me how they want the handle designed, how far apart they want the guide spacing and the weight and action they want. Some of the folks have taken it even further. One customer wanted the wrappings the same combination as his college colors, a lady wanted hers with blue wrappings that matched the color of her eyes, and another fellow wanted his in colors to match his boat," Thomas said.

"Sometimes they want their name and the date embossed on the rod, so I fix them as close to their specifications as I can," he continued.

Thomas has been making fishing rods to order for nearly 30 years. He estimates that he has made more than 500.

It started in 1945 when someone gave him a beat-up flyrod. He and a friend stripped the guides and varnish off the bamboo rod and decided to rework it. When they got through, they had a beautiful rod, but it wasn't any good for catching fish. Stripping the varnish off the bamboo caused it to lose its strength, so Thomas decided then to stick strictly with fiberglass rods in the future.

His hobby is one of love and demand. He loves to work on fishing rods, but he never does unless he is filling an order for a customer.

Most of his work is done by hand without any special machinery or tools. He orders blank fiberglass rods from a commercial distributor and then gets the specific sized guides, handles and



GUARANTEED TO PLEASE—Tom Patton, left, an Engineer with SAFSCOM, looks over the custom made rod made by Ben Thomas.

wrappings he needs from a supply house.

Thomas estimates it takes a week of working in the evenings to finish most of the custom rods he makes. Now and then it takes longer when the customer wants something extra special.

His wife and five daughters aren't interested in fishing, so when Thomas goes fishing it is usually with some of his buddies. You'd think a man with his talents would have the finest fishing rod he could make for himself . . . but he always ends up with some makeshift rod and reel that no one else wants.

Thomas explained it this way: "Whenever I took one of my custom made rods fishing, someone would always want it and I'd end up without a rod. With the old rod—no one wants, I can enjoy my fishing."

Bowling Results



Officers Final Standings (First Half)

	W	L
ExASPRators	86	34
Black Jacks	83	37
Bee M's	78	42
Strikeouts	76	44
Sperfs	73	47
Swingers	71	49
TBDL's	60	60
Users	58	62
RASA Widgets	54	66
Hardhats	50	70
No Names	50	70
Misfits	48	72
Wheezers	48	72
Alley-Oops	44	76
Readiness Group	41	79
Lucky Strikes	40	80

Dec. 19

Alley-Oops-8 — Wheezers-0
Black Jacks-8 — Lucky Strikes-0
Strikeouts-8 — Readiness-0
Widgets-6 — No Names-2
ExASPRators-6 — Swingers-2
TBDL's-6 — Hardhats-2
Users-6 — Misfits-2
Bee M's-4 — Sperfs-4

High Series: Coffman, 551; Fuller, 545; Ollaro, 531; Ludick, 524; Bales, 519; Lux, 517; Weinberg, 516.

High Games: Hopper, 204; Bales, 199; Oard, 194; Torok, 193; Coffman, 193; Ollaro, 190; Lange, 190.

High Ave: Coffman, 168.

First Half Highs: Team Game: Alley-Oops, 903; High Series: Bee M's, 2480.

Monday Night Mixed STANDINGS

	W	L
O'Dragon	38	18
Strike-Outs	35	21
Snoopy Snoozers	34	22
L & M's	32	24
Moback's	31	25
Tanglefeet	30	26
Gotcha's II	30	26
Hover-Lovers	29 1/2	26 1/2
Nite-Owls	28	28
Odd Balls	26	30
Noboutadoutit	26	30
213 Bombers	26	30
Black & White	24	32
Riff-Raffs	22	34
-3 plus 1	19	37
Luckless IV	17 1/2	38 1/2

HIGH ROLLERS

High ind. series: Wayne Wagner, 538; Al Fasnacht, 515; Bill Sevey, 512; Paul Manna, 508; Readie Kelly, 506; Loretta Lowery, 475; Louise Reese, 475.

High ind. games: Paul Manna, 196; Esaw Kelly, 194; Wayne Wagner, 193; Readie Kelly, 187; Ginger Tavano, 172; Judi Dwyer, 168.

High team series: Strike-Outs, 1776;

High team games: L & M's, 631; O'Dragon, 627; Strike-Outs, 621.

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Skinner And His Legend Named Bazooka

Continued from p. 9

General Electric Company to make 5,000 bazookas in 30 days. Company records indicate the order was met "with 89 minutes to spare."

Large scale production orders followed quickly after a second formal, demonstration at Camp Simms just outside Washington. There Skinner and Uhl fired at a tank while scores of high ranking Army officials and military representatives from allied nations watched.

"...an official Ordnance Corps history calls the initial results 'amazing'."

It may have been that day—June 25, 1942—that Soviet Army officers got their first look at the bazooka. The official Army history of World War II notes that the Soviets learned of the weapon about that time and immediately asked for it. Several hundred of the first weapons produced were shipped to the Soviet Union in the early fall of 1942. It is probable—but not certain—that some of them were the first to be fired in combat.

Most of the initial production quantities went directly from factories to troop ships loading for the invasion of North Africa. In some instances crated launchers and rockets were flown to the ports and hustled aboard ships just before they sailed.

The American soldiers who took the bazooka into action, as a result, learned there were such weapons when they unpacked them on board ship, taught themselves how to use them and fired their first shots, not on a training range, but in actual combat.

Even so, an official Ordnance Corps history calls the initial results "amazing." There were numerous combat reports of enemy tanks exploding after being hit by a single bazooka rocket; one soldier blew the turret off a tank with a single shot; a detachment of 10 enemy tanks surrendered after several rockets scored near misses at long range. The commander told his captors he believed he was being fired on by artillery and thought it foolish to continue fighting.

Mass produced throughout the war, the bazooka proved an invaluable weapon in Africa and Europe and in the Pacific fighting from New Guinea to the final ground actions in Okinawa and the Philippines.

Epitomizing the successful combination of the essential ingredients of a great infantry weapon—simplicity and firepower—the bazooka has been hailed as one of the major developments of World War II. Very little of the credit ever got down to Skinner.

The tiny rocket development unit of the Ordnance Corps spent some exciting but not particularly happy days after the bazooka became known, fending off a flood of suggestions for redesign, new design, and all kinds of proposed rocket applications to exotic weapons. Many of the later, Skinner now notes scornfully "could have been done better with rubber bands."

"He emerged from the meeting relieved of his job...and ordered to leave for a new assignment in England within 48 hours."

The days when he had worked alone and forgotten, free from interference and restraint, were all behind him now. So were the spectacular results he had achieved with his unorthodox methods and short cuts. Decisions had to be made, important ones. Since men were involved there were differences of opinion, the kind that lead to arguments, arguments about modifications to

the bazooka, the aircraft and artillery rockets, the target rocket, rocket propellant manufacturing methods, even the kind of powder to be used. Skinner was in the middle of all of them, fighting for the future of rockets in the Army.

Hindsight reveals he won the war, but lost the battle, specifically a session with a general and a colonel in the Spring of 1943 over the future course of Army rocket development. He emerged from that meeting relieved of his job as

chief of the special projects unit and ordered to leave for a new assignment in England within 48 hours.

A few months later—in September 1943—the Ordnance Corps established a Rocket Development Branch to direct and coordinate the development of rockets. There was no place in it for Colonel Skinner when he came back from England that Fall. He spent the next few months in the Pentagon in a variety of minor assignments, then in June 1944 went to California to set up an Ordnance Corps liaison office at the California Institute of Technology. Cal Tech had begun work earlier that year on an Army project to develop a long range missile. Skinner helped set up facilities at Camp Irwin, California and Ft. Bliss, Texas, for the experimental firings of the Cal Tech rockets, then finished out the war in an assignment in the Pacific.

He retired from the Army in 1948, worked for a time in the armaments industry and was recalled to active duty with the Air Force in June 1949. He put in a year at the Armaments Laboratory at Wright Patterson Air Force Base and another at Eglin Air Force Base where he assisted in planning facilities for the Air Armament Test Center there. In June 1951, just as the Army began to expand its rocket and missile activities at Redstone Arsenal, Skinner took off his uniform for good.

Over the next decade he worked as a planner and consultant for various aerospace and armament companies.

There was some formal recognition of his pioneering work. When he retired, the Army presented him with the Legion of Merit. The American Rocket Society honored him with its Hickman Award for his contributions to weapons and solid fuel rocket propulsion. Neither award mentioned the bazooka specifically.

Skinner never claimed to have invented the bazooka. Instead he referred to himself as the "designer" in a magazine article in 1944, a term he explained in discussing both the shaped charge and the bazooka, when he wrote: "The basic invention had been known for some time and the present outgrowths are ingenious and reasonably intelligent combinations of old principles into a practical device which legally may be an invention but certainly not a basic one."

Basic invention or not, he correctly observed in the same

inventions patented during his career.

Now living in retirement with his wife in Florida, Leslie A. Skinner has the personal satisfaction of knowing that greatly improved versions of the rocket he first put on the soldier's shoulder more than 30 years ago is still there today.

"There was some formal recognition of his work... the Army presented him with the Legion of Merit."



... Radio comedian Bob Burns (right) compares his original bazooka with the Army's rocket firing model during a visit to Camp Hood, Texas, in June 1943. (U. S. Army Photo)



GETS AWARD—Colonel Earnest Deadwyler has been awarded the Legion of Merit at the Missile Command. Major General Vincent H. Ellis presented the medal to the Hawk Project Manager during a recent ceremony at Redstone. Deadwyler was cited for meritorious contributions in his job before coming to MICOM as Chief of Safeguard's Site Technical Operations Division.

Honor Student

ROME, Ga.—A young Redstone man has been named to the Honor Roll for his academic work during the fall quarter at Darlington School in Rome, Georgia.

He is Wayne P. Busck, son of Col. and Mrs. Albert A. Busck, of 466 Simpson Drive. Wayne, a freshman, received Honorable Mention on the Honors listing.

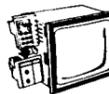
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Multi-Talented Nurse

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1st Lt. Linda C. Ruthven, Army nurse, joined the staff at the pediatrics clinic of the Redstone Arsenal Medical Department Activities, in September and has developed a well-rounded program for the care and feeding of children from infancy through adolescence.

The lieutenant has been specially trained to examine babies and treat minor ailments, referring them to doctors only when the condition warrants a doctor's attention.

Her day begins at 8 a.m., answering questions of mothers with sick children and making appointments for a clinic visit if necessary. This goes on for one hour with the aid of a long time employee at the clinic, Grace Giles who has been on the nursing staff since 1956. Guidance offered by these nurses often eliminates the need to visit the clinic.

The lieutenant conducts classes twice a week for mother's with new babies to help them take care of themselves and their children. She will also examine infants after they are two-weeks-old by appointment.

"Six weeks is a long time to wait to see a doctor," she said. "Many mothers need reassurance, especially with a first child."

Lt. Ruthven's capabilities are not limited to mother-infant care. She holds a weight watcher's clinic for pre-teen and teenagers.

"In the case of the overweight child, it is very important that both parents not only cooperate, but also participate," she said. "It is very hard for a child with over-

weight parents, to try to control his weight."

"I advise on portions, offer recipes and generally try to make it as easy as possible to develop good but slimming eating habits."

On Thursdays the lieutenant holds classes in social behavior, rap sessions in which the youngsters themselves generally choose the topics covering everything from venereal disease and drugs to social activities at home and at school.

"The youngsters do better without the presence of parents at these sessions," the lieutenant said, "because they don't have the inhibition among their peers that automatically develop in the presence of adults."

The teenagers and pre-teens are not left without parental guidance if they have a problem. Counselling as a follow up is offered if there is an individual problem whether it be behavioural or physical.

The teaching-lieutenant's day in the classroom doesn't end on the job. She is taking courses at the University of Alabama in Huntsville to help her on the job and perhaps add credit to the master's degree she intends to add to the bachelor of science degree obtained from the University of Maryland, and the registered nurse degree conferred by the Institute of Nursing at Walter Reed Army Hospital.

Lt. Ruthven became a specialist while at El Paso where there was need for pediatric nurses.

"I didn't choose the specialty, but I found I like it," she said.



CONFIDENCE—Christopher Walrath, son of SP4 and Mrs. David W. Walrath, responds happily to Lt. Linda C. Ruthven during a checkup in the well baby clinic.

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Pat Fundum's husband, Gene, works as a Personnel Specialist. He's just reenlisted, but that was no surprise to her.

"Actually, it wasn't something we had to discuss. He knows how I feel about the Army.

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"But what's more important, I know he likes his job. He's proud of the way he's advanced. And he's always saying there's no way he could have moved up as fast as a civilian.

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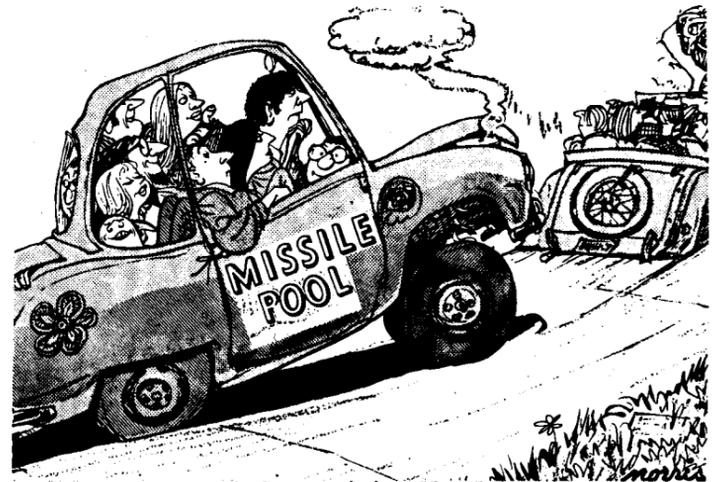
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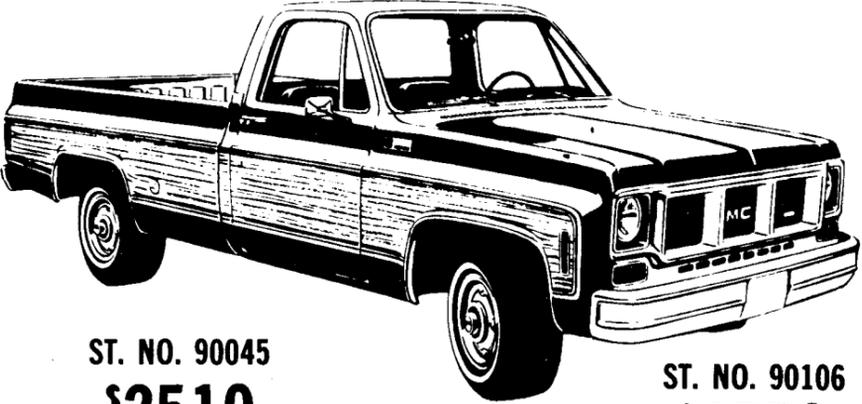
BARGAIN PRICED USED CARS LEE-BENTLEY Chrysler-Plymouth GAS SAVER Specials

STOCK NO.

H-476A	1973 Full pow	Cadillac Coupe	\$5,395.00
218	1973 P.B. & windows	Satellite, AM-FM, 4 Door	3,295.00
219	1973	Satellite 4 Door	3,295.00
U-1057	1973 Full power	Chrysler N/Y 4 Door	5,495.00
V-1183A	1973 Full power	Chrysler N/Y 4 Door	5,495.00
200	1973 AM-FM, P.W.	Satellite 4 Door	3,195.00
201	1973	Satellite 2 Door	3,295.00
202	1973 A, PS & B	Satellite 2 Door	3,295.00
205	1973 Air	Valiant 4 Door	2,995.00
206	1973 PS & B	Valiant 4 Door	2,995.00
210	1973	Satellite 4 Door	3,195.00
211	1973	Satellite 2 Door	3,095.00
212	1973	Satellite 4 Door	3,195.00
216	1973	Satellite 2 Door	3,195.00
U-1058	1972	Chrysler N/Y 4 Door	3,895.00
R-1059	1972 Full	Chrysler N/Y 4 Door	4,195.00
P-40034A	1972	Plymouth Fury S/Wagon	2,495.00
I-80004A	1972 Full Power	Imperial 4 Door	3,695.00
V-1058A	1972 Full Power	Chrysler	3,895.00
C-60002B	1972	Plymouth Fury 2 Door	2,695.00
H-452A	1972	Chevrolet Imp. 2 Door	2,895.00
H-473A	1972 6 cyl. SS Rad	GMC P.U.	2,495.00
134	1972	Ply Sub S/Wagon	3,295.00
I-7013A	1972	Chrysler New Yorker	3,695.00
C-60009A	1971	Chrysler N/Y 4 Door	2,195.00
C-5070A	1971	Chrysler S/Wagon	3,495.00
T-9328A	1970 Full power	Buick S/Wagon Estate	2,695.00
I-7015A	1970	Chrysler 4 Door	1,995.00
P-40115A	1970	Plymouth Cus S/Wagon	2,495.00
H-469A	1969 Full power	Pontiac 2 Door	1,595.00
C-5101A	1972	Chrysler S/Wagon	4,195.00
V-1058A	1967	Chrysler 4 Door	495.00
V-10012A	1967	Plymouth 2 Door	695.00
T-90094A	1973 Air, PS & B	Chevrolet 1/2 Ton P.U.	3,395.00
H-473A	1972 GMC 1/2 Ton-6-cyl. Std. Tran Red/White		2,000.00
U-1042	1963 GMC Cabover-5 spd., 2 spd rear axle 671 Detroit New Cyl, Head, rings		
T-9217A	1967 Ford WT-1000-Tractor 318-10 spd-34,000 lb Bogie,		5,500.00
T-9243A	1970 Ford WT-9000-Cabover Tractor-318-10 spd, 34,000-lb. Bogie, New paint, air cond., 1000x20 cast spoke Red		12,500.00
T-90006A	1972 GMC L.W.B. 1/2 Ton V/8 fully loaded Gr-White		2,400.00
T-90056B	1970 Ford LWB 1/2 Ton Extra clean Fully loaded XLT Green/White		2,100.00
T-90058A	1972 Ford Ranchero, Fully Loaded Low Mileage, Clean		2,495.00
T-9029A	1969 WT 1000, Tractor Air Cond, 318 Det, 10 spd 34,000 lb Bogie 1000x20, new paint, new engine overhaul Yellow/White		12,500.00

All Satellite 4 doors have AM-FM power steering, brakes & windows.
All Satellite 2 doors, air, power steering and brakes.
All Chrysler New Yorkers, full power and air.

1974 GMC 1/2 TON PICKUP



ST. NO. 90045
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ST. NO. 90106
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PLUS TAX & TAG

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ST. NO. V-10034
2 DOOR SPORT COUPE
198 CID 6 CYLINDER ENGINE
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3 SPEED MANUAL TRANSMISSION
DELUXE WHEEL COVERS
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WHICH '74 COMPACT WILL GIVE YOU THE MOST MILEAGE BETWEEN PIT STOPS?

The facts put Valiant/Duster on the inside track
How do they stack up in miles per gallon?
Check these figures from Popular Science magazine!

MILES PER GALLON		
	Basic Six	Basic V-8
Plymouth Valiant	18.5	14.4
Ford Maverick	15.5	12.7
Chevrolet Nova	16.0	14.5

The figures charted above appeared in the October '73 issue of Popular Science Magazine, following a test program which covered various car makes and models. The tests did not include cars with the special emissions control systems prescribed for California only.

Here's what Popular Science says about the mileage ratings:
"...The mpg figures are based on results obtained in our own tests, and on test results published by the U.S. Environmental Protection Agency. The EPA has three test cycles (urban, highway and country road), while we test at a constant speed (45 mph) but with variable throttle opening (due to gradients and curves)."
"Figures have been extrapolated from available test data for more models and power trains not tested by EPA or PS. The figures in our table represent the gasoline mileage the average user is most likely to get in all-around driving..."

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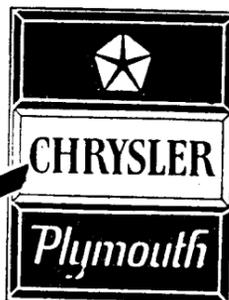
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