NUCLEAR DIVISION NEWS

UNION CARBIDE

A Newspaper for Employees of the Nuclear Division, Union Carbide Corporation

Vol. 1 — No. 4 | OAK RIDGE, TENNESSEE | Thursday, March 26, 1970

Three at Nuclear Division Facilities Awarded Technician Scholarships for University Study

Robert C. Crowe | Charles P. Sampson | Clarence C. Wright

Three members of the staff of the Nuclear Division have been named recipients of Technician Scholarships awarded by the U. S. Atomic Energy Commission.

The scholarship program is designed for employees at the technician level who have some college education. Nominations are made by each plant and selection is based on the potential of the applicant.

Each of the scholarship recipients will continue to receive his regular salary while attending the university. In addition, the cost of tuition and fees will be defrayed by the Atomic Energy Commission.

This year's recipients are:

Robert C. Crowe, of Oak Ridge, a senior radiographer at the Oak Ridge Y-12 Plant, for study at The University of Tennessee to obtain his B.S. degree in engineering physics.

Charles P. Sampson, Knoxville, a senior engineering draftsman at the Oak Ridge Y-12 Plant, for study at The University of Tennessee to complete work toward a B.S. degree in electrical engineering.

Clarence C. Wright, Lenoir City, a senior laboratory analyst at the Oak Ridge Gaseous Diffusion Plant, to complete requirements for a B.S. degree in chemistry at The University of Tennessee.

Crowe, who has been a member of the Nuclear Division staff since 1960, is interested in the technical aspects of the field of radiation testing. He has taken several mathematics and physics courses at The University of Tennessee. He, his wife and five children live at 101 W. Price Lane, Oak Ridge.

Sampson joined the Nuclear Division in 1954 as a chemical operator, and was promoted to draftsman five years later. In 1968, he was certified as a Senior Engineering Technician. He has already accumulated more than 100 credit hours toward his bachelor of science degree. He, his wife and two children live at 1000 Bardill Lane, Knoxville.

Wright has been employed at the Oak Ridge Gaseous Diffusion Plant since 1953, and has been a member of the special analysis department for the last eight years. He has earned more than 90 credit hours toward his degree. He is married, has two children and lives at Route 1, Lenoir City.

Good Friday Holiday

Friday, March 27, is an official holiday for Nuclear Division employees in Y-12 and K-25.

Good Friday is the third holiday of the year. No employee is required to be at work unless his presence is required by continuous operation or security in the plant.

Computing Reports Presented by Four

Four Nuclear Division staff members presented papers last week at meetings sponsored by the Association of Computing Machinery at Gatlinburg.

The speakers included :

Martin S. Ginsburg, development specialist at the Oak Ridge Gaseous Diffusion Plant's Operations Analysis Division, "Some Problems in Time-Sharing."

Gerald B. Knight, Head of the Computing Technology Center's Remote Access Support Section, "Special Considerations in Planning and Implementing an On-Line System."

Jack H. Owings, a computer applications analyst at CTC. "CIRK —Computer Technology Center's Information Retrieval from Keywords."

Charles E. Price, head of CTC's Computing Applications Section, "Information Processing at the CTC."

Are You Getting Your Union Carbide World?

Are you getting your copy of **Union Carbide World?** If not, here's something you can do about it.

The next issue of the publication should reach your home no later than April 10. If you haven't received your copy by that date, you should contact one of the following, depending on your plant location:

Oak Ridge Gaseous Diffusion Plant—Call 3-3150 or write the Employee Relations Department, Building K-1001.

Oak Ridge Y-12 Plant — Call 3-7100 or write to J. A. Young, Building 9711-5.

'Operation Clean Water' Set For April at Melton Hill Lake

Everyone talks about cleaning up Melton Hill Lake, but now some people are really going to try it.

"Operation Clean Water" will be launched in April by a group of some 50 volunteers, including many from the Nuclear Division, who are interested in preserving the natural beauty of area lakes.

According to one of the volunteers, R. E. (Chuck) Brockwell, Separation Systems Division, Oak Ridge Gaseous Diffusion Plant, "the idea is to first clean up area waters, starting with Melton Hill Lake, and then to keep them clean."

Boy Scouts Help

About 25 adult helpers and 25 Boy Scouts from Troop 228 will meet at selected cleanup sites along the lake on each of the first three weekends in April. Scoutmaster Jim Simpson, also of ORGDP's Separation Systems Division, will direct the Scout activities.

Initially, the workers will concentrate on four major lake-side areas—the Oak Ridge Marina, Solway, Clark Center Park, and the Knox County access to the Lake across from the Carbide park facilities. The collected trash—paper, old bottles, and other debris —will be hauled to the city dump.

The volunteers emphasize that the initial cleanup is only part of the job. "We hope to get something started that will eliminate the need for 'mass cleanups' in the future," Brockwell said. A pledge card will be distributed to campers, boaters, fishermen, and other persons enjoying the lake urging continuing efforts to keep the waters clean.

Avoid Littering

Lake users will be urged to not only avoid littering themselves, but also to take a little time to clean up trash when they see it.

Persons interested in helping on the project should call Brockwell at 3-3576.

What if the idea works well at Melton Hill Lake? "Many of us have been talking about the problem for years," Brockwell answers. "If this first step works, we'll try to continue the cleanup at Norris and other sites."

Pilot Program

30 College Students Selected For Unique Cooperative Plan

Thirty students who will enroll next fall in five predominantly Negro colleges and universities have been selected for the pilot cooperative program conducted by the Nuclear Division.

This new program, which is supported by the U. S. Atomic Energy Commission, is designed to encourage Negro students to pursue college studies in science and engineering. The pilot program is specifically aimed at students who, because of financial limitations, might otherwise be unable to attend college.

Under the program, the Nuclear Division places several high school graduates recruited by each of the participating institutions in summer jobs as "pre-cooperative" students. Placement is contingent on their acceptance into an engineering or science cooperative curriculum at the institutions. In addition, the students must meet normal requirements for summer employment at Nuclear Division facilities.

Students participating in the pre-cooperative program, and their planned fields of study, are:

Howard University (Washington, D. C.) — Michael P. Farley, Lewistown, Pa., mechanical engineering; Wayne R. Henry, Greensboro, N. C., civil engineering; John E. Newsome, Delray Beach, Fla., electrical engineering; Dorothy Nell Sims, Dublin, Ga., civil engineering; George A. Smith, Birmingham, Ala., electrical engineering; Curtis Speller, Norfolk, Va., civil engineering.

North Carolina A & T State University (Greensboro) — Reginald T. Booker, Greensboro, electrical engineering; Quentin Brooks, Philadelphia, Pa., engineering; Steven Dukes, Union City, Ga., electrical engineering; Ronald S. Fleming, Woodleaf, mechanical engineering; Iwona Lucas, Raleigh, mathematics; Rodney S. Robinson, Alcoa, Tenn., electrical engineering; Broderick E. Rogers, Raleigh, architectural engineering.

Southern University (Baton Rouge, La.) — Albert J. Boykins, Baton Rouge, electrical engineering; Clotis C. Johnson, Plaquemine, electrical engineering; Leroy Jones, Baton Rouge, civil engineering; Booker T. McKinnon, Oak Ridge, Tenn., zoology; Leslie Mirabeau, Baton Rouge, engineering; Donnie Lee Williams, Baton Rouge, mechanical engineering.

Tennessee State University (Nashville) — Carol M. Crockett, Nashville, mathematics; William D. Howard, Maryville, mechanical engineering; Harold L. Owens, Nashville, mechanical engineering; Charles Rice, Jr., Nashville, mechanical engineering; Larry E. Steele, Nashville, electrical engineering; Cass F. Teague, Nashville, electrical engineering.

Tuskegee Institute (Tuskegee, Ala.)—Charlie W. Betts, Jr., Corinth, Miss., engineering; Patrick Miller, Corinth, Miss., engineering; Olivia S. Robinson, Alcoa, Tenn., mathematics; Jesse J. Smith, Prattville, electrical engineering; Steven Williams, Montgomery, electrical engineering.

Another aspect of the pilot project is extension of a program to include stipends to science and engineering honor students for 12 internships at Nuclear Division facilities. The internships are designed to give the outstanding students who are not in a cooperative program an opportunity to work in an industrial atmosphere prior to graduation at the bachelor level. The honor students will be given work assignments related to their areas of study.

After the results of the pilot study are evaluated, it is envisaged that the program will be extended to other schools and industries.

Koons Chosen For New Post

Melvin E. Koons

The appointment of Melvin E. Koons as an executive assistant has been announced by Roger F. Hibbs, President of the Nuclear Division. Koons will work closely with Kenneth W. Bahler, Assistant to the President, reviewing major management problems and on other administrative activities.

Koons joins the Nuclear Division after seven years with Oak Ridge Associated Universities where he was Head of the Office of Legal and General Services.

A native of Minneapolis, Minn., he holds degrees in law and journalism from the University of North Dakota. In addition, he has taken

(Continued on Page 6)

Complex Metalwork in Y-12 Gives Myriad Assignments to Engineers

Editor's Note: The following article depicts highly important work being performed by metallurgical engineers in Y-12. It resulted during Engineers' Week, recently celebrated throughout the area. A similar article is being readied which describes the metallurgical engineering work being done in Oak Ridge Gaseous Diffusion Plant. It will be run in a subsequent issue of the Nuclear Division News.

By J. L. CADDEN and R. L. WESLEY

Metalworking operations at the Oak Ridge Y-12 Plant are as comprehensive as any industrial plant in the world. While most plants work with a limited number of metals and metallurgical processes, the Y-12 Plant metallurgists work with practically every metal and alloy in existence and utilize a wide variety of metalworking processes to support the nation's nuclear, space and defense programs.

The role of the metallurgical engineer at Y-12 was outlined by W. H. Dodson, superintendent of the Metallurgical Development Department, Development Division.

"In general, our job is to prepare a chosen metal or alloy, or perhaps a powder metallurgical product, for fabrication—a task that may require several months to several years, depending on what is already known about the basic material. Sometimes our job involves the development of new alloys or discovering new facts about alloys already in existence. This involves some basic research, followed by numerous physical tests, and finally, establishing fabrication procedures on production-type equipment used in casting, rolling, heat treating, pressing or machining operations."

The initial development and selection of an alloy for a desired application often becomes the job of W. J. Hulsey, who heads the basic studies group in the Metallurgical Development Department.

Start from Scratch

"Quite often we have to start from scratch to find the proper alloy to do a specific job," Hulsey said. "We are given the specifications that a material must follow. From that information, we try to decide whether an existing alloy can do the job. If not, then a new alloy must be developed. This usually begins with a study of existing information on various metals and alloys. Theoretical predictions as to possible alloying behavior are made and subsequently checked out by making sample melts. The properties of these samples guide us to the results we're after.

"Our first tests are often made to analyze crystal structure or to determine basic physical properties. When we find alloys that look good in the initial tests, we progress to mechanical and physical tests to determine such characteristics as strength, toughness, corrosion resistance and long-term stability. Alloys which perform well then are recommended to the process metallurgists who will continue to develop the alloy further toward the ultimate goal of use in a production process."

'Basic Characteristics'

This is the job of R. A. Huber, who heads the alloy and powder metallurgy group. "Scaling-up a laboratory development to production equipment is not always a sure bet," Huber said. "One of Murphy's laws is that no matter how good something looks in the laboratory, nothing works when you scale it up and try to make hardware from it. Our job is not only to understand the basic metallurgical characteristics of a metal or alloy, but to use them to our advantage in casting, rolling, pressing or heat treating.

"Use of powder metallurgical methods also affords us a practical route to the solution of tough fabrication problems. Powder metallurgy utilizes the ability to pour metallic particles into almost any desired shape. High pressure then is applied either at room temperature or elevated temperatures to form a 'green' compact. The cold pressed compacts then are sintered at or below the melting point of the metal to achieve densification."

Welding Increase

An important criterion with any alloy is its ability to be welded or joined to other metals. The joining of unusual alloys by the most efficient method is the primary interest of P. W. Turner, who heads the Plant's Welding Development Laboratory.

"Our welding laboratory has grown twenty-fold since 1960," he said. "Welding technology is just now coming into its own because of the current unusual requirements for lightweight materials, tightness and continuity. Not too many years ago, rivets and bolts were used in holding materials together because design engineers were afraid to risk the use of welds, but it's altogether different today."

He explained that even the title of "Welding Laboratory" is something of a misnomer today because welding is just one of several methods of joining metals. Other methods include brazing, soldering, cold bonding and solid state joining.

Other Welding Forms

"By welding, we mean that the pieces to be joined are melted with or without a third metal acting as 'glue.' The layman probably is most familiar with arc welding, in which the electrical energy from an arc is used to melt the ends of the material being joined. There are electron beam welders which bombard the workpieces with fast-moving electrons to produce heat. This method permits a deep weld penetration and a tiny weld bead with little distortion and no atmospheric contamination.

"We used a laser beam welder to weld thermocouple components for the Apollo moonboxes. This type welder produces a thinly focused laser beam as the energy source. It can weld miniature components through any transparent material such as glass or plastic without harming the transparent material. Since the welding is performed by a beam of light, direct contact between welding tool and workpiece is not required.

Brazing, Soldering

"Another unusual welding method is the friction welder. In this method, one workpiece is mounted and held stationary while the other workpiece is rotated rapidly against it, causing the two to melt at the contact point.

"Soldering is different from welding in that the pieces to be joined are held together by a third material heated to a temperature below 800° F. Brazing is somewhat similar to soldering except that the third material which acts as the 'glue' is heated to over 800° F.

"Cold bonding is forcing two metals together without the use of heat. It sounds impossible, perhaps, but theoretically any two metals can be joined without being melted if they are perfectly clean and perfectly flat on the surfaces to be joined. Obtaining perfect cleanness and flatness, of course, is the problem.

"Solid state joining involves the application of pressure and heating below the melting point to promote bonding between two metals."

By the time a chosen metal reaches J. E. Thompson, most of the basic research and testing has been accomplished. Thompson heads the metal forming facilities. These facilities consist of a number of heat-treating furnaces and giant presses which are used to shape plates or ingots into their first rough forms.

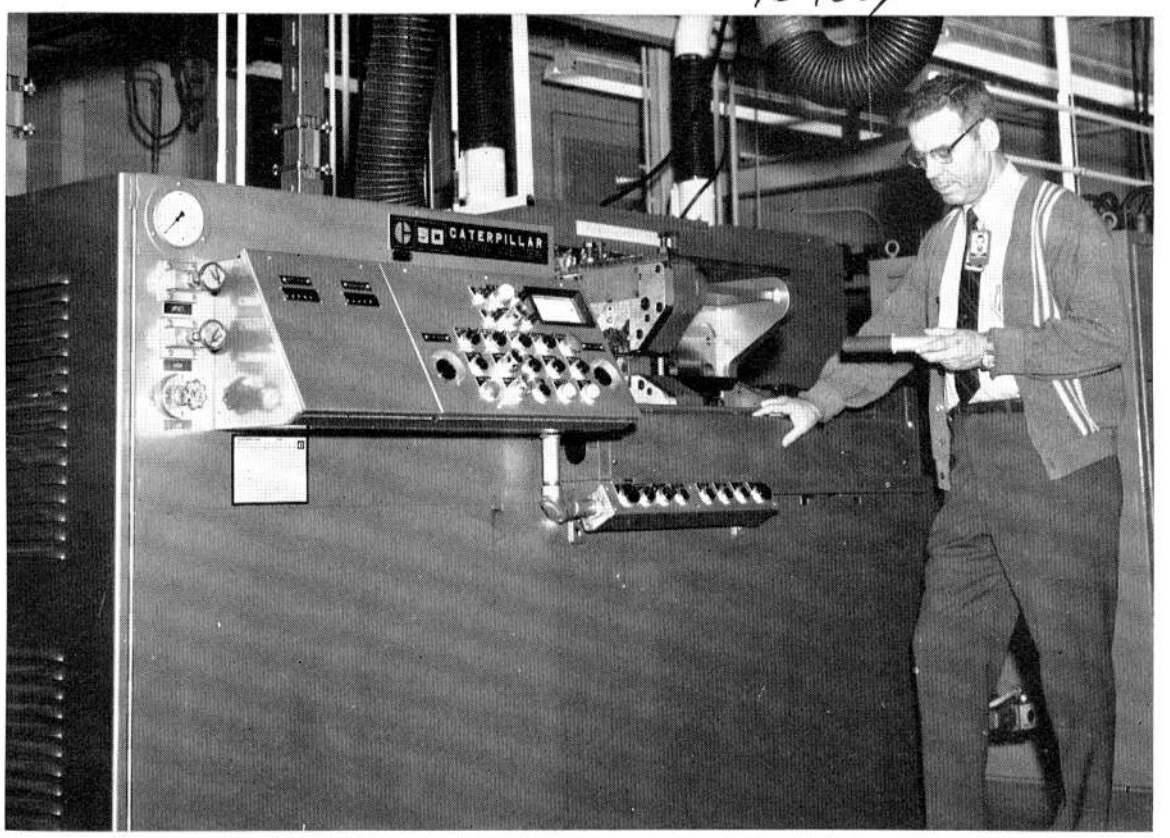
7500-Ton Press

"The workpieces handled by these big presses range in size from a pound to several thousand pounds," he said. "Some metals are heated before pressing, while others can be pressed at room temperature. We make a number of test pressings for development people and for various AEC laboratories to determine which forming operation will be most appropriate."

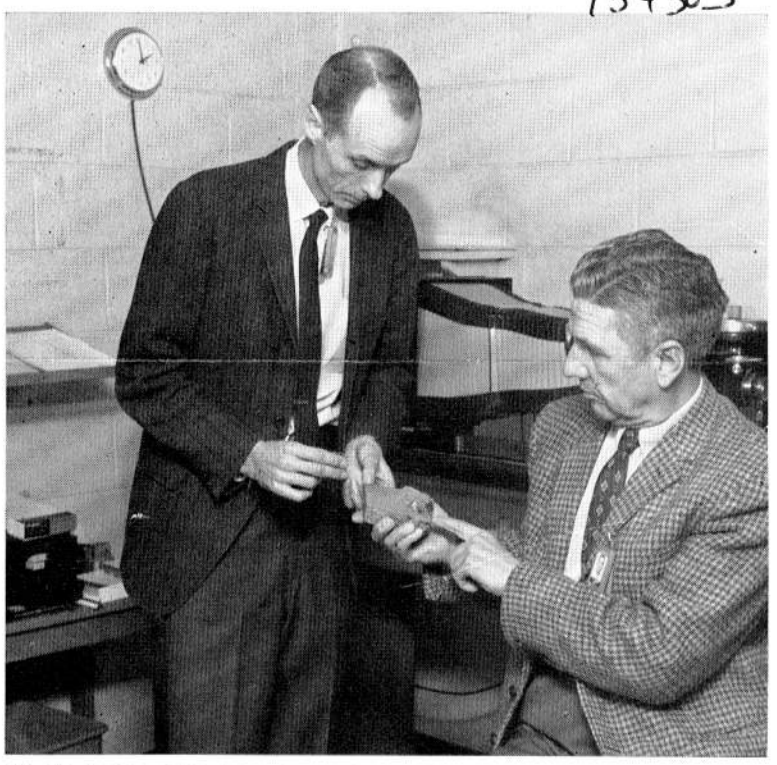
The largest Y-12 press is a 7500-ton, triple-acting, hydraulic press which stands about three stories tall. It can be adapted to press forging and rubber-pack forming as well as the conventional die pressing operations. Cylindrical aluminum ingots which eventually became Apollo moonboxes were forged into their first box-like shape on this press.

Other metal forming equipment in the Plant includes hydroform,

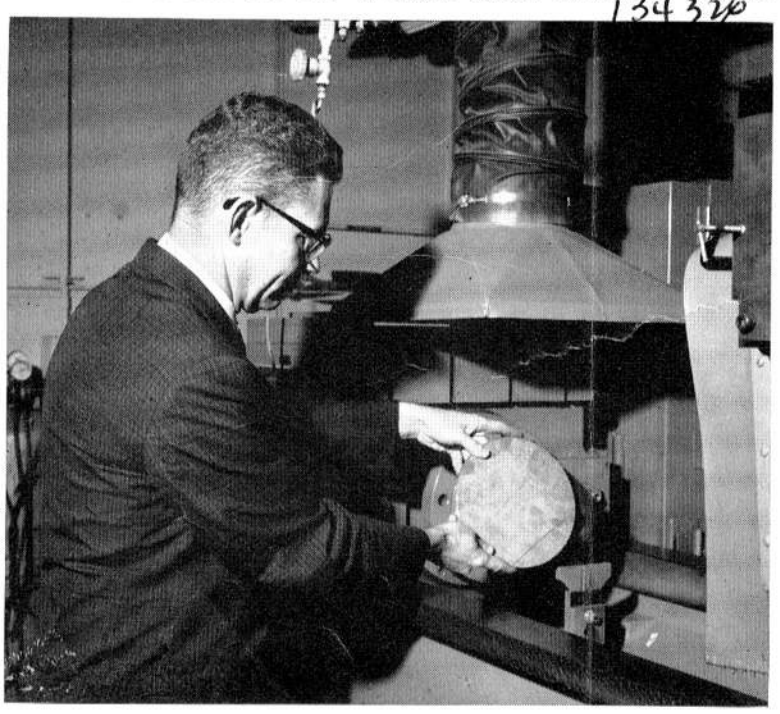
(Continued on Page 5)



P. W. TURNER, Welding Development, operates a friction welding unit. He recently authored an article for the Welding Journal on welding procedures Y-12 participated in on hardware for the Apollo lunar space shots.



W. H. DODSON, left, Superintendent of Y-12's Metallurgical Development, discusses a test sample with F. J. Lambert, a steel expert in Y-12.



R. A. HUBER is seen by a shear spinning machine. Many exotic metals are handled in Y-12.

NEWS

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NUCLEAR DIVISION

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UNION CARBIDE

—Y-12 BULLETIN

Thursday, March 26, 1970

Y-12 DESIGNED AND FABRICATED the medallion above which went to three Atomic Pioneers. In the top photograph AEC Chairman Glenn Seaborg looks on while President Nixon awards the medal to Vennevar Bush, James B. Conant and Leslie R. Groves. The 'one-time-only' medallion was designed in the Graphics Art Department.

Y-12 - Designed Medallions Presented To Pioneers Bush, Conant, Groves

Three men who played a major role in World War II development of nuclear weapons and subsequent government support of scientific research received a unique "Atomic Pioneers Award," at the White House recently.

They were Dr. Vannevar Bush, Dr. James B. Conant, and Lt. General Leslie R. Groves.

The special award (it will not be bestowed on any other recipients in the future) was presented by President Nixon in ceremony Friday, February 27.

The citations read as follows:

Dr. Vannevar Bush

For his exceptional contributions to the national security as Director of the Office of Scientific Research and Development in marshalling the resources of American science for national defense during World War II and for his pioneering leadership as a Presidential advisor in fostering the establishment of new Federal agencies, including the Atomic Energy Commission and the National Science Foundation, which have made possible the unprecedented growth of scientific research and development in the last two decades.

Dr. James Conant

For his exceptional contributions to the national security as Chairman of the National Defense Research Committee in overseeing the successful development of weapons systems, including the atomic bomb, during World War II and for his pioneering leadership in the nation's atomic energy program after the war as Chairman of the Committee on Atomic Energy of the Joint Research and Development Board and as a member of the General Advisory Committee to the Atomic Energy Commission.

Lt. General Leslie R. Groves

For his exceptional contributions to the national security as Commanding General of the Manhattan Engineer District, United States Army, in developing the world's first nuclear weapons during World War II, and for his pioneering efforts in establishing administrative patterns adopted by the Atomic Energy Commission in effecting the use of atomic energy for military and peaceful purposes.

Dr. Bush, as Director of the Office of Scientific Research and Development, had general responsibility for organizing the abilities and resources of the nation's scientists during World War II to

(Continued on Page 4)

Technical Journal Yield for Y-12ers Is High Thus Far

The first three months of 1970 have proven a publication bonanza for Y-12's technological spinoff efforts.

The January issue of the Welding Journal published a seven page article describing a welding project performed at Y-12.

The January/February issue of Cutting Tool Engineering published a Y-12 machine tool development on the magazine cover. The same story also was published in at least five other national magazines.

The March issue of Automation published a full page editorial authored by a Y-12 engineer.

The Welding Journal article was authored by P. W. Turner, who heads the Plant's welding development laboratory, Development Division, and A. J. Moorhead, a former Y-12 engineer now with ORNL.

The article, entitled "Welding a Thermocouple Gauge to Apollo Lunar Sample Return Containers," carried some 18 photographs and drawings. It described the development of welding procedures for joining thermocouple vacuum gage to a moonbox. The two-step procedure involved the use of both a laser welder and an electron-beam welder.

The Cutting Tool Engineering issue used a photograph of Y-12's N. B. Bloomer, Fabrication Division, on the cover in addition to a larger photograph inside. The magazine article described the air bearing steady rest developed by P. J. Steger, Fabrication Systems Department, Development Division.

In addition to publication in this magazine, the news about the Y-12 air bearing steady rest has been publicized in Product Engineering, Manufacturing Engineering and Management, Iron Age, Design News and American Machinist. A longer article in Modern Machine Shop is pending.

The editorial in Automation was authored by D. L. Foulk, Superintendent of Numerical Control Engineering, Engineering Division.

In his editorial, Foulk pointed out that viewed in a historical perspective, technology is but the means to obtain political, social and economic ends for man's progress.

New Division Heads Named As Smith, Kahl Take Posts

Harwell F. Smith, Jr.

Keith G. Kahl

Key organizational changes to become effective immediately have been announced by Y-12 Plant Superintendent J. M. Case.

Harwell F. Smith, Jr., Superintendent of Y-12's Fabrication Division, has been named Superintendent of the Product Engineering and Scheduling Division. He replaces Clyde C. Hopkins, who recently was appointed Manager of Accounting and Finance for Union Carbide Corporation's Nuclear Division.

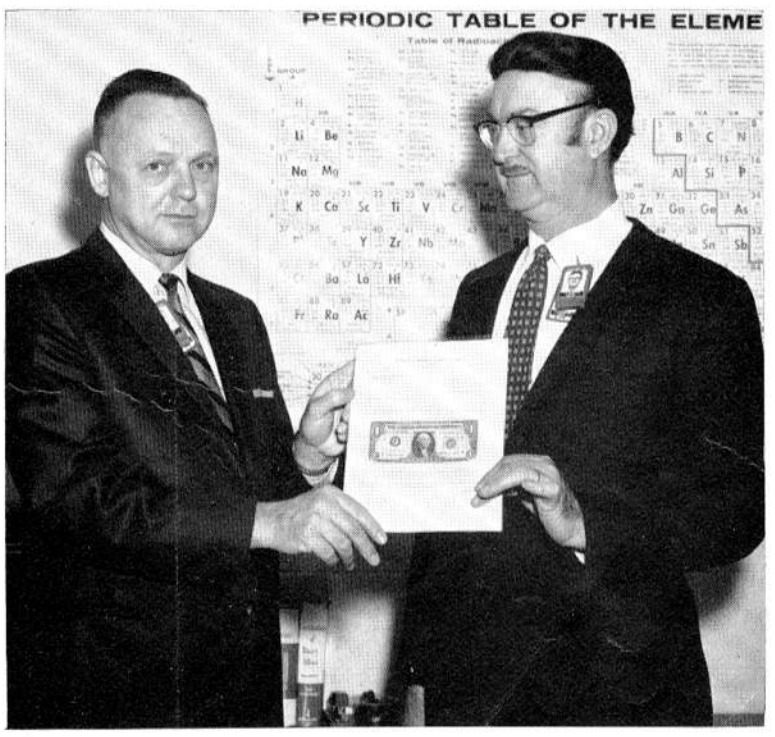
Keith G. Kahl, Supervisor of the Fabrications Systems Development Department, Development Division, becomes the new Fabrication Division Superintendent.

Smith, who joined Union Carbide here n 1958, has been Superintendent of the Fabrication Division since January, 1968. A native of Montgomery, Ala., he holds a B.S. degree from the U. S. Military Academy at West Point and an M.S. degree in electrical engineering from the University of Illinois.

He lives at 936 West Outer Drive, Oak Ridge. Mrs. Smith is the former Louise Hocking. They have three children — Harwell, Evelyn, and Wayne.

Kahl, a native of Carrington, N. D., joined Union Carbide in 1959. He too is a West Point graduate and holds an M.S. degree in industrial engineering from The University of Tennessee. He has headed the Fabrication Systems Department in the Development Division since September, 1968.

Mrs. Kahl is the former Martha Roberts. The couple lives at 109 Newton Lane, Oak Ridge. Their three children are Keith, Kathy, and Mary.



A PATENT APPLICATION in the name of the U. S. Government has been filed on C. R. Schmitt's 'Method for Producing Fibrous Carbon Structures.' He is notified above by J. M. Schreyer, right, Superintendent of Chemistry Development.

'Clean' Talk Set At Brevard College

Dr. James M. Schreyer, head of the Chemistry Development Department, will speak at Brevard (N.C.) College, April 10.

Dr. Schreyer, who played an important role in preparing equipment for the Apollo moon landing missions, is an alumnus of Brevard and the University of North Carolina.

In his talk, "Cleaner than Clean," Dr. Schreyer will describe an ultra-clean room facility used in Y-12 to sterilize equipment used in the Apollo missions. He also will propose the application of such clean room systems for use in homes, offices, institutions and industries as one answer to the problem of environmental pollution.

SAFETY SCOREBOARD

The Y-12 Plant Has Operated

82 Days Or

2,870,000 Man Hours

(Unofficial Estimate)

Through March 22

Without A Disabling Injury

SAFETY AT HOME, AT WORK, AT PLAY

Congratulations to the early Spring celebrants of anniversaries with Union Carbide Corporation.

25 YEARS

Lloyd T. Murphy, Jr. Dimensional Inspection, March 20.

Kenneth E. Caughron, Utilities Administration, March 21.

Buford E. Reneau, Alpha Five East Shop, March 26.

George M. Kirtland, Chemical Services, March 29.

Minnie T. George, Building Services, April 4.

Lonnie C. Nelson, Process Maintenance, April 6.

James T. Roland, Process Maintenance, April 6.

20 YEARS

William C. Slagle, General Machine Shop, March 19.

Earl E. Goode Jr., Material Control, March 20.

William J. B. Hayes, Machine Maintenance, March 22.

Ben W. Coward, Beta Two Forming, April 1.

Athala M. Dow, Superintendents Division, April 4.

15 YEARS

William M. Chandler, Alpha Five Processing, March 23.

George H. Russell, Utilities Administration, March 27.

William A. Gardner, General Shop Job Liaison, March 29.

Benjamin F. Thomas, Beta Four Forming, March 30.

William E. Underwood, Alpha Five Processing, March 30.

Luther C. Maples, Utilities Administration, March 30.

John F. Terrell, Facilities Engineering, April 1.

Silas R. Brown, Tool Grinding, April 1.

Benic P. Hampton, Mechanical Inspection, April 4.

Mary C. Wright, Technical Administration, April 6.

10 YEARS

Robert E. Bohanan, Alpha Five West Shop, March 28.

Jimmy D. Ball, Engineering Mechanics, March 28.

Jane B. Batch, Law Department, March 28.

James H. Potter, Utilities Administration, April 4.

Woodpeckers Still Atop Carbide Starlite League

The Woodpeckers climbed into first place in the Carbide Starlite League, defeating the Thunderbirds for the full count, and the Dynapaths for two points.

Steve Ditto, Thunderbirds, rolled like a madman recently, posting scores of 218 scratch, 251 handicap in singles . . . 581 and 680 in series. Charlie Gaylor, subbing for the Hi Jackers, rolled a 223, 251 game on March 10.

League standings follow:

Team	W	L
Woodpeckers	45	18
Hi Jackers	43½	19½
Splitters	36	27
Has Beens	36	27
Dynaptahs	30	33
Thunderbirds	29½	33½
Wild Cats	24	39
Jaguars	7	55

Y-12 Schedules Siren Test Sunday, April 5

A regular siren test will be set in Y-12 for 9 a.m. Sunday, April 5. The test will be the attack warning (wail of the siren up and down for three minutes).

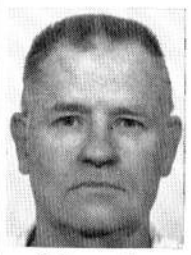
Signals on Buildings 9201-3, 99996, 9204-4 and 9213 will be tested. These tests will encompass the attack warning only.

A voice announcement will preceed the tests on the plant intercom system. Employees need not leave their work stations Sunday for the tests.

Schumaker Rites Held in Knoxville

The General Machine Shop sadly marked another death Saturday, March 7, when Kenneth A. Schumaker died in Knoxville.

A native of Knoxville, Mr. Schumaker came here November 27, 1950, after working with the Knox Stove Works and the Aluminum Company of America. He was a Mason and a member of the Second Methodist Church.



Schumaker

Survivors include his wife Mrs. Genevieve Wade Schumaker, 1419 Kenyon Avenue, Knoxville; daughters, Mrs. Selena Juhasz, Cincinnati, Ohio; Mrs. Suetta Webb and Mrs. Sereca White, both of Knoxville; two granddaughters, a brother, Jess E. Schumaker, also of Knoxville.

Funeral services were held Tuesday, March 10, at 3:30 p.m. at Mynatt's Funeral Chapel, with the Reverend George Creswell officiating. Burial followed in Lynnhurst Cemetery.

Sympathy is extended to the Schumaker family.

Riders wanted or will join car pool from Childress Trailer Court, on 61 cut-off to Oliver Springs, to East Portal, straight day. J. R. Williams, plant phone 3-5445.

Rider wanted from Cherokee Hills section, Kingston, to Bear Creek, Pine Ridge, North or Central Portals, straight day. John Emch, plant phone 3-5775, home phone Kingston 376-9482.

Ride wanted from Karns Community to East Portal, straight day. Elmer Zachary, plant phone 3-5095, home phone Knoxville 947-7576.

Ride wanted from 106 Arizona Road, Oak Ridge, to East or North Portal, straight day. Glenn Bryson, plant phone 3-5710, home phone Oak Ridge 483-6678.

Ride wanted from Derry Street, North Knoxville, to North Portal, straight day. H. W. Anderson Jr., plant phone 3-5583, home phone Knoxville 523-2005.

Ride wanted from Lake City to Bear Creek Portal, G Shift. R. V. Guy, plant phone 3-5807, home phone Lake City 426-3807.

Ride wanted from Kingston Exit of I-40 to West Portal, straight day. Fred H. Faw, Jr., plant phone 3-5174, home phone Kingston 376-6668.

Sunflowers Lead Alley Race in C League Play

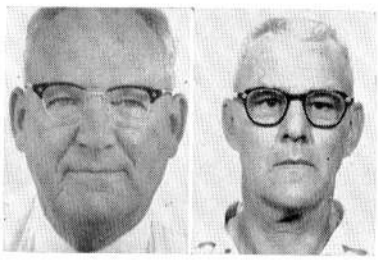
The Sunflowers bloom atop the C Bowling League, after defeating the HiLifers for the big count, and the Royal Flush for three last week.

Recently, Jim McLain, Fireballs, posted a 226 scratch game, a 249 handicap single. Pete Gregory, Rounders, rolled a 232, 256 game. (They may move over to K-ville and roll with the pros!)

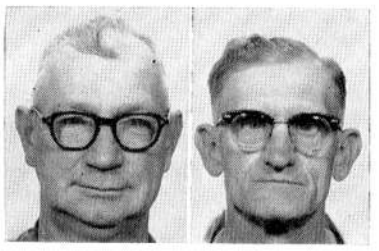
League standings follow:

Team	W	L
Sunflowers	36½	15½
Rollmasters	34	18
Big Five	32½	19½
Instrument Engineers	29	23
HiLifers	28	24
Rounders	26½	25½
Fireballs	25	27
Badgers	24½	27½
Anodes	24	28
Royal Flush	21	31
ParBusters	18	34
Go Go Gophers	13	39

Five Y-12 Veterans Retire This Month



Benninghoff Wilkerson



Green Nelson

Webber

Five Y-12ers with long service records retire from the plant Tuesday, March 31. All except one, C. R. Webber, is an early retirement.

Leaving are H. N. Benninghoff, Shift Superintendent; Elmer E. Green, Buildings, Grounds and Maintenance Shops; George F. Nelson, Stores Department; Cecil R. Webber and Raymond Wilkerson, both in Buildings, Grounds and Maintenance Shops.

Has Beens Hold Slight Lead On Classic Alley

The Has Beens stay atop the heap in the Classic Bowling League, after sharing two points with the Markers, then last week defeating the Splinters for the full count. The Bumpers, one and one-half points out, recently grabbed three points from the Rippers and the Rebels.

Del Ducay, Pinbusters, rollicked recently, rolling singles of 259, 275, series of 642 and 680! J. W. Halsey, Bumpers, belted out a 247 scratch game last week. The Has Beens' Rudy Pletz put a 639 scratch, 708 handicap series on the boards!

League standings follow:

Team	W	L
Has Beens	34½	9½
Bumpers	32	12
Swingsters	27	17
Splinters	26	18
Rebels	26	18
Rippers	26	18
Eightballs	24	20
Screwballs	21½	22½
Tigers	21	23
Playboys	21	23
All Stars	20	24
Markers	19	25
Cubs	16½	27½
Pinbusters	14	30
Eagles	12	32
Smelters	11½	32½

Y-12 Duffers Set Five Tournaments on Greens

Golfers will tee off Saturday, April 25 at Gatlinburg Country Club, high in the Smokies. The rallying cry was heard throughout the land last week as the Recreation Department put out a summer schedule, tentative, of course.

Other tournaments tentatively set are as follows:

May 23—Wallace Hills, Maryville.
June 27—Southwest Point, Kingston.
July 25—Whittle Springs, Knoxville.
August 22—Melton Hill, Clinton.

Beavers Belt Pack As Volleyball Has Its Final Serves

Y-12's busy Beavers captured the Volleyball crown again this year! They defeated ORNL's Pack in the best of three games in the play-off last week. The Y-12 aggregate won the first game 15-2, while the Pack bounced back to win number two 16-14. The Beavers belted the Pack again in number three 15-4.

In final scheduled games the Beavers downed the Y-12 Old Men for four . . . while the Pack ousted the Boomerangs for four also. K-25's Hawks took four from the Eagles, and the ORNL-Set-Ups sank the Blacksmiths for the full count.

K-25's Gashouse Gang clipped the Bombers for four, and the Ecobums edged by the Beta 4 Commodores for the full score.

Final League standings:

Team	W	L
Beavers, Y-12	44	3
The Pack, ORNL	43	4
K-25 Hawks	36	12
Set-Ups, ORNL	34	10
Old Men, ORNL	26	18
K-25 Gashouse Gang	27	21
Eagles, Y-12	20	28
Y-12 Old Men	18	30
Ecobums, ORNL	17	31
Bombers, ORNL	13	35
Blacksmiths, ORNL	12	36
Boomerangs, ORNL	7	39
Beta 4 Commodores, Y-12	5	43

'Pioneer' Medal

(Continued from Page 3)

work on nuclear energy and other defense developments.

Dr. Conant, working with Dr. Bush, had special responsibilities for initial scientific research which demonstrated the possibility of developing nuclear energy for military uses. He and Dr. Bush also served as members of the policy committee for the Manhattan Project.

General Groves, a Corps of Engineers officer who demanded and received the highest wartime materials priority for the Manhattan Project, provided much of the drive and sense of urgency that made the project successful.

The three men served in positions closely associated with the Atomic Energy Commission's activities for several years after World War II and had a profound effect on the Commission after it took over the Manhattan Project in 1947.

Doctors Bush and Conant took the lead in establishing a new structure for Government support of scientific research and development and helped draft legislation creating the AEC, the National Science Foundation, and the Research and Development Board in the Department of Defense. Dr. Conant served from 1947 until 1952 on the AEC's General Advisory Committee.

In the months immediately following World War II, General Groves took steps to preserve the research and production facilities of the wartime project until the Commission took control in January, 1947. He then served for more than a year as a member of the Military Liaison Committee and Chief of the Armed Forces Special Weapons Project.

The 'one-time' only medallion presented the three pioneers was designed and fabricated in Y-12.

With idea sketches from the AEC, the Graphic Arts Department of Technical Information Services designed the pencilled sketch of the medallion.

A local plastic sculptor adapted the sketch to a mold with which the Development Division (Fabrication Systems and Ceramics and Plastics) could work. The gold-plated alloy medallion was struck here and forwarded through the AEC offices to Washington.

Basketball Race Is Near Final Throes

The ORNL Computes still stand as undisputed leaders in the Basketball League with no losses. They took recent wins from the Rolling Bones, 58 to 31; and the Nads, 79 to 40.

Second-placed GBU's laced the Y-12 Hawks 70 to 21 . . . and the Buccaneers 81 to 36.

A quote came up from one of the games . . . as the Aggressors edged by the Meat Loafs 35 to 34. "We underwhelmed them," explained one of the Aggressors.

League standings follow:

Team	W	L
Computes, ORNL	16	0
GBU's, Y-12	15	1
Bombers, ORNL	14	2
CC 69ers, K-25	13	2
Beta 2 Miners, Y-12	13	3
Nads, ORNL	13	4
Butterballs, ORNL	11	5
Isotopes, ORNL	9	7
K-25 Trojans	9	7
Rolling Bones, ORNL	9	8
Spoilers, ORNL	7	9
Aggressors, ORNL	6	9
Buccaneers, Y-12	5	10
Rats, Y-12	5	10
Meat Loafs, ORNL	5	11
Quarks, Y-12	5	12
Road Runners, ORNL	4	12
Mod Squad, Y-12	4	13
Hawks, Y-12	3	12
All Stars, ORNL	1	15
Development All Stars, Y-12	1	16

Alley Cats Nail Down Mixed League Last Half

The Alley Cats nailed down the last half of the Mixed Bowling League last week, staying 11 and one-half points out front. (Only two more nights of play makes an eight-point spread the mathematical odds.) They will face the Goofers on April 8 in the league roll-off, as the Goofers won the league's first half.

The Alley Cats mixed the Roses 'N Thorns on March 11 and took two from the Rollers last week.

League standings follow:

Team	W	L
Alley Cats	38	10
Hits & Misses	26½	21½
Goofers	24½	23½
Twisters	24½	23½
Rollers	22	26
Spare Parts	22	26
Mustangs	18½	29½
Roses 'N Thorns	16	32

Recreation Sounds Its Annual Call for Softball

The Recreation Department has sent out a call for Softball teams for Summer play. Play will start about May 4, and will be held on Monday, Tuesday and Thursday nights. (Wednesday and Friday will be saved for rained out games.)

Please call in your team name, telephone number of manager and assistant manager . . . and their names, of course.

Deadline is announced as 4:30 p.m., Friday, April 10. So get those Slow Pitch teams entered now so the schedules can be set.

Badge Exchange Is Set For Y-12ers March 31

Spring badges go into the self-service racks at the portals Tuesday, March 31. They will remain there through the 11 p.m. shift Sunday, April 12.

The new quarterly badges will have yellow bottoms. Employees must exchange them for themselves before the expiration date.

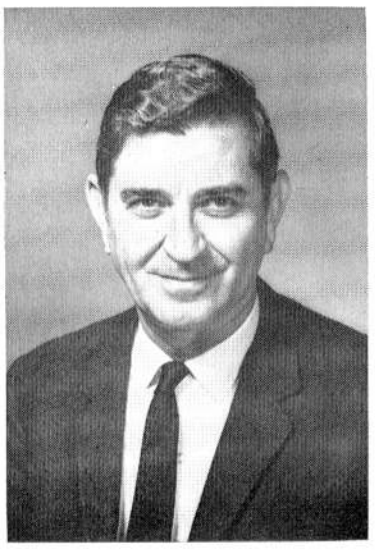
Graduate School Enrolls Thru Tuesday, March 31

The Oak Ridge Resident Graduate Program has announced its Spring schedule, beginning March 30 through June 10.

Registration is continuing through March 31. The Graduate Office is located in the Oak Ridge Associated Universities Training Building on Laboratory Road, Oak Ridge.

THE CARBIDE COURIER

Thursday, March 26, 1970



Leon Matthews

AEC Publicizes Cost Reduction Accomplishments

T. L. (Leon) Matthews of the Cascade Maintenance Department is the author of a cost reduction accomplishment here in K-25 that appeared in the most recent "Cost Reduction Abstracts" issued by the U. S. Atomic Energy Commission. The Abstracts are widely circulated throughout the entire AEC, their contractors, and other agencies of the government. They are selected from a multitude of offerings submitted by all AEC contractors each six months. Leon has been congratulated for his contribution to our K-25 cost reduction program and the potential cost savings to other contractors and government agencies.

Mathews' report reads:

PORTABLE HEATERS THAW FREEZE-OUT PROBLEMS

A source of portable heat was needed at the Oak Ridge Gaseous Diffusion Plant to prevent freeze-out of process piping in cell drop housings. This was originally accomplished by the costly generation of steam and the maintenance of steam and condensate lines over a large area. The use of kerosene heaters was ruled out because of refueling problems and attendant fire hazards. An experimental 15KW electric heater was built and successfully tested. An additional 17 heaters were fabricated and assembled using a simple sheetmetal cover and commercial components. Use and maintenance of the steam heating system was discontinued for an estimated savings of over $100,000.

Uranium Is Shipped For San Clemente

The Oak Ridge Gaseous Diffusion Plant has begun shipment of $7 million worth of enriched uranium that eventually will be fabricated into fuel elements for the San Onofre Nuclear Generating Station at San Clemente, Calif.

The order represents 44,424 pounds of uranium enriched to four percent in uranium 235. The material is being shipped in the form of uranium hexafluoride under the Atomic Energy Commission's lease program.

The order will be processed by the Nuclear Materials and Equipment Corporation at Apollo, Pa., and will be fabricated into fuel elements by the Westinghouse Electric Corporation at Pittsburgh, Pa.

San Onofre, owned by the Southern California Edison Company and San Diego Gas and Electric Company, is a pressurized water reactor that produces 430,000 kilowatts of electricity. The station has been in operation since 1967.

Lab Notes

Congratulations to Calvin Wright of the Chemical Analysis Department who has been awarded an AEC Technician Scholarship. Calvin will leave in September to continue his academic studies on a full-time basis at The University of Tennessee. (See story on page 1.)

* * *

Elsie McKeethan, Technical Information Department, and George McKeethan, Machine Shop, departed March 17 for England where they will attend the wedding of their son, William Thomas. Bon Voyage, Elsie and George! We are looking forward to a story on this trip when you return.

SAFETY SCOREBOARD

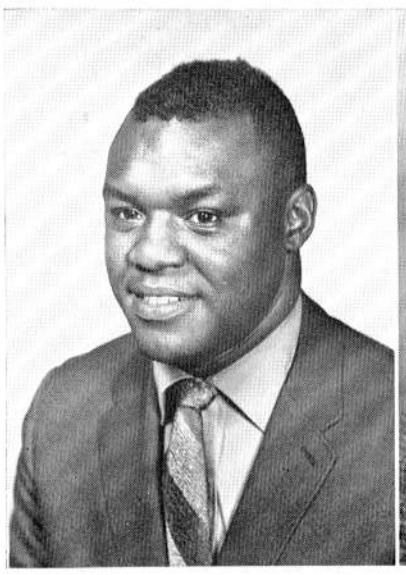
OUR PLANT
Has Operated
2,931,000 Safe Hours
Through March 19
Since last disabling injury on August 19

Engineering

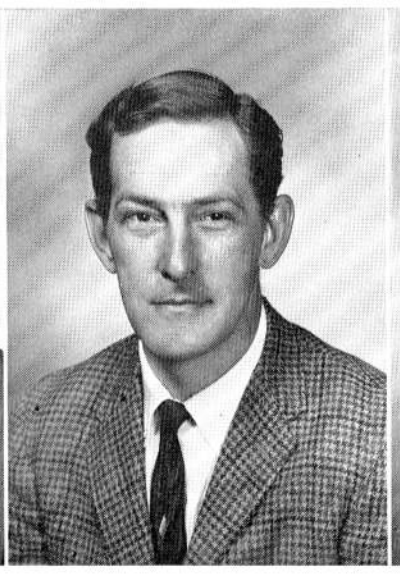
By F. DODGE

Mr. and Mrs. James Luther Glandon were married February 7 at the home of the bride's mother, Mrs. Claude W. Baker, and Mr. Baker in Madisonville, Tennessee. The Reverend Von Millsaps officiated. The bride is the former Miss Martha Gail Rhea, daughter of the late Mr. Glen Rhea. She attends Knoxville Business College. Mr. Charles Hensley of the Laboratory Division served as best man.

The groom is the son of Mr. and Mrs. Curtis L. Glandon of Maryville. He is a University of Tennessee graduate with a BS degree in Machine Engineering and is with the Machine Engineering Department. After a Florida honeymoon the couple is making their home in Oak Ridge.

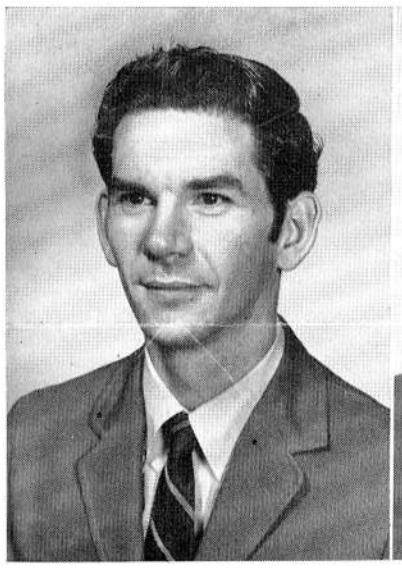


James G. Brown



Donald R. Lawrence

John H. Salts



Paul D. Thomas

John T. White

J. A. Womac

Fabrication and Maintenance Divisions Promote Six to Planners and Estimators

Six employees in the Fabrication and Maintenance Division have been promoted to planner and estimator positions. They are James Gilbert Brown, Donald R. Lawrence, John Henry Salts, Paul Douglas Thomas, John T. White and Junior Allen Womac.

James G. Brown

Brown was promoted from instrument mechanic to planner and estimator in the Instrument Fabrication Department. He has been employed here since January, 1964. Before joining Union Carbide, he served two years with the U. S. Army as a flight dispatcher and radio repairman.

A native Knoxvillian, he was graduated from Austin High School and attended Knoxville College. He is married to the former Mary Elizabeth McSwain and they live on Route 18, Yount Road, Knoxville. Brown's outside interests include fishing, art, photography, amateur radio and electronic experimenting.

Donald R. Lawrence

Lawrence was promoted from machinist in the jib and fixture shop to planner and estimator in the machine shop. He has been a staff member since November, 1963. In addition to his work as a machinist, Lawrence has taught algebra in the Machinist Helper Training Program. Before that he worked as a machinist, tool and die maker and machine parts inspector.

Lawrence is a native of Decatur, Ala. He was graduated from Hume Fogg Technical and Vocational High School in Nashville. Mrs. Lawrence is the former Era Dean Reed from Pleasant Shade, Tenn. The Lawrences live on Paint Rock Ferry Road, Route 2, Kingston. They have two sons, Randall Keith, 14, and Timothy Wade, 11.

Lawrence's outside interests include golf and fishing. He also coaches little league play in baseball, football and basketball in Kingston.

John H. Salts

Salts is now working in the Methods Engineering Department after having worked as a sheetmetal worker for five years. He was employed at the Y-12 Plant for five years before coming to K-25.

Salts, a native of Sullivan County, Tenn., attended school in Bluff City. He is married to the former Clara Mae Stonecipher, Elizabethton, Tenn., and they have a daughter, Sharon Marie, attending Sunbright Elementary School.

The Salts live on Route 2, Lancing.

Thomas is now working in the

(Continued on Page 4)

Carpool members wanted from U-T area to administration area, 7:45 to 4:15. R. K. Sood, 3-9682, home 523-2047.

Women's Bowling

Eileen Walbrecht and **Jo Ann Johnson** shared Bowler - of - the - Week honors in the March 11 session of the K-25 Women's League. Jo Ann had both single game high scores, 187-246. Eileen had the best series handicap score with a 633. **Mary Foley** rolled the best scratch series with 503 total pins.

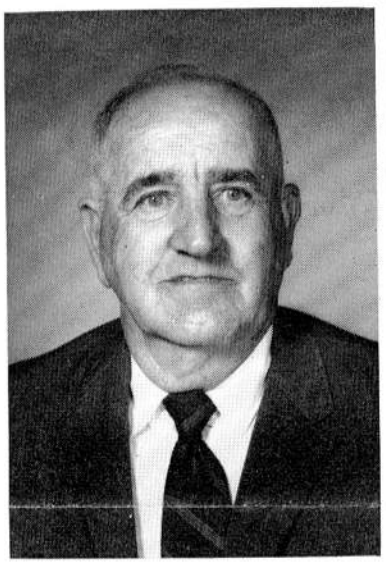
Oleta Carden was the Bowler-of-the-Week in the March 3 kegling. She had an even 200 scratch game and a 528-627 series. **Betty Kemper** had the best handicap game with a score of 237.

The second half is really turning out to be a tight race, the Pay-Offs lead with 25 points while the Pin-Ups, Uptowners and the Wood Bees each have 24 points. Anything can happen in this league.

Standings

Pay Offs	25	Spotters	19
Pin-Ups	24	Bowlettes	17
Uptowners	24	Hot Shots	16
Wood Bees	24	Purchurettes	11

These Employees Reach 25 Years Service This Month



Arthur J. Gilliam

A. J. Gilliam Elects Early Retirement

Arthur James Gilliam, Painter in the Buildings and Grounds Department, Fabrication and Maintenance Division observed his twenty-first anniversary as an employee of Union Carbide on March 23 and has elected to take early retirement effective April 1.

Gilliam is a native of Spring City, Tennessee and attended school there. He was employed by the Tennessee State Highway Department for 18 years before coming with Carbide.

Mrs. Gilliam is the former Della Mae Garner from Lenoir City. The Gilliams have nine children, all married. They have 23 grandchildren and one great-grandchild.

Mr. Gilliam said, "I think Carbide is the best company for which I have ever worked. They have good benefit plans and good supervision. After my retirement, I plan to work in my flower and vegetable gardens and enjoy my many grandchildren." The Gilliams live on Star Route, Spring City.

MORE PEOPLE ON THE WAY

By 1980, by conservative estimate, our nation's population will have swelled to 235,000,000. Since we are starting the 70's with a population of approximately 202,000,000, the projected 1980 figure represents an increase of more than 3,000,000 in each year of this decade.

THE CARBIDE COURIER
Published Biweekly
Editor ..... H. J. Mayberry
K-1002 Building, Tel. 3-3097

Announce Schedule For This Season's Golf Tournaments

The schedule for the 1970 K-25 Golf Tournaments has now been confirmed. There will be five tournaments again this year starting May 2, the last one to be held on August 29.

These are handicap tournaments. Each golfer's handicap will be figured using the best nine-hole scores from the corresponding number of tournaments, up to a maximum of the last five tournaments played starting in 1965. For example, if a golfer has played in two tournaments since 1965, he will use his two best nine-hole scores—for three tournaments, his three best nine-hole scores—for five tournaments, his five best nine-hole scores.

Handicaps will be calculated on the basis of 80% of the difference between par 36 and the golfer's average score on his best nine holes played. A new golfer or one who has not played in a K-25 Tournament since 1965 will play with a blind handicap, computed separately for each nine holes.

1970 TOURNAMENT SCHEDULE
GOLFERS CLIP AND SAVE

May 2—Southwest Point, Kingston
June 6—Gatlinburg
June 27—Wallace Hills, Maryville
July 29—Whittle Springs, Knoxville

Starting Times
For First Tourney

Tee-off times for the first tournament to be held at Southwest Point, Kingston, on May 2 may be obtained from the Recreation Office in the front of the Cafeteria starting at 7:45 a.m. on Monday, April 27. The Recreation telephone number is 3-3097. The greens fee at Southwest Point is $3.00.

15 Years' Service

J. S. Francis 3-09-55

10 Years' Service

L. H. Edds, Jr. 3-07-60
F. J. Andre 3-14-60

Hendrix, Kermicle Receive Patent Application Awards

H. A. Kermicle and D. E. Hendrix of the Gaseous Diffusion Development Division have just received patent application awards for their work in developing an "Eddy Current System for Vibration Testing of Cantilevered Nonferrous Articles." Work on this apparatus was prompted by the need for better methods of testing the fatigue properties of axial flow compressor blades. Accurate amplitude and frequency control are provided for determination of crack initiation and propagation rates, damping capacity, fatigue life, and the complete vibrational spectra of vibrating compressor blades. Three such systems are currently in operation at ORGDP.

This is the fourth patent application award Kermicle has received since working at K-25. Harold was born and reared near Olney, Illinois. He joined Fercleve Corporation (S-50) after being discharged from the Army in February, 1945, remaining there until the conclusion of that operation. He joined Carbide at K-25 in September, 1945. Harold is married to the former Mary Boyd, a North Carolina native, and former K-25 employee. They have two sons: Perry (18), a senior, and Denis (16), a sophomore, in Oak Ridge High School. The Kermicles have resided at 102 W. Maiden Lane, Oak Ridge, for the past 19 years.

Don Hendrix transferred in 1968 to ORGDP from the ORNL, which he joined in 1965. Prior to that he worked with the U. S. Bureau of Mines Metallurgy Research Station in Norris, Tennessee after earning an M.S. in Metallurgical Engineering at The University of Tennessee. Don and his wife, Shirley, have two offsprings, Purkey, five, and Holly, one year old. They live at 112 Woodridge Lane in Oak Ridge. Don dabbles in photography and is a confirmed do-it-yourselfer.

PATENT AWARD RECIPIENTS—D. E. Hendrix, center, and H. A. Kermicle, right, receive their patent application transmittal awards from H. E. Trammell, Superintendent of the Gaseous Diffusion Development Division.

Double X Rolls Way Into Tuesday Lead

By MAL STRICKLAND

Charles Hale, with a good 591 scratch series (654 handicap) and Charles Hensley, with a good handicap series of 656 (557 scratch) were the two leaders in these categories the week of March 10.

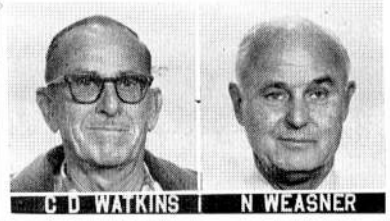
Guinn Marrow, with a 214 scratch game and Charles Baker, with a 240 handicap game, were leaders in these categories.

Close behind in scratch series were Bart Simcox (with a 573 series) and Millard Gibson with a 560 series.

Bart Simcox, with a 617 scratch series (674 handicap) took the honors in both the above categories on March 3.

Claude Jones, with a good 577 scratch series, and Ed Felte, with a 568 scratch series were close behind. Felte also had high scratch game of 232. High handicap game of the night was a 247, James Parsons and Felte had the honors in this category.

Double X	22	Full House	15
Atoms	20	AECOP	13
Possibles	20	All Stars	12
Late Comers	15	City Slickers	11



Promotions

(Continued from Page 3)

fabrication shops after having been a welder here for more than four years. Before coming with K-25, he served four years in the U. S. Air Force.

Thomas is a native of Oliver Springs. He studied mechanical drafting in Draughon's Business College in Nashville. Mrs. Thomas is the former Dickie Ruth Anderson of Rockwood. They have three children: Anthony Paul, 8; Virginia Ruth, 6; and William Mark, 2. The Thomases live on Oak Circle, Route 3, Oliver Springs.

John T. White

White is now a planner and estimator in the Instrument Department, having been promoted from an instrument mechanic. He has been with the plant for 16 years after having served two years in the U. S. Navy.

A native of Cave Creek Community in Roane County, he attended Carson-Newman College and took a number of courses in electronics while in the Navy. Mrs. White is the former Bessie E. McDaniel of Lenoir City. They have two children at their home at 1201 East Broadway in Lenoir City, Tammy Kay and Mark Thomas. White's off-the-job interests include the buying, selling and developing of lake property.

J. A. Womac

Womac was promoted from a maintenance mechanic to planner and estimator in the Methods Engineering Department. He was originally hired in January, 1945, and he has worked at Y-12 as a machinist and at K-25 as a process operator and a barrier operator. Before coming with Union Carbide, Womac worked for the Tennessee Valley Sand and Gravel Company at Sheffield, Ala.

Womac was born in McMinn County, Tenn. He is married to the former Virginia Wolfenbarger from Lutrell, Tenn. The Womacs have three children: a daughter, Linda, is married and resides in Nashville; Charles is employed in the Planning Department, City of Oak Ridge; and Michael attends Highland View School. The Womacs live at 100 South Hollywood Circle in Oak Ridge. Womac's outside interests include bowling and fishing.

Fertility Control

By T. A. LINCOLN, M.D.

The recent birth of quintuplets to a woman who had taken fertility shots and the controversy over the safety of the "pill" have stimulated considerable interest in fertility control. Many young couples now either need to prevent or facilitate pregnancy. The latter is now the major challenge.

Fertility seems to be a story of feast or famine. Two-thirds of all pregnancies begin with three months of exposure. Eighty percent conceive within six months and 90 percent become pregnant by the end of one year. As many couples can testify, one lapse in contraception may be all that is necessary. Nevertheless, about 15 percent of married couples are unable to conceive. Although there is no shortage of babies needing adoption, the barren couple still yearns to have a child of their own.

Dr. Lincoln

In about one-third of infertile marriages the problem is primarily due to the female, in about one-third it is due to the male, and in the remainder it is due to decreased fertility in both partners.

Male Fertility

Male fertility is usually based on the ability to produce normal sperm in adequate quantities. The sperm count necessary to assure pregnancy has been probably overestimated. Sperm counts as low as 20 million per milliliter, compared to the normal range of from 80 to 200 million, may be adequate if the wife is fertile. No breakthroughs have occurred in treating male infertility. The possibility of using pituitary hormones has just begun to be explored and may prove to be helpful.

In women, infertility may be due to anatomical, physiological or possibly immunological causes. The most common anatomical problem is a blockage in the tubes. Gross damage either to the uterus or tubes due to the effects of old infection or as a result of endometriosis is not easily amenable to treatment. In endometriosis, cells of the lining of the uterus are misplaced in the tubes, in the wall of the uterus, or in the abdominal cavity, and are subject to bleeding at the time of a menstrual period, thus causing scarring.

Little is known about immunological factors other than occasionally a woman seems to develop some immunity to her husband's sperm.

The cervical mucus must allow the sperm to pass into the uterus and changes in its consistency and biochemical characteristics may prevent conception.

Hormone Problems

In the last analysis, about one-half of the cases of female infertility are due to hormone problems. Normally, a woman who never takes a contraceptive pill will produce 400 to 500 potentially infertile eggs during her 30 to 35 years of reproductive capacity. If, for some reason, a woman fails to release eggs (in other words does not ovulate), she can never get pregnant. The contraceptive pills prevent ovulation.

The only sure test that a woman has ovulated is when she gets pregnant. Only indirect tests are possible. One which has been used is the basal temperature method. A woman takes her rectal temperature first thing in the morning before she gets out of bed. Normally the body temperature rises from .5 to 1.0 degree F. after ovulation. Several other methods of detection involving complicated hormone analyses or cytological studies are used but are frequently not available except in large medical centers. If studies suggest that a woman is not ovulating, it is now often possible to cause ovulation artificially.

Clomiphene citrate, Clomid, a synthetic estrogen derivative, was first reported to cause ovulation in four patients in 1960. The exact mechanism of this drug's action is not known but its biological effect seems to be related to its anti-estrogenic properties. Clomid successfully prevents estrogens from acting on the pituitary. Thus the feedback control mechanism is favorably affected. The pituitary responds and produces hormones which stimulate the ovary.

Another way to stimulate the ovary is to use extracts of human pituitary hormone. These can be separated from the urine of women who have passed the menopause or from human post mortem pituitary glands.

Associated Hazards

In the past eight years, several thousand pregnancies have resulted from use of these agents. As one should expect, there are hazards associated with this form of treatment. About 25 percent of the pregnancies will end in spontaneous abortion. About one-third which go to term deliver multiple births. The twin birth rate in one recent study was 29 percent as compared with the normal twinning rate of 1.6 percent. There were significantly more girls than boys born, but the babies were healthy and developed normally.

In a few cases, the ovaries may be overstimulated with an increase in blood volume, coagulability and viscosity. Problems of blood clots may be a consequence of overstimulation so women on this treatment must be followed closely.

The success rate in women who are infertile because of a failure to produce or release eggs is 60 to 70 percent—a truly remarkable achievement.

It is now possible for fertile women to turn "off" their pregnancy potential by taking the "pill" and many infertile women to turn "on" pregnancy by taking an entirely different pill or injection.

The use of sex hormones has hardly begun. With understanding of basic physiology and chemical manipulation of hormone compounds, fertility and infertility will be progressively easier to safely induce or prevent. When that is safe, one can expect an increasing search for various compounds to maintain love interest in middle age.

Carbide Overseas Business Improves

Union Carbide Corporation's international operations accounted for $768 million of the corporation's $2.9 billion in sales for 1969, according to the annual report. International sales represented 26 percent of the total and were 18 percent more than a year ago. Not included in the overall figure were 50-percent-owned companies with sales to customers of $181.3 million in 1969.

Stockholders were told that in addition to substantially improved overseas business, the general strength of the economy was an important factor in Union Carbide's overall sales gain of 9 percent. Completion of new production facilities, as well as a higher level of plant operations, enabled the corporation to meet the increased demand for its products.

Product Lines Grow

All of Union Carbide's principal lines of business experienced significant sales growth in 1969. In a breakdown of sales for six major product classes, chemicals were shown to have contributed $818 million, 28 percent of total sales. This was 7 percent more than the previous year. Next largest contributors were consumer and related products with sales of $622 million, accounting for 21 percent and 12 percent more than in 1968; and metals and carbons with $618 million, also contributing 21 percent and up 12 percent.

Sales of gases and related products increased 4 percent to $371 million, or 13 percent of total sales. Plastics sales rose 8 percent to $359 million, accounting for 12 percent; and materials systems sales rose 15 percent to $145 million, contributing 5 percent of total sales.

Among the products showing exceptional growth in the corporation's chemicals and plastics businesses were vinyl acrylic latexes used in house paints; ingredients for making urethane foams for automotive safety padding and bumpers; and silicone chemicals for bonding glass fibers and plastics. Another major sales contributor was ethylene glycol used in making polyester fiber, anti-freeze, and a host of other products.

Large Outlay for New Plants

A special detonation gun process developed by the corporation is being used to apply protective coatings to critical components in practically all the engines for the large commercial aircraft, including the new Boeing 747's. Also, more than 90 percent of U. S. oil refineries are now using Union Carbide's Molecular Sieves, unique materials that serve as both absorbents and catalysts, to increase the production of gasoline from oil.

Consumer and related products continue to be one of the most rapidly growing portions of the corporation's business. Included in this group are Eveready batteries, Prestone anti-freeze, the Glad line of household bags and wrapping materials, Dynel fibers, vinyl materials, as well as casings and films used in processing and packaging meat and other products.

While not as high as the previous year, 1969 construction expenditures were still substantial. Approximately $322 million was spent throughout the world, distributed as follows: $230 million in the United States and Puerto Rico; $18 million in Europe; $51 million in the Pan American area (which includes Canada); $18 million in the Far East; and $5 million in Africa and the Middle East. An additional $14 million, not included in the total, was spent by 50 percent-owned companies. In 1968, the overall figure for consolidated companies was $347 million and for the 50-50 affiliates was $21 million.

Metal Facilities Expanded

Among the chemicals facilities completed during 1969 were: a 1.2 billion-pound-per-year plant at Texas City, Texas, to produce ethylene and other olefins; a 350 million-pound-per-year ethylene oxide unit at Seadrift, Texas, and a 250 million-pound unit at Antwerp, Belgium; an acrylates plant at Taft, Louisiana; additional silicones capacity at Sistersville, West Virginia; and polyethylene expansions at plants in Texas, Japan, Austrialia, and Sweden. Two large projects under way are a chemicals and plastics complex at Ponce, Puerto Rico, to cost ultimately over $300 million, and a $60 million chemicals and plastics expansion at Cubatao, Brazil.

The first tonnage oxygen unit for the copper industry went on-stream in Utah. A large air-separation plant was shipped to Spain, and construction started on Union Carbide's ninth Canadian air-separation plant.

To meet increased demands for metals, facilities were expanded for making chromium alloys and metals at Marietta, Ohio, and for manganese alloys at Alloy, W. Va. A major new facility for making graphite electrodes was built in Puerto Rico, and an expansion of carbon and graphite capacity was begun in Canada.

$76 Million for Research

In 1969, Union Carbide spent about $76 million on research and development activities, about $7 million less than in 1968. The reduction was accomplished, the report pointed out, primarily through a consolidation of efforts and a finer focusing on programs appearing to have the greatest commercial potential. About 90 percent of the total expenditures was used for improvements and innovations, including new products, in the corporation's established businesses. The balance went toward development of opportunities in new fields.

Three developments cited as examples of cross-pollination of technology were a new line of dry powder aerosol products for personal health and hygiene resulting from technology gained in the production of propellants; a unique arc radiation source that is an offshoot of the corporation's electric arc welding business and shows promise of interesting applications in chemical processing; and a high-speed analyzer invented within the corporation's Nuclear Division that has been developed into a commercial system called the Centrifichem for biomedical and chemical applications.

New ORCBA Brochure Offered in Membership Drive for 70-71 Season

The Oak Ridge Civic Ballet Association has prepared a new brochure which outlines the organization's 1970-71 program and also briefly describes its goals and membership opportunities. Copies are available on request.

According to ORCBA's president, Jane (Mrs. Takashi) Makinodan, the organization is currently conducting its annual membership drive. Season ticket sales finance the group's efforts "to develop local dance talent and to bring quality professional performances to Oak Ridge," she said.

During the coming year, ORCBA will present two performances by the Company of area dancers, a special performance by a professional dance company, and a ballet film. The first season event is scheduled for April 17-18, when the Company will present its annual Spring performance.

The theme of this year's membership drive is "Please Keep Us on Our Toes."

Persons interested in learning more about ORCBA should contact Mrs. Makinodan (483-8394) or Mrs. J. T. Gillespie, membership chairman (483-5285). "We'd be happy to send a brochure to anyone who has not seen it," Mrs. Makinodan said.

Complex Metal

(Continued from Page 2)

water-die and isostatic presses, rolling mills and a variety of casting furnaces. When the shapes are formed, they will be turned over to fabrication personnel to be machined on one of several of the Plant's approximately 1,500 machine tools.

The metallurgists' job continues into the production stage as certain liaison or troubleshooting jobs must be performed. B. D. McElroy heads a staff group that works with both development and production personnel in solving metalworking problems.

"We must move from place to place—from the rolling mill to the presses to the machine shops — attempting to answer questions and to solve problems that may arise in adapting a new program to production. Our work really is not completed until a program is running smoothly through the production sequences without a hitch."

LIBRARY LISTINGS

As a continuing service, Nuclear Division News will publish representative lists of recent acquisitions by the libraries at the Oak Ridge facilities.

Oak Ridge Gaseous Diffusion Plant

Middle East Study: Markets and Potentials for Agricultural Output of a Middle East Agro-Industrial Complex.

The EBR-II Skull Reclamation Process; Part IV, Pilot-Plant Development. I. O. Winsch, et al.

Onedium; A Computer Code for Solving One-Dimensional Nonlinear Heat Transfer Problems. V. K. Gabrielson, et al.

Health and Safety Manual of the Analytical Chemistry Group. W. H. Ashley, et al.

Preliminary Studies in Computer Processing of Optical Emission Spectrometer Data. A. L. Langhorst.

Calculation of Gamma Dose Rates at the Surface of Plutonium Oxide Sources. H. H. Van Tuyl.

Review of Possible Peaceful Applications of Nuclear Explosions in the National Economy of the Soviet Union, Moscow, 1969. (Translated from the Russian text.)

Oak Ridge National Laboratory

Let Them Eat Promises, The Politics of Hunger in America. Nick Kotz, with introduction by Sen. George S. McGovern. (Central, 4500).

Computers for Engineers, Introduction to Computing Machines and Programming. Bartow Hodge. (Central, 4500).

Advances in Control Systems, Theory and Applications (Vols. 6 and 7). Cornelius T. Leondes, Ed. (Central, 4500).

Professional Perspective Drawing for Architects and Engineers. Friedrich W. Capelle. (Central, 4500).

The Natural Radiation Environment. Jacob Lastner. (Biology, 9207, Y-12 Area).

Handbook of Molecular Cytology. A. Lima-de-Faria, Ed. (Biology, 9207, Y-12 Area).

H. J. Conns Biological Stains, A Handbook on the Nature and Uses of the Dyes Employed in the Biological Laboratory (8th ed.). Harold J. Conn, Ralph D. Lillie and the Biological Stain Commission. (Biology, 9207, Y-12 Area).

Recent Progress in Hormone Research (Vol. 25). Laurentian Hormone Conference, Gregory Pincus, Ed. (Biology, 9207, Y-12 Area).

Electrochemical Techniques for Inorganic Chemists. J. B. Headridge. (Technical, 9711-1, Y-12 Area).

Advances in Photochemistry. William A. Noyes, et al, Eds. (Technical, 9711-1, Y-12 Area).

International Conference on High-Energy Physics. (Proceedings). Technical, 9711-1, Y-12 Area).

Metals Handbook (8th ed.). American Society for Metals. (Thermonuclear, 9201-2, Y-12 Area).

Handbook of Numerical Inversion of Laplace Transforms. Vladimir I. Kuylov and Nadezhda S. Skoblia. (Thermonuclear, 9201-2, Y-12 Area).

Type II Superconductivity. (International Series of Monographs in Natural Philosophy, Vol. 17). D. Saint-James, G. Sarma, and E. J. Thomas. (Thermonuclear, 9201-2, Y-12 Area).

Argonne National Laboratory Studies Fish in Great Lakes

If the Great Lakes are to be saved from premature death, scientists must first find out what it is that is killing them. This is the objective of investigators studyng changes being brought about by pollution in these inland waters—changes which threaten the balance of nature in the lakes.

A number of studies are underway to learn more about the lakes and the life that inhabits them. One such study, funded by the Atomic Energy Commission, is being conducted by the AEC's Argonne National Laboratory, near Chicago. The Argonne study involves the analysis of fish taken from the Great Lakes to determine the types and amounts of metallic elements they contain. Some of these pollutants are caused by industrial wastes while others occur due to the use of chemical fungicides and pesticides in agriculture.

Henry F. Lucas, Dr. David N. Edgington and their colleagues in the Radiological Physics Division of Argonne have been studying various species of Great Lakes fish. They are employing a technique called "Neutron Activation Analysis" to determine accurately the types and amounts of metallic elements found in the flesh and vital organs of the fish. Periodic collection of samples enables the scientists to determine how rapidly the concentration of these pollutants is increasing in the lakes. The data also provide clues to the sources of this pollution so they may be dealt with.

Argonne researchers, in cooperation with the U. S. Bureau of Commercial Fisheries, collect fish from throughout the Great Lakes. The fish are caught in nets at various depths and locations.

The case history of each fish caught is accurately recorded for later use in the research program. The size, weight, sex, and age of the fish, as well as the location and conditions under which it was caught, are all carefully noted. The vital organs are removed from the fish for separate analysis and the entire specimen is then quick frozen for transfer to Argonne.

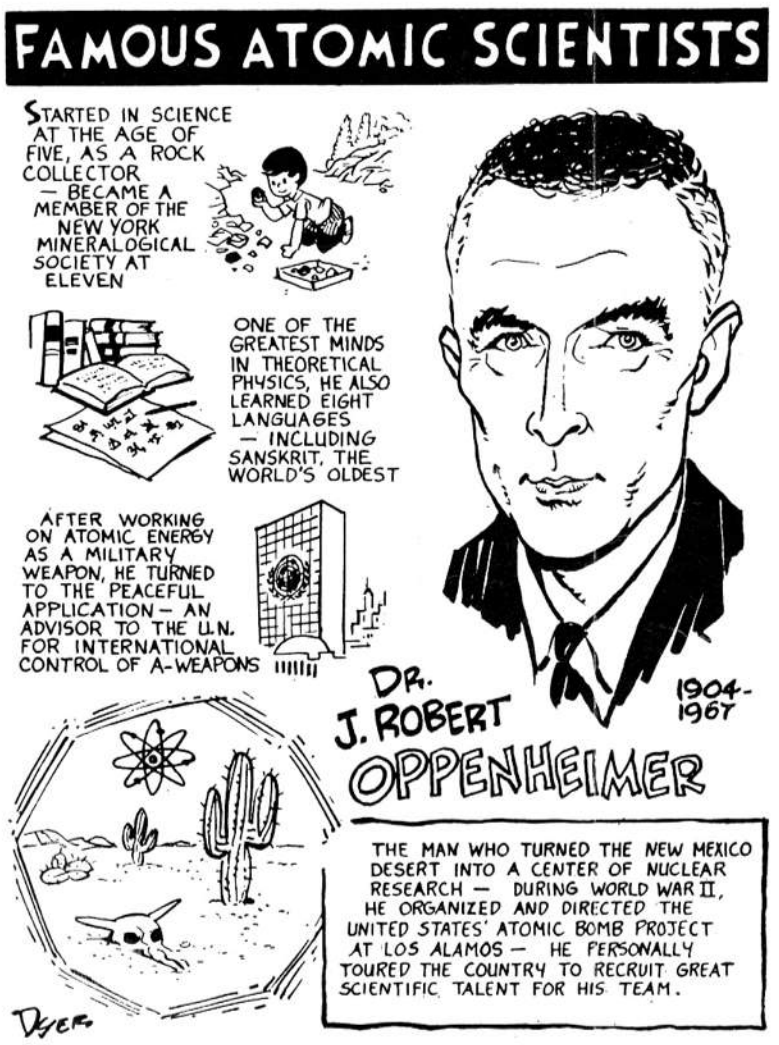
In the laboratory the fish is reduced to an ashed analytical sample by special laboratory techniques. These techniques prevent losses as well as contamination of the sample. This sample, amounting to a fraction of an ounce, is then exposed to neutron irradiation in a nuclear reactor. The metallic elements in the sample become radioactive in varying degrees when exposed to the neutrons. Because each element has a characteristic type of radioactivity it is possible for the researcher to identify the elements present in the sample.

All of the small bits of data taken by the researchers are fed into a specially programmed computer. The resultant information provides an overall picture of the dispersion and types of metallic element pollution in the Great Lakes. Such an understanding of the condition of the lakes is important if ecologists and other environmental scientists are to be able to prescribe the steps necessary to save life in the Great Lakes from extinction.

AEC is interested in such studies because the movement and distribution of non-radioactive materials reveals how similar radioactive materials would move. Similarly, past research in radioactivity has provided much of what we know now about the movement and distribution of non-radioactive pollutants.

OUR COLORFUL LIFE

Our "colorful" lives started accidentally more than a century ago. Back in 1856, a man named William Henry Perkin was looking for another chemical and came up with a synthetic purple. Today, some 4,000 different dyes, or combinations of dyes are being manufactured.



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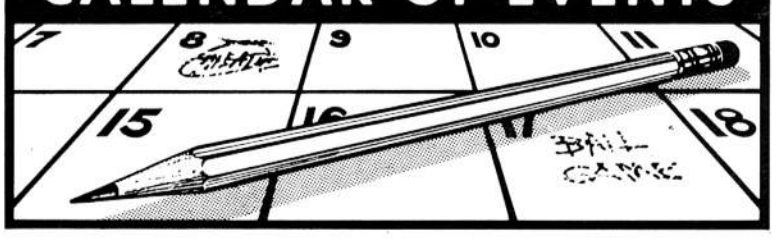

TECHNICAL

March 30

East Tennessee Chapter of the Health Physics Society. Alexander Motor Inn, Oak Ridge, 5:30 p.m. Dr. Wright H. Langham, Biomedical Research Group, Los Alamos, will speak on "Biomedical Aspects of Negative Pi Mesons."

April 2

Sheldon Penman, Department of Biology, Massachusetts Institute of Technology, will be guest lecturer at Biology Division-Biomedical Graduate School Distinguished Lecturer Series. "New Species of RNA in Mammalian Cells." Large Conference Room, Building 9207, 3 p.m.

April 3

Harriet Gershon, National Institute of Allergy and Infectious Diseases, will speak on "Studies on the Immune Reconstitution of Sublethally Irradiated Mice by Peritoneal Macrophages. Biology Division Seminar, First Floor Tower Annex Conference Room, Building 9207, 12:15 p.m.

"The Nematode as a Model Organism for Aging Research: Biological and Biochemical Observations," by David Gershon of the National Heart and Lung Institute. Biomedical Graduate School Lecture Series on the Biology of Aging. Large Conference Room, Building 9207, 3 p.m.

Dr. Takashi Makinodan, ORNL, will speak on "Current Studies on Aging of the Immune System." UT-AEC Agricultural Research Laboratory Seminar, UT-AEC Conference Room, 3 p.m.

April 6-9

Biology Division Annual Spring Conference. Riverside Motor Lodge, Gatlinburg, Tennessee.

'DON'T DRINK THE WATER' TRYOUTS SET FOR MARCH 30

The Oak Ridge Playhouse will hold tryouts for Woody Allen's "Don't Drink the Water," Monday, March 30, at 7:30 at the Playhouse.

A total of 12 men and four women from ages 20 through 60 are required in the cast of the comedy. The rollicking hit will be staged for six performances, beginning June 6. More information may be obtained from the Playhouse at Oak Ridge telephone 483-6193, or 483-1224.

ALCOHOL AND DRIVING

The Department of Transportation's 1968 Report to Congress on "Alcohol and Highway Safety" concluded that "alcohol has been the largest single factor leading to fatal crashes." The National Safety Council reports that alcohol was a factor in half of the 55,200 highway fatalities during 1968.

COMMUNITY

March 28

Smoky Mountains Hiking Club. A hard, one-day hike to Woolly Tops via Laurel Branch. Alternate hike: Kalanu Prong, in the Greenbrier Wilderness. Total hiking distance, six miles.

March 30

Tryouts for the Woody Allen play, "Don't Drink the Water." Oak Ridge Playhouse, 7:30 p.m.

April 4-5

Junior Playhouse Production, "Tom Sawyer." Oak Ridge Playhouse, 1 p.m. and 3 p.m. Admission: .75¢.

April 5

Oak Ridge Chamber Music Series, The New York String Sextet, Oak Ridge Playhouse, 8:15 p.m. Admission: Adults, $4; Students, $2.

Koons Chosen

(Continued from Page 1)

special courses at the Judge Advocate General School at the University of Virginia.

Following graduation he worked as a news representative for the F. W. Dodge Corporation, Washington, D.C. From 1955-1957 he served as a navigator with the United States Air Force.

After being discharged from service he was employed with a private law firm for two years, and served as an assistant city attorney and city prosecutor in Minot, N. D. He joined the Defense Supply Agency in Richmond, Va., as an attorney in 1962, serving in that capacity until his appointment with Oak Ridge Associated Universities.

Koons is a member of the American, Federal, and Tennessee Bar Associations. He is also admitted to practice before the United States Supreme Court. He is the author of several papers dealing with various aspects of the legal profession. He is a member of the committees of the American Bar Association dealing with legal services to the poor and public contracts law. In addition, he has served as vice chairman of the Federal Bar Association's research and development subcommittee of the Government Contracts Committee.

While in Oak Ridge he has been active in civic and community affairs. He has been campaign director for the Oak Ridge March of Dimes for the past three years and is President and member of the Board of Directors of the Oak Ridge Chapter of Sertoma International. In addition, he has been active in the United Fund program, serving for two years as drive chairman at Oak Ridge Associated Universities.