

1996

William G. Jackson: Enterprising Scientist

Gordon L. Olson

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William G. Jackson

Enterprising Scientist

By

GORDON L. OLSON

Dedication

*“To Kathleen,
Whose love, counsel, optimism, courage, good humor,
hard work and frugality helped make it all happen.”*

*William G. Jackson
Cortez, Florida, 1996*

*Cover photo: Success in business
enabled Dr. William G. Jackson to
support community causes that he
had deemed important throughout
his life.*

William G. Jackson

Enterprising Scientist

A BIOGRAPHY

BY

GORDON L. OLSON

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Grand Valley State University
Allendale, Michigan

Acknowledgments

Information for the preparation of this volume was provided by Dr. William Jackson and many of his friends and associates, as well as archivists and librarians in Michigan and Illinois. Lengthy interviews with Dr. William Schroeder, Dr. Gordon DeWall, and Wayne Kahrs provided information about the founding and development of the Burdick & Jackson Laboratories; Linda Thompson at the *Muskegon Chronicle*, Alan Nolan at the University of Illinois Archives, Sue Husband at the Western Michigan University Archives and Regional History Collection, Larry Martin at the Ferris State University Archives, Clara Weser at Pharmacia & Upjohn, Nancy Deromodi at the Bentley Historical Library, and John Carry at the Michigan State Archives all provided photographs and other background information.

William Jackson and many others reviewed the manuscript and helped prepare it for publication.

Dr. Douglas Kindschi, dean of science and mathematics at Grand Valley State University, and Dr. Ron Ward, director of the university's Water Resources Institute, provided support and suggestions throughout the project. Michele O'Brien transcribed all the interviews, Ellen Arlinsky edited the text, and the staff at West Michigan Printing turned it into this volume: Lynn Gort designed the layout and produced camera-ready copy, Sharla Obetts produced the photograph negatives, and the printing crew turned out a finished product in which all can take pride.

All of those involved did their best to produce an attractive, accurate publication. Any errors that have eluded their scrutiny must remain solely my responsibility.

Gordon L. Olson
Grand Rapids, Michigan

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Introduction

DR. RONALD WARD
DIRECTOR, WATER RESOURCES INSTITUTE
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The intent of any biography, this one included, is to document a person's life. This biography records many of the highlights in the life of Dr. William G. Jackson. In and of itself, the story of Dr. Jackson's life is interesting and merits preservation. It represents the classic American Dream in which an individual of humble beginnings establishes a record of achievement and success. That success extends through his personal life as well as his educational, research, and business careers. Dr. Jackson is a great example of that elite group of highly talented scientists/entrepreneurs who, through their knowledge, energy, and business acumen, have carried our nation to a position of preeminence in the world.

But Bill Jackson was not content with being just a successful scientist and businessman. He wanted to make the world a better place for his generation as well as future generations. That desire led him to organize the Save Our Lakes Committee dedicated to the protection and improvement of Muskegon Lake and our general environment. Bill's initiative and boldness can well be imagined as he started that movement at a time when such action was not necessarily viewed as desirable. Nevertheless, Bill's success is well documented by the

improved water quality, outstanding sports fishery, and environmentally sensitive economic development that has occurred in Muskegon since he began to intervene. These changes illustrate another dimension of an individual's success.

Anyone who knows Bill or reads his biography will recognize that here is an individual who has shaped the past. We should also recognize that he has shaped the future. His gift to the *Making Waves In Muskegon* campaign to build a research and education vessel was one of vision. It was the key to gaining the broad support of the community, including individuals, business, and industry, as well as the State of Michigan, foundations, and Grand Valley State University. The naming of the new vessel in his honor is an appropriate recognition of Bill Jackson's vision and leadership.

I expect that the vessel *William G. Jackson* will become a major component of research and education in Muskegon Lake and throughout Lake Michigan. Bill Jackson's success and generosity will continue to shape the development of Grand Valley State University, our community, and the Great Lakes region. It will be a legacy from which unborn generations will benefit.

An Upper Peninsula Boyhood

On June 27, 1996, a shiny, 65-foot-long, freshwater research vessel christened the W.G. Jackson began its maiden voyage on Muskegon Lake as the newest research and teaching component of Grand Valley State University's Water Resources Institute. Watching proudly as his floating namesake was officially launched was scientist and business entrepreneur Dr. William G. Jackson, whose challenge grant of \$250,000 had been the largest and most important personal gift in the fund drive to build and outfit the boat.

As he enjoyed the occasion, Jackson could be pardoned if he reflected for a moment about the twists of fate that led from his early years in a small town in Michigan's Upper Peninsula to the scientific and business achievements that enabled him to make such a gift. From the time he performed his first high school chemistry experiment and throughout his successful career as a chemist with Upjohn and his later years as a partner in the Burdick & Jackson Laboratories, he never lost his fascination with chemistry. At the same time, his talent for business was accompanied by a dedication to maintaining a clean environment and a commitment to family and community.

Fittingly, all the distinct threads in his life became entwined in the form of the W. G. Jackson. His lead gift helped generate other funds from business, individuals, foundations, and government to create a community-based research and teaching vessel that would employ careful science to help create a healthy environment for coming generations.

William Jackson was born on April 22, 1919, in Iron Mountain, Michigan, a town of slightly more than 10,000 trying to cope with the decline of its mining and lumbering industries. Situated along the Michigan-Wisconsin border, Iron Mountain is at the center of the Menominee Iron Range, which in the 1890s supported 30 mines. Surrounding forests gave life to equally prosperous lumber companies. But by 1920, the mines were petering out, the softwoods and hardwoods were gone, and Iron Mountain faced an uncertain future.



Before beginning her teaching career, Elizabeth Anderson took the college preparatory curriculum at Ferris Institute, graduating in 1913. (Crimson and Gold yearbook, Ferris Institute, 1913, p. 34)

A true son of Michigan's Upper Peninsula, Jackson was descended from Cornishmen who worked in the iron mines. His paternal grandfather, James Henry Jackson, once a hoist engineer for the Oliver Mining Company, left mining and bought a farm when iron ore production slowed. Although James was content raising and harvesting his crops, his three sons made it clear they did not intend to farm. As soon as they could, the two oldest, Sam and Warren, left the north for the lure of higher-paying jobs in Detroit's burgeoning auto industry. His youngest son, James Gordon (or J. Gordon as he liked to be called), also left the farm, but stayed in the Upper Peninsula after he graduated from high school, doing carpentry and small-time construction in the Iron Mountain area.

In 1916, some years before the senior Jackson decided to sell his farm and retire to a small house in Iron Mountain, J. Gordon met Anna Elizabeth Anderson, a teacher at nearby Pine Creek country school. Her grandfather had emigrated from Sweden to Baraga, on the Lake Superior side of Michigan's Upper Peninsula. It was there that Elizabeth (as she preferred being called) was born, but her mother and father died when she was small, and she was raised by the Nepper family who lived in Vulcan, a small town near Iron Mountain. After high school, she left the area to train as a teacher at Ferris Institute in Big Rapids and then returned to take the job at Pine Creek.



His proud parents had this photograph taken five months after William Gordon Jackson was born on September 22, 1919. (W.G. Jackson)

Word spread fast that there was a pretty new school teacher in the neighborhood, and J. Gordon became her suitor. The couple married in 1918, and by 1925 they had three small sons, William, the oldest, Robert two years younger, and Joseph, the baby.

J. Gordon and Elizabeth Jackson and their sons enjoyed this picnic shortly after they arrived in Florida. (W. G. Jackson)



By the time their fourth son, Gerald, was born two years later, J. Gordon Jackson had moved his family out of Michigan. With the area economy in decline, he was having a hard time finding work, and he succumbed to the blandishments of fast-talking Florida land developers. Florida seemed to be a place where everyone got rich. Stories had spread throughout the country of land prices that doubled overnight, of houses that sold as fast as they could be built, and of cities that sprang up from swampland. J. Gordon Jackson was convinced there was a place for him amidst all these riches, and soon after his oldest son finished kindergarten, he sold everything the family owned, packed his wife and sons into a new Essex automobile, and headed to Florida.

Little did J. Gordon Jackson know that Florida's bubble was about to burst. Speculation and over-development had driven prices too high. By 1925 land developments were beginning to fail, and investors were pulling out. Instead of high-paying construction work, Jackson found himself without a job and with no place for his family to live.

Just five years old at the time, Bill Jackson still remembers the scene in Palm Beach when his father returned from talking to the man whose offer

of work had originally encouraged him to come to Florida. Rather than good news, he had to tell his wife, who was waiting in the car with the boys, that the man was bankrupt. Elizabeth and J. Gordon were soon both crying, and it was not long before their three frightened sons joined in.

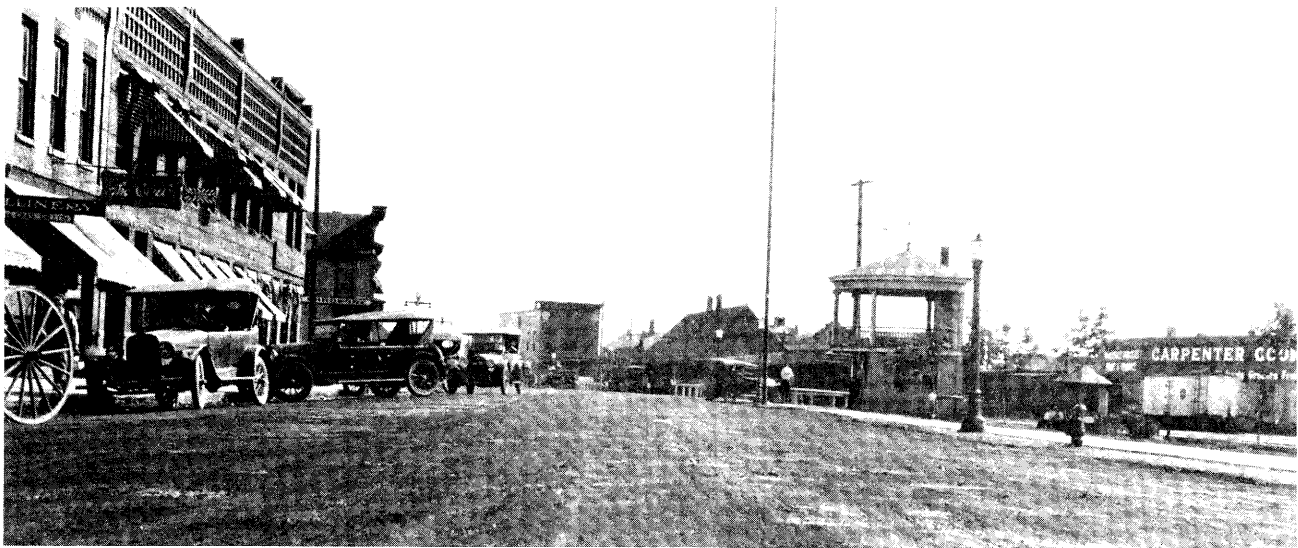
Fortunately, the Florida economy rebounded for a time in the late 1920s, and J. Gordon managed to find work as a carpenter in Fort Pierce, on the Atlantic Coast about 50 miles north of Palm Beach. Taking whatever carpentry and masonry jobs he could find, he established credentials as a good builder and eventually secured a contract to build a wooden, three-story hotel for a Dr. Burstyn, who was using the money he earned from his medical practice to invest in real estate.

In 1929, after the Burstyn Hotel project was finished, J. Gordon learned that the U.S. Sugar Refining Company wanted office buildings put up at Clewiston, which is on the south shore of Lake Okeechobee, and the Jacksons were on the move again. J. Gordon built three or four buildings for U.S. Sugar, and when those projects were completed, he built a new post office for Clewiston.

It was while they were in Clewiston that the family received a jolt from which it never fully recovered. Elizabeth Jackson was dying of cancer. Although he was only ten years old, William Jackson's childhood was over. Shortly after Elizabeth's funeral, J. Gordon took his oldest son aside and told him that, if the family were going to be held together, the boy would have to be his father's partner in raising his younger brothers.



Despite their family's economic difficulties, Bill Jackson and his brothers Robert (left), Joseph (right), and Gerald (held by Bill) enjoyed many happy moments in Florida. (W.G. Jackson)



By the early 1920s, when this photograph was taken, Iron Mountain's economy had begun to decline in the wake of diminished mining activity. (Michigan State Archives)

For a time the Jacksons lived with another transplanted Michiganiaan, Jack Rashley, who was a truck farmer in South Bay, Florida. With eight Rashley children and four Jacksons, there were plenty of hands to look after the youngsters and help with the farming.

Unfortunately, conditions in Florida worsened

after the stock market crashed in 1929 and an economic depression settled over the country. The combination of his wife's death and a lack of construction work was more than J. Gordon Jackson could stand. As spring arrived in 1930, he decided to load his boys into the now-six-year-old Essex and return to Michigan. Florida, however, had



The Commercial Bank Building dominated Iron Mountain's downtown at the time Bill Jackson graduated from high school in 1937. (Michigan State Archives)

made its mark on young William. He loved the warm weather, the ocean, the beaches, and the opportunity to fish whenever he wanted. Years later, those Florida memories drew him back.

Upon his arrival in Michigan, J. Gordon found the economy no better than it had been in Florida. There was little demand for either lumber or iron ore, many Iron Mountain businesses were closed, and buildings stood empty on Main Street. With little money and four boys to care for, J. Gordon turned to his older sister, Irilla, and her husband, who had no children, and asked them to take in his sons while he looked for work. For the nearly two years that followed, J. Gordon took whatever work he could find. Then in 1933 he found regular employment with the PWA. A federally funded New Deal program, the PWA (Public Works Administration) put the unemployed to work building projects to improve the infrastructure of communities across the United States.

At the time Iron Mountain did not have a sewage treatment plant, and its sewers emptied into a creek known as "Sewer Creek," which flowed into the Menominee River. Visually offensive, the open sewer was also smelly and unhealthy. Using federal PWA funds, the town began a project to enclose the creek within poured-in-place concrete pipe. Experienced in carpentry and concrete work, J. Gordon was hired to supervise the construction of the forms and the pouring of five miles of concrete sewers, enclosing the creek all the way to the river.

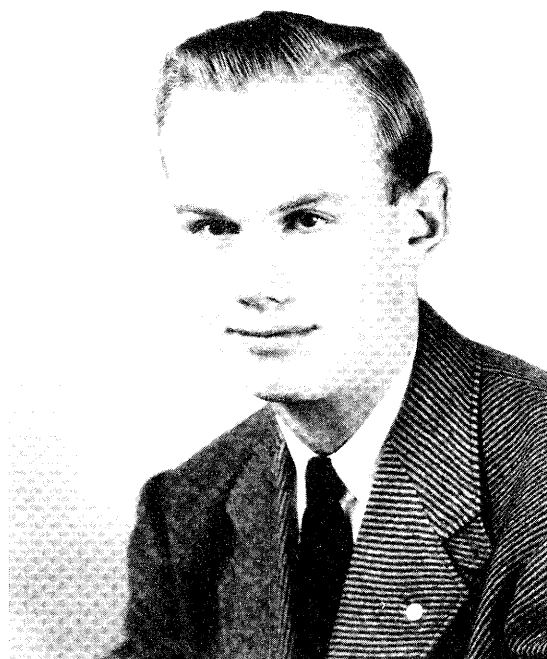
PWA jobs didn't pay well, but they provided reasonably steady work. After the sewer project was completed, J. Gordon found his skills in demand for other PWA projects that included new state police headquarters in Iron Mountain and Marquette, and additional buildings at the state mental hospital in Traverse City.

Even before J. Gordon Jackson found PWA work, it became clear the job of caring for four rambunctious boys was more than Irilla and her husband could handle. In 1932, when William was 12 years old, his father made a difficult decision — to place his sons in Goodwill Farm, a facility in Houghton, which, for a monthly fee, housed and fed young boys and girls who were either orphans or had a single parent who could not care for them.

It was far from an ideal situation. The food was simple, quarters were spartan, and the residents were expected to help maintain the facility. Aside from the free Saturday afternoon movies in

Hancock, the only entertainment was what the youngsters could improvise. Bill Jackson recalls beginning each morning with tasteless cereal topped by a dab of brown sugar. The remainder of the day was spent either working — in the summer — or attending the local elementary school.

The Jackson brothers were seldom far apart while they were at Goodwill Farm. Among the boys on the farm was a hierarchy based on fighting ability, and more than once during the time he was there, Bill had to use his fists to protect his brothers. Once he reached high school age, Bill left Goodwill Farm as the rules required and returned to Iron Mountain. His brother Bob left a short time later, and when his father married Elizabeth Houle in 1934, the remaining two boys returned home. J. Gordon Jackson, with no formal training beyond high school, continued to work as a builder and engineer for the rest of his life. After working for the state of Michigan for many years, he was chief engineer for a several-building expansion project at Goshen College in Indiana and had completed a senior citizen complex in Byrne, Indiana, shortly before his death in 1974.



Salutatorian of his Iron Mountain High School class, William Jackson headed for the University of Michigan in the fall of 1937. (W.G. Jackson)

Bill Jackson entered Iron Mountain High School in 1933 and, while he was there, made two discoveries that would be important for the rest of his life. First, he became fascinated with chemistry, an interest fostered by Bruce Guild, the school principal and chemistry teacher. Guild encouraged Jackson to spend extra time in the lab whenever he wanted, working on practical as well as theoretical chemistry problems. He also discovered, through a job distributing the *Saturday Evening Post*, that careful planning and diligence were important ingredients of a successful business venture.

Despite the demands of his money-making efforts — he also mowed lawns, shoveled snow, and did whatever other odd jobs he could find — Jackson found time to participate in the school's Upper Peninsula championship debate team, school plays, choir, and the Maestoso Club, a music organization. Juggling his classwork, extracurricular activities, and outside jobs, he kept his grades high, graduating as salutatorian in a class of 140. This earned him a small scholarship to attend the University of Michigan in the fall.

Training for a Career in Chemistry

Bill Jackson left for Ann Arbor in September 1937 full of apprehension about his ability to compete in a university classroom, but determined to make his best effort. Although his father could provide very little assistance, he was able to make ends meet by working at a restaurant for room and board to supplement his scholarship. To avoid travel costs, he hitchhiked to Ann Arbor that first fall, came home at the end of the semester, and then hitchhiked back for the second semester. Later, he became friends with a student from Escanaba whose father owned a Dodge car dealership. The boys would take a bus from Ann Arbor to Detroit at Christmas vacation time, pick up several Dodges and Plymouths due to be delivered to the dealership and sell rides to Upper Peninsula students who wanted to get home for Christmas. It was a cautious, slow-moving caravan; the cars were all equipped with 30-mile-per-hour governors to assure that they arrived in top shape for their new owners.

After his first year, Jackson's financial circumstances improved slightly. He found a better restaurant job and took other part-time employment, including a stint teaching the latest dance steps to a faculty wives group. Later he worked in the New Deal's National Youth Administration program for Ann Arbor, correcting and grading intelligence tests for the Ann Arbor Public Schools and helping with the city's Boy Scout program. More important, he secured a Mandelbaum Scholarship, which was open to any U-M student from the Upper Peninsula and paid more than the initial aid he had received.

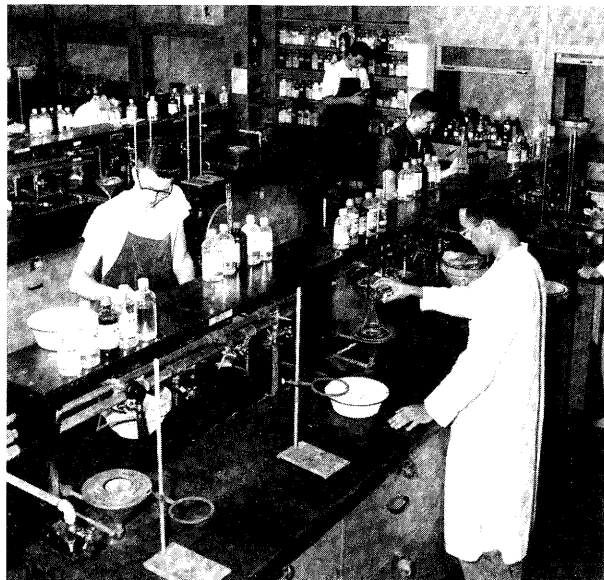
In his freshman year, Jackson discovered that classes were not going to be as easy for him as they had been in Iron Mountain, but that he could handle the work. He had an excellent high school record, with only one B and all the rest A's in his four years. At the University of Michigan, however,

it was a different story. Despite long hours of studying, Jackson's first semester produced two B's and two C's, and he was thinking of withdrawing until a fellow student explained that the first year was the roughest: There were more students than the university had room for, and about half the freshman class was weeded out each year. That story gave Jackson the confidence he needed to keep going, and his grades gradually improved during his five years on campus. (Jackson's need to fit his classes around his work schedule added the extra year to his quest for his bachelor's degree.)

As had been the case in high school, key faculty members encouraged Jackson when he needed it most. Interestingly, the most striking act of kindness was by a French teacher rather than one of his chemistry professors. A stern taskmaster, Professor Abraham Hermann noticed Jackson nodding off in class one day and directed him to stay behind at the end of the session. Expecting a reprimand, Jackson was astonished when Hermann offered him a loan so that he could concentrate on his studies instead of working so many hours. Jackson gratefully accepted the money, which he repaid while he was in graduate school.

Although his first year had been a little rocky, there was never any doubt in Jackson's mind about the course of study he intended to pursue. Initially, his plan had been for a double major in chemistry and business administration, but it soon became apparent that a chemistry major and a science-related minor would make more sense. After sampling some physics courses, Jackson settled on mathematics as his minor.

Each summer during his college years, Jackson returned to his Upper Peninsula home to work full time for a highway construction company. His



William Jackson began preparation for his career in chemistry in the labs of the University of Michigan. (Bentley Historical Collection, University of Michigan)

introduction to the company had come during his high school days when he worked occasionally as a driver for the woman whose husband owned the company. Although his official position was listed as "timekeeper," his duties actually consisted of all types of errands in addition to keeping track of every worker's time. Not only did the job pay well, but it was an excellent way to see how a company was run, and Jackson paid careful attention.

More than once, he saw a company official change the time sheets in order to reduce overtime pay, knowing that without a union the worker would have little recourse but to accept the reduction. He also saw wages withheld for later payment in order to assure that workers would stay on the job until work was done for the season. Similarly, there were gifts requested by state inspectors in exchange for their approval of jobs that did not quite meet contract specifications. None of these unsavory practices added up to major corruption, but they were enough for Jackson to vow that he would tolerate nothing of the sort when he was in a position to make decisions about such things.

It was during the summer of 1941 that Jackson and a group of construction workers were involved in an automobile accident. They had been working near the small town of Nestoria and were headed

home to Iron Mountain for the weekend when their car was struck head-on by a driver who veered over the center line. Fortunately no one was killed, but Jackson suffered a broken pelvis. Placed in a body cast and confined to Ishpeming Hospital for most of the summer, he worried about missing work and being unable to return to college in the fall. Luckily, his injuries healed and an insurance settlement provided enough money to cover his medical bills and the tuition for his upcoming senior year. The money also freed him from the need to work part time and allowed him to live in the Alpha Chi Sigma house. Jackson had been invited to join the U-M chapter of the national chemistry fraternity at the beginning of his senior year.

By the time Jackson graduated from the University of Michigan in 1942, he had not only finished the requisite courses for his major and minor, but he had also taken three graduate-level courses as well, as a means of assuring himself and his faculty advisers that he was ready to step up to the next level in his education. He had not made the decision to go on to graduate school until his senior year, when advice from his fraternity brothers helped him realize that a teaching assistantship could pay his way. Encouraged by Dr. Evan Horning to broaden his perspective by continuing his education at a school other than the University of Michigan, he soon had letters of application on their way to the University of Illinois, the University of California, Columbia University, and the University of Wisconsin, all of which had good chemistry programs. Back came word that he had been accepted at both Columbia and Wisconsin, but from his first choice, Illinois, he heard nothing.

Checking with Dr. Horning, Jackson learned there was a simple answer. It was wartime and Dr. Roger Adams, head of the Illinois chemistry department, was spending nearly all his time in Washington, D.C., as a technical adviser to the U.S. State Department. He had paid very little attention to graduate student applications and the awarding of assistantships. Horning intervened on Jackson's behalf, and within a few days a telegram arrived offering an assistantship at Illinois.

No sooner had Jackson arrived on the University of Illinois campus in Champaign-Urbana in September 1942 than he discovered he was about to learn a new kind of chemistry. At Michigan, where the core of the chemistry department's senior faculty, led by Professor Moses Gomberg and his

protégé Werner Bachmann, was from Germany, the emphasis was on the chemistry of coal, the dominant fuel of Europe. Illinois, on the other hand, with a younger, American-dominated faculty, based its courses on petroleum, the primary fuel resource of North America.

United States involvement in World War II had a significant impact on the course of Bill Jackson's graduate school career. For the first year, in addition to his teaching responsibilities, he was assigned to work on a military gases program of the National Defense Research Committee. Although this work later became part of his doctoral thesis, the project was so carefully guarded by the government that he was not permitted to take a copy of the thesis with him upon earning his doctorate.

As part of the project, Jackson, along with other graduate students, tested such highly toxic substances as nitrogen mustards, fluorophosphates, and central nerve stimulants. On one occasion he worked on ways to neutralize a toxic compound that some feared the Nazis might use to contaminate British water supplies. Only after the war did he learn that the Germans had neither the understanding of the compound nor the ability to use it.

So lethal were the gases and the many other compounds used in the lab that the supervising instructors made it a point each semester to assemble new students in an open field for a demonstration involving a bell jar and two laboratory

rats. A single drop of one of the poisonous gases was introduced to the jar, and when the rats died horrible deaths, no one needed to remind the lab assistants about the need to wear their gas masks. Needless to say, there were no accidents in the lab.

Among the students Jackson taught as a graduate assistant were members of the Navy's V-12 program who had enlisted in return for the promise of an undergraduate education. Quite often those students would be called to active duty before the course was completed, and it was not uncommon to end the semester with only half as many students as had begun.

One major point of interest for all the students was the constant comings and goings of faculty members for trips to military locations. "Just got in from Washington" was an all-too-familiar phrase for students whose classes were canceled or who missed opportunities to confer with their research professors. One atomic physics instructor regularly called off his classes because he had to be in Chicago. He would never say anything about his trips, but when he returned he would focus students' attention on uranium and other atomic fuels by assigning such questions as, How many grams of uranium would be needed to drive the *Queen Mary* across the Atlantic Ocean? The students surmised that he was working on atomic energy in some capacity, but only after the war did they realize their professor had been closely involved in Dr.



William Jackson joined the University of Illinois chapter of the Alpha Chi Sigma professional chemistry fraternity. Membership was composed almost entirely of graduate and post-doctorate students working on government research projects. Jackson is third row, second from right. (University of Illinois Archives)

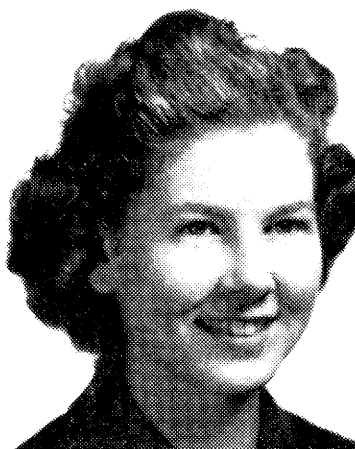
Enrico Fermi's experiments at the University of Chicago that led to the first successful controlled atomic reaction.

As important as the lab work and teaching assignments were during Jackson's first year at the University of Illinois, they played second fiddle to developments in his personal life. Shortly after classes started, he noticed a young woman student in a Saturday lab class taught by his friend Bob Reitsema and arranged an introduction. Unfortunately, Kathleen Swingley, known as Kay, was already dating someone else. It took some persistence on Jackson's part to persuade her to go out with him, but after a slow start their romance blossomed. They were married in October 1943, little more than a year after he had arrived on the Illinois campus.

For the next two years the young couple struggled through college together, she an undergraduate, he a graduate student, living in a small apartment on the meager income of a graduate assistant, with little money for recreation. Fortunately, there were others in the same circumstances, and the young couples supported and sustained each other.

While Kay finished her bachelor's degree in home economics, Bill made steady progress toward his doctorate, doing military-related research and preparing his thesis at the same time. The fortunes of war that dictated the nature of his laboratory research changed in 1944 after the successful Allied invasion of Europe. With Germany on its way to defeat, the military was less concerned about poisonous gases than it was in the development of better anti-malarial drugs for the troops who were fighting their way across the Pacific and being readied for the final assault on Japan. Some troops in tropical climates reported strains of malaria resistant to quinine, which had long been the standard treatment. In 1945, Jackson became part of a team working for the War Department Committee on Medical Research in quest of replacements for quinine and its synthetic twin Atabrine. One of the products they developed, chloroquine, is still used to control malaria.

By the time the war was over, in August 1945, Bill Jackson had more than two years of intensive graduate study and extensive laboratory experience in poisonous gases and anti-malarial research. All that remained was to write and defend a thesis reporting the work. In November 1945, Jackson's



Kathleen Swingley caught William Jackson's eye while she was taking a class from one of his fellow University of Illinois graduate students. Less than a year later they were married. (University of Illinois Archives)

thesis was accepted as evidence of completion of all requirements for the Ph.D. in chemistry. Formal graduation would not take place until June of 1946, but the time had come to start looking for a job.

Newly minted Ph.D. in hand, Jackson was fortunate to be entering the job market just as American chemical companies were making the shift from wartime to peacetime production. Several firms were interested in interviewing the young scientist whose experience included synthesizing pharmaceuticals. Companies such as the giant DuPont were anxious to transfer war research and developments to domestic applications, and young Dr. Jackson was someone who could help in that process. His training as a physical organic chemist had given him experience both in synthesizing organic chemicals and in the use of instrumentation to measure such variables as absorption, energy, and rates of reaction. Soon, Jackson was contemplating job offers from Merck, Pfizer, and various departments of the DuPont Corporation.

It was the Upjohn Company of Kalamazoo, Michigan, however, that appealed most to Jackson. Closer to his Midwest roots, it was a family-owned firm with a corporate culture that better fit his personality and interests. Whereas the interviewers from companies in the East spoke of their travels to Europe, the Upjohn representatives talked to the Upper Peninsula native about their fishing trips. Whether they knew it or not, they were saying just the right things to a young man who dreamed of working and living in surroundings he knew and understood.

Thirteen Years at Upjohn

Founded in 1885 by Dr. W. E. Upjohn as the Upjohn Pill and Granule Company, Jackson's new employer had attained its success by compounding purchased chemicals into a variety of medicines that included a popular antacid named Citro-carbonate and a cough suppressant marketed as Cheracol. The addition of Unicap vitamins in the 1940s pushed Upjohn's annual sales to over \$300 million, and Upjohn's white office building and research tower were dominant landmarks in downtown Kalamazoo.

With the advent of World War II, Upjohn secured government contracts to supply the military with penicillin, sulfa powder, and plasma and other separated blood products. Following the war, the company decided to continue the manufacture of such antibiotics as penicillin and streptomycin and built a new, large-scale production complex in Portage, immediately south of Kalamazoo. In order to com-

pete in the highly volatile drug-manufacturing field where a new product could change the market overnight, Upjohn also beefed up its microbiology research division to assure a steady flow of improved and new products.

As soon as he arrived at Upjohn's microbiology laboratories in January 1946, Bill Jackson went to work identifying antibiotics that could be mass produced at the firm's new production facility. Fermentation broths of supposedly unique microorganisms would, if they showed antibiotic activity in the test tube, be subjected to techniques designed to isolate and concentrate the biologically active entity. Then, if the isolated substance still looked new and interesting, Jackson and his fellow chemists would begin the job of separating out the pure compounds to determine their structure and possible applications. The complex process involved suspending the various substances in solvents; running them

Upjohn's headquarters building, completed in 1936, dominated downtown Kalamazoo. Originally housing both research and production, it was later converted to research work exclusively. (Pharmacia & Upjohn, Inc., Communications Production Services)





Upjohn grew rapidly in the post-World War II years, and by the mid-1950s had built this sprawling manufacturing complex in Portage south of Kalamazoo. (Pharmacia & Upjohn, Inc., Communications Production Services)

through filter presses, centrifuges, and other extraction devices; and performing biological assays on samples. In later years, computer-generated simulations would take over many of these tasks, but in the late 1940s and early 1950s that time was still far off in the future.

One example of the type of work being done in the microbiology department by Upjohn's skilled physical organic chemists involved vitamins. Synthetic vitamins became increasingly popular among health-conscious consumers after the war, and in 1954, Jackson was assigned to isolate the newly discovered vitamin B-12 in streptomyces fermentation. In its natural form, the vitamin's concentration was on the order of parts per billion, and he had to find, extract, and purify it. Jackson had a clue that the B-12 compound might be red when he found it. On a hunch, he cut short other tests and focused on color. Although the work still took nearly two years, ultimately his decision proved correct — in its crystallized form the compound appeared nearly black, but when dissolved in water it became distinctively red.

Once the compound was isolated and purified, it was possible for chemists to synthesize it chemically into the same substance as the original natural product and to prepare it for the vitamin market. Work on vitamin B-12 was an important research project for Upjohn, which initially marketed the pure product at \$12,000 per milligram.

Jackson liked the work and remained in the

microbiology department during his entire tenure at Upjohn. One of the pleasures of his job was the close relationship he enjoyed with Dr. George Cartland, who headed the department. At first, working for Cartland was not smooth sailing. Because his chief kept having some of his tests redone to assure their accuracy, Jackson felt nothing he did was satisfactory. A private meeting at Cartland's home finally reassured the young chemist that it was Cartland's own thoroughness and not the caliber of Jackson's work that prompted the lab chief's actions. "The reason I'm so hard on you," Cartland explained, "is I depend on you so much...if there is a tough one coming up, I give it to you." After that session, Jackson never again questioned his role in the lab, and Cartland ceased double-checking Jackson's work.

For the next few years the two men worked well together. And had the work environment not changed, both might have completed their careers at Upjohn, with Jackson assuming Cartland's position as head of the laboratory when the older man retired. Internal company politics, however, conspired to assure that such a succession would never occur. One of the reasons Jackson had chosen to work for the family-owned Upjohn was its congenial, almost patriarchal, atmosphere. But in 1958 the company went public with the sale of more than \$100 million in stock, and its corporate culture began to change.

In the subsequent restructuring, a new research

director was brought in to oversee all operations, including the microbiology department. Cartland was reassigned, and Jackson, closely identified with the old department head, was passed over for further promotion. Suddenly, the greater emphasis on faster results, more attention to quarterly financial reports, and less loyalty to long-term employees made working for the company a different experience from the one Jackson had initially found so attractive.

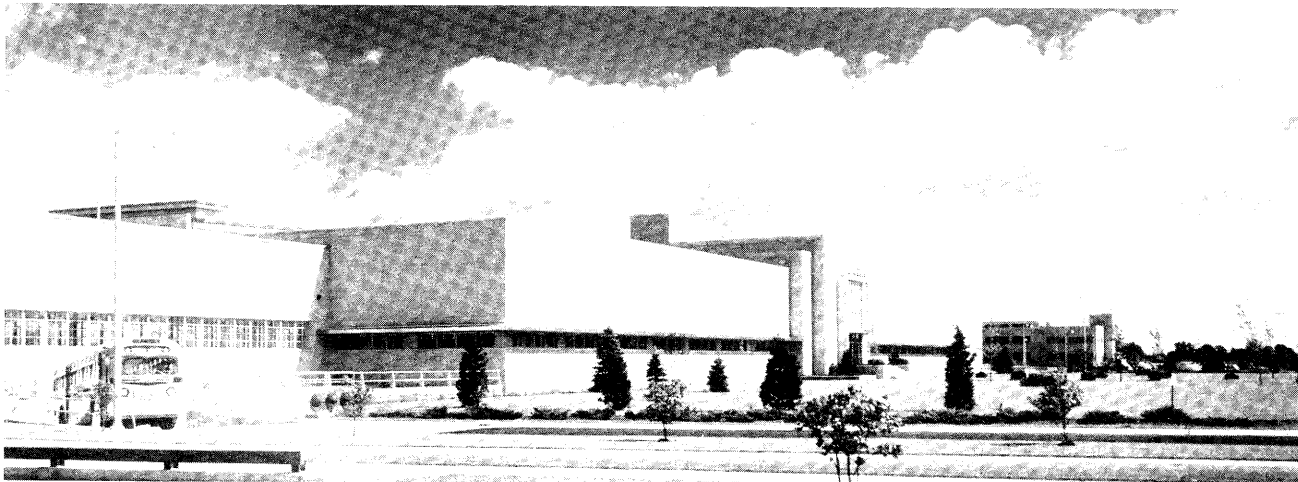
The 39-year-old Jackson, by now the father of two, was still reviewing his options when, on a trip west with his family, he stopped in Denver to visit Bob Reitsema, his former University of Illinois classmate, who was now working in Ohio Oil Company's western research lab. While there, Jackson learned a new lab was under construction and that the size of the company's Denver staff was going to be tripled. Reitsema encouraged him to apply for one of the new positions. But instead of being invited for an interview as he expected, Jackson was told the company was looking for people with no more than five years of experience and that he quite simply was overqualified for any of the available positions. That response helped convince him that he had to move soon if he wanted to make a change. The question was: "What kind of move should it be?"

The answer came from Dr. Arnold Ott, a former Upjohn chemist who had left to start his own chemical company in Muskegon. Ott's business

appeared to be doing well, and Jackson had heard that he might be hiring additional chemists. The opportunity to leave the Upjohn bureaucracy behind to join a smaller, growing company appealed to Jackson, and he asked to pay Ott a visit. On Labor Day, 1958, the two men held a meeting that stretched late into the evening. During the course of their discussion, which ranged over many topics, it became evident to Jackson that there was no place for him in Ott's firm. The meeting broke up just before midnight, and as Jackson prepared to leave, Ott offered a suggestion. An opportunity might be available at a small laboratory operation in town owned by Orel Burdick. Ott, who had been renting space there, had a key to the building, and if Jackson were interested, he would be happy to give him a quick tour despite the late hour.

After a short trip from North Muskegon, they arrived at a recently constructed 24 x 64-foot cinder-block building at 1953 South Harvey Street in Muskegon. The facility was completely self-contained, with its own well and septic system, and a quick look inside revealed a laboratory that was practically brand new. Ott then told Jackson that he would soon be moving, and when he did, Burdick would likely expand his own use of the building. Word around Muskegon was that Burdick, who was not a disciplined laboratory chemist, was looking for a partner. "Maybe," Ott said, "you'd be interested in talking to him." As Jackson later recalled, he looked around at the pristine new lab

By the 1950s, Upjohn's Portage Road plant employed so many people the company ran regular bus service from Kalamazoo to the plant. Employees could ride for ten cents per trip. (Pharmacia & Upjohn, Inc., Communications Production Services)



and thought to himself, "Boy, you bet I'd like to talk to him."

On their way back to Kalamazoo, Bill told Kay what he had just seen, and by the time they got home, they had decided Bill would contact Burdick. Shortly thereafter a letter was in the mail. In it, Jackson told Burdick of his midnight visit to the building with Arnold Ott, and that he thought it was an excellent facility. If it were true that there might be a place for him in the business, he would like to arrange a meeting.

Back came an immediate response from Burdick assuring Jackson that there might indeed be a place for him, and inviting him to Muskegon the next weekend to get acquainted. Thus began a series of weekend meetings, first in Muskegon, then in Kalamazoo, and then back in Muskegon, that helped the two men and their wives get to know each other. The meetings went well, and although Jackson felt Burdick was in some ways a "funny duck," he believed a partnership had some very real possibilities.

Before long, Jackson was traveling to Muskegon every weekend to moonlight in Burdick's lab. Slowly, he was making up his mind to cast his lot with Burdick. Among the factors that went into his decision was his experience in dealing with vendors for Upjohn who were less than precise in their work. Given an adequate facility, Jackson was sure he could compete with them.

Jackson had yet to reach a final decision when Arnold Ott paid him a late-night weekend visit at

Burdick's lab and encouraged him to make the move. At the same time, however, Ott felt compelled to point out that the 60-year-old Burdick had limited practical experience as a chemist, could charitably be described as casual in his business practices, and was not a good manager. If Jackson came aboard, he should expect to do the lion's share of the work. Jackson had already made a similar determination, and a bit later Burdick himself confirmed it when he revealed that a stroke had limited his stamina and his capacity for precise work. By then, Jackson had decided to go through with the partnership anyway, since word of his discussions with Burdick had gotten around and it would have been difficult to stay on at Upjohn.

In mid-winter 1958-59, Orel Burdick and William Jackson sat down and worked out an agreement. Although the men would be 50-50 partners in owning the business, Jackson would receive 75 percent of the revenue because his needs were greater than those of Burdick, who had other investments that provided additional income. Burdick retained ownership of the building, but he would not collect rent from the newly formed Burdick & Jackson Laboratories until Jackson was earning as much as he had at Upjohn. Thus it was that in April 1959, just short of his 40th birthday, William and Kay Jackson and their two small children, six-year-old Lee William and two-year-old Elizabeth Ann, left the comfort and security of their Kalamazoo home for a new, uncertain future in Muskegon.

Burdick & Jackson Laboratories

As soon as he concluded his agreement with Burdick, Jackson set about giving the business a new look. He designed stationery, business cards, and business forms that provided the company with a professional image it had not had before. Always a stickler for detail, he wasted no time before purchasing an electric typewriter so that all correspondence would have a neat, precise look. He also did everything possible to exaggerate the size of the embryonic company. Advertising, labels, stationery, and packaging were all selected with an eye toward making the business appear much larger. The big-business impression made by correspondence and other paperwork and the handling of telephone contacts and shipping

procedures was so successful that the rare client who actually visited the site usually expressed amazement at the tiny size of the facility.

Since the company was short of cash and did not have enough work for a full-time secretary, Kay Jackson initially handled the clerical duties. She and Bill had a system that made efficient use of their time. He dictated letters while he was driving the 10 miles home to North Muskegon at the end of the workday. Kay spent her evenings typing the newly dictated letters while Bill returned to the lab to monitor tests running there, taking the previous day's correspondence with him. Between tests he would proofread the letters, and then return them to Kay for corrections and mailing.

At the time it was formed, the Burdick and Jackson partnership had very few customers. Arnold Ott's company rented space in the building and used the equipment, and Burdick had done some metallurgy work for area foundries, but there were few other clients. The best contract was with a mink farmer who wanted his feed tested to be sure it provided a balanced meal without over-feeding his animals. Before long, however, the farmer concluded that he could just as easily determine his minks' health by their appearance and ceased further testing.

Numerous incidents in the early days illustrated Orel Burdick's unique character. For example, Jackson often found that his calculations did not read as he expected. Even after checking and re-checking them on the lab's calculator, he could not find the mistake. Finally, he took the problem to Burdick, who admitted the calculator was the culprit. "I got a good buy on that," he told his new partner. "There's something wrong in the gear. Every once in a while it stops one short of where it should roll



Although there had been several additions by the time this photograph was taken in the early 1970s, the original Burdick & Jackson laboratory building is clearly visible in the right center. (Burdick & Jackson Laboratories)

to. But it was really well priced." Jackson got rid of the calculator.

Jackson also discovered that Burdick, who had a master's degree in chemistry and a law degree, had many interests and was easily distracted from the lab. Behind the building he had four hives of bees, a raspberry patch, and a small asparagus garden that he carefully tended. On the window of the lab was a honeybee hive that was visible from inside the building. Often, Burdick would be tending his plants or watching the bees at work inside their hives when he could have been attending to business.

With Burdick leaving much of the lab work to Jackson, it soon became necessary to hire a part-time secretary and lab assistant. Just at that time Juanita Marble, who had worked with Jackson at Upjohn, moved with her husband to Muskegon and inquired about a job. Agreeing to a six-hour-a-day position that entailed washing lab dishes as well as typing and office tasks, she became the company's first employee. Each day she reported to work in blue jeans and a sweatshirt to do the cleanup chores. When that work was done, she switched to a skirt and blouse and took up her post as receptionist and secretary. Juanita's career with Burdick and Jackson ended, with mutual regret, when her husband's job moved the couple to Munising.

In its formative days, the Burdick & Jackson company pursued a variety of avenues for generating income. Inspired in part by his own needs in the laboratory, Jackson produced several time-saving devices for laboratory use and marketed them to other companies through trade publications and word of mouth. Most successful was the Burdwatcher, a collection of clocks, relay switches, and sensors designed to measure physical properties such as temperature, pressure, and linear position. Burdwatchers could be set to throw switches or ring alarms when an appreciable change occurred, relieving lab technicians of the tedious task of manually monitoring all phases of a procedure.

Burdwatchers were born of necessity. Jackson was working long hours and often had to return to the lab after dinner to monitor a procedure started earlier in the day. Sometimes he spent the night at the lab, sleeping on the cot he kept in the building for such occasions. Relying on the Burdwatcher alarm to wake him should that prove necessary, Jackson could monitor activities and still get some sleep. Concerned that he might be too tired to hear the alarm, Jackson would place it under a five-gallon metal can to amplify its sound. Welcomed by harried technicians in many labs, the Burdwatchers, at \$385 each, were an important source of supplementary income for the Burdick & Jackson firm.

Other devices developed by Jackson were equally ingenious. Burd Dogs, for example, were temperature sensors used to monitor materials in cold storage. When rising temperatures threatened to contaminate the materials, the Burd Dog sounded the alarm. Another practical solution to a laboratory problem were conical plastic adapters used to accommodate different-sized stoppers or connecting pieces for the standard taper openings of chemical vessels. Named "Poly-Cones," they were originally designed and marketed by Burdick & Jackson and are still being made and sold by laboratory supply houses.

Around the plant, Jackson had a well-earned reputation for "making do" with materials at hand. Longtime employees recall that masking tape was an indispensable part of his arsenal, useful for everything from labeling containers to holding filters and other apparatus together. He was also known to use his electric, motor-driven turning lathe to rotate cylinders of solids that needed to be thoroughly

use **"Poly-Cone"** a true **Universal Adapter for the laboratory**

A precision-engineered standard-taper cone of high-melting polypropylene — can be cut or sawed to any shape needed.

Cut a "Poly-Cone" into 50-mm. segments and you have 6 concentric bushings, each capable of bridging two adjacent 3/8" joint sizes.

35/50 to 30/50 (accommodates 34/45 to 29/42)
 30/50 to 25/50 (accommodates 29/42 to 24/40)
 25/50 to 20/50 (accommodates 24/40 to 19/38)
 20/50 to 15/50 (accommodates 19/38 to 14/35)
 15/50 to 10/50 (accommodates 14/35 to 10/30)
 10/20 to 5/20 (accommodates thermometers, glass tubing, etc.)

A FEW USES

ORDER A DOZEN ON APPROVAL, ONLY \$1.50 EACH IN DOZEN LOTS.

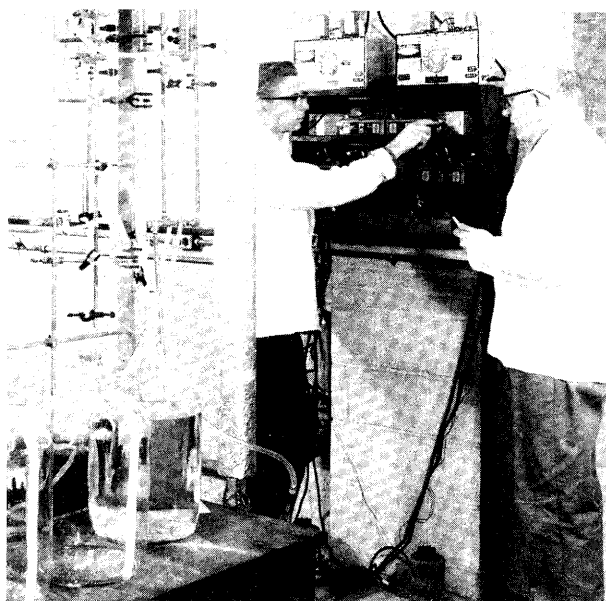
"Poly-Cone" universal adapters were one of several items produced and marketed in Burdick & Jackson's early days. (Burdick & Jackson Laboratories)

mixed. Old hands still remember the occasion when Kay's kitchen Mixmaster was pressed into service to prepare Amadac, one of Burdick & Jackson's early successful products, used to measure the fluoride level in drinking water. The mixer worked fine and still resides in an unused corner of the plant as a silent reminder of the firm's humble beginnings.

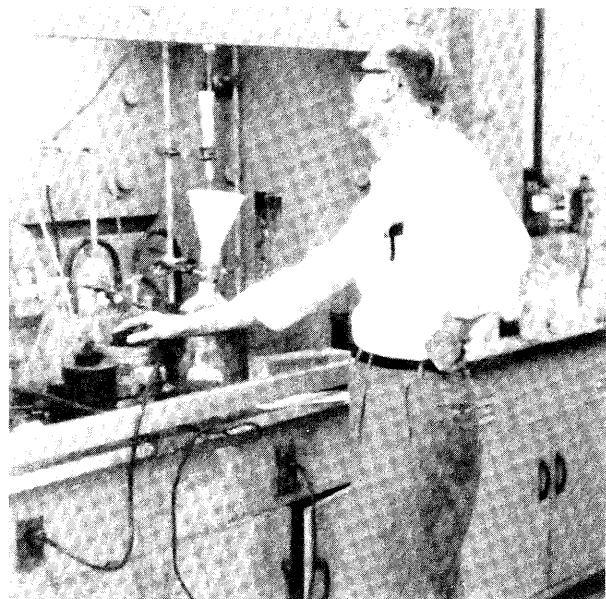
By 1961, Burdick & Jackson was doing well enough to begin hiring the small group of employees who were the firm's heart and soul for the next several years, doing whatever was necessary to keep the enterprise going. Wayne Kahrs, now the company's human resources manager, was a student at Muskegon (now Baker) Business College when one of his teachers, who happened to be the Jacksons' neighbor, told him the company was looking for a speedy and accurate typist to replace Juanita Marble, who was leaving. A young, strong farm boy who was also the fastest typist in his class, Kahrs was just what Jackson was seeking. Hired as secretary, his primary job was handling correspondence, orders, and billing. But when he was needed, Kahrs also took a turn monitoring the lab at night, swept the floors, shoveled walks in winter, and even washed Bill Jackson's car.

Dr. Gordon DeWall, now vice president for manufacturing, joined the company in 1961 as a summer employee while he studied chemistry at Calvin College in Grand Rapids. DeWall's father advised him to take the job in order to gain valuable experience in his chosen field. Over the next three years he ran experiments and worked in the lab under Bill Jackson's direction, took his turn on the night shift, and performed a wide variety of other jobs. Later, after earning a Ph.D. in chemistry at the University of Michigan, DeWall returned to Burdick & Jackson. Also added to the roster in the early 1960s were LeRoy Mudge, who handled plant maintenance, and Sharon Klinger, who took over Kahrs's secretarial duties when he became the company's shipping and receiving manager.

Mudge quickly learned that although Jackson was willing to make do with materials at hand, he would not tolerate sloppy work. On one occasion, Jackson remembers overhearing Mudge's conversation with a plumber while standing around a hallway corner. The plumber had just installed a new pipe, and Mudge noted it ran at a slant rather than forming a perfect 90° angle. When the plumber protested that it would make no difference in the way the system functioned, Mudge told him that did not



Wayne Kahrs (left), shown here with Orel Burdick, was "Jack-of-all-trades" when he first came to Burdick & Jackson. (Burdick & Jackson Laboratories)



In Burdick & Jackson's early years, Bill Jackson took his turn minding the laboratory. The equipment sometimes looked a little primitive, but Burdick & Jackson products were always high quality. (Burdick & Jackson Laboratories)

matter. "You can change it now," he said, "or fix it in a few hours when Bill Jackson sees it. You can be sure he will notice it, and when he does he will demand that it be perfectly square." The plumber

fixed the pipe. Jackson explains his insistence on precision and order by saying, "My dad was that way, I had been subjected to that since I was a baby."

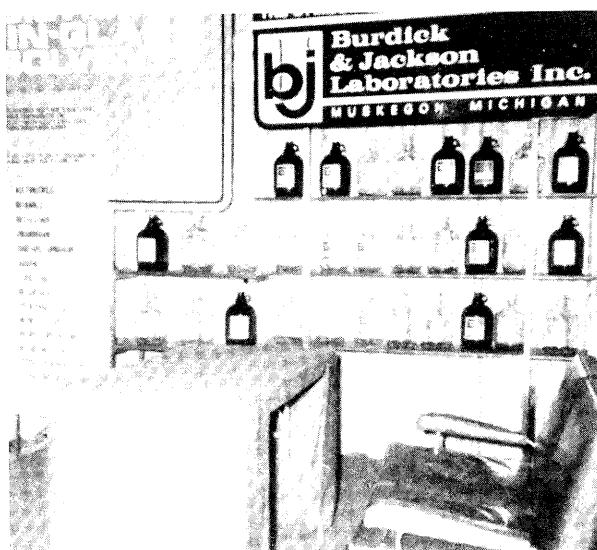
Thanks to Jackson's skills as a chemist, his business acumen, a small group of loyal, motivated employees, and plenty of masking tape, Burdick & Jackson progressed steadily toward financial stability. Looking back now, Jackson credits the eventual success of Burdick & Jackson to working hard, working smart, and being lucky. When he left Upjohn at the age of 40, his children were only age two and six. Unlike many of his contemporaries who were staring at looming college expenses for their offspring, Jackson had no such immediate worries. As a result, he had the luxury of being able to leave his steady job for a potentially risky new venture. He also had a supportive and courageous wife who said, "I'm with you whatever you decide." Added to that were the generous terms of his agreement with Burdick, the unreserved support and dedicated labors of those who worked at the company, and an order from Upjohn that set Burdick & Jackson on a prosperous new path.

The new relationship between the two companies began when Jackson's former colleagues at Upjohn purchased some Burdwatchers to monitor the purification of solvents such as the acetone they used to test for chemical residue. When a second, larger, order prompted Jackson to pay a personal call, he discovered that the Upjohn chemists were really less interested in buying new Burdwatchers than they were in finding a supplier of purified solvents. Jackson's company had already been supplying Upjohn with some purified solvents on a small scale, and he left the meeting with a greatly expanded order in hand.

Before the major Upjohn order, Burdick & Jackson had made small amounts of purified solvents for various clients, but the company had not been engaged in large-scale production. All that was about to change.

Making purified solvents was not a simple matter. It required buying the purest solvents available and then purifying them further – through processes such as fractional distillation (boiling), drying, oxidizing, and/or other chemical treatment – to meet exacting test laboratory standards.

Although Burdick & Jackson eventually developed a list of more than 60 purified solvents, output in the early days was far more limited. To fill



This simple display emphasizing its many pure solvents, all distilled in glass, was exhibited at one of Burdick & Jackson's first trade show appearances. (Burdick & Jackson Laboratories)

even small orders, the operation had to run 24 hours a day as each solvent went through four cycles in the stills. Jackson, Kahrs, and DeWall all took turns coming down to the plant to make sure each cycle was completed successfully, and that there were solvents to ship the next day.

When the newly purified solvents were ready for bottling, Burdick & Jackson used thoroughly cleaned glass bottles. Other companies, by contrast, used containers straight from the supplier without removing the impurities left during manufacturing. For many years the attention paid to that and other simple details gave Burdick & Jackson an edge over its competitors.

The bottle shipments came in once a month, and everyone helped with the unloading. With the aid of a corn elevator borrowed from a nearby farmer, the bottles were raised to a second-floor room in the rear of the plant where they were stored. From there, they were retrieved as needed, washed, and started on their way to be filled with purified solvents and shipped to the growing list of customers.

In early 1963, as they were launching their large-scale, solvent-production operation, Orel Burdick and William Jackson were approached by Jack Hennig, who proposed to join them as a third partner. Hennig was a chemical engineer who

had worked several years with Arnold Ott's company before coming to Burdick & Jackson to help organize their production processes. Imbued with a strong entrepreneurial spirit, he stayed a few years and then moved on to start his own company.

With increased production possible, Bill Jackson decided the time had come to place the company's first national advertisement for solvents. A small announcement in the trade journal *Analytical Chemistry* informed potential customers of highly purified solvents that were "distilled in glass." That notice turned out to be an important watermark for the company. No sooner did it appear than Jackson received a call from U.S. Food and Drug Administration headquarters in Washington, D.C., for half a case of each of the eight solvents the company offered. The order was shipped the next day, and back from Washington shortly thereafter came an invitation to bid on supplying petroleum ether and acetonitrile to FDA laboratories.

The invitation to bid caused consternation among the partners. While Jackson was ready to proceed, both Orel Burdick and Jack Hennig

wanted to pass. The specifications called for were met by commercial grades already available, they said, and larger companies could easily underbid them. Before the matter went any further, Jackson convinced his partners that he should place a call to Reo Duggan, the head of the FDA. Duggan readily explained that the FDA, like the chemists at Upjohn and other Burdick & Jackson clients, wanted to purchase rather than redistill pure solvents for its research needs. If Burdick & Jackson would submit a bid, Duggan told Jackson, it would be accepted. "Your solvents measure up in our use tests," Duggan said, "and others don't."

The conversation with Duggan was all the encouragement Jackson needed. True to Duggan's word, the company's bid to supply the FDA with highly purified solvents was accepted. Only later did Jackson discover that he was the only bidder. It was the first of a quickly growing number of orders from the FDA and other government agencies.

Behind the orders was an increasing national concern about pesticide residues in animals and crops that were part of the human food chain. In 1962, biologist Rachel Carson published a book titled *Silent Spring* in which she argued that widespread use of chemical pesticides like DDT was upsetting nature's balance and contributing to death and disease in animals and humans. In the national furor that followed, concerned citizens demanded to know more about the effect of pesticides and herbicides in their lives. A concerned Congress gave the FDA a "hurry-up" assignment to locate high concentrations of DDT residues throughout the nation and determine how they could be eliminated.

Highly purified solvents such as acetone, ethanol, methanol, isopropyl alcohol, and butanol were critical to the testing process because they would remain transparent in the optical measurements no matter how greatly they were concentrated. The purity of test reagents was essential in the detection and measurement of trace DDT residues – or any other substance, for that matter – in soil, water, or plants. Starting out with a solvent that was not pure enough and then concentrating it to a thousandth of its prior volume would also concentrate its impurities a thousand times and render the test results almost meaningless.

By 1963, with steady orders from Upjohn and the FDA, Bill Jackson's vision of a profitable and thriving enterprise was becoming a reality. The

The advertisement is a black and white graphic. At the top left, the text "HIGH PURITY SOLVENTS" is written in a bold, sans-serif font. To its right is a square logo containing the lowercase letters "bj". Below the main title is a large, stylized illustration of a glass distillation apparatus, with several large, teardrop-shaped droplets falling from the bottom. To the right of this illustration, the phrase "Distilled in Glass" is written in a smaller font. Below that, the text "Residue-Free" is prominently displayed, followed by a list of applications: "and suitable for... all types of chromatography... spectrophotometry... scintillation counting... atomic absorption... mass spectral measurements... fluorescence determinations... pesticide residue analyses...". At the bottom of the advertisement, there is a small line of text: "SEND WRITTEN ORDERS AND REMITTANCES TO 1953 SOUTH HARVEY STREET, BURDICK & JACKSON LABORATORIES, INC., MUSKEGON, MICHIGAN 49442".

Advertisements extolling the virtues of Burdick & Jackson's high-purity solvents, "Distilled in Glass," attracted several new customers for the small Muskegon company. (Burdick & Jackson Laboratories)

lab's small, 22-liter glass distilling flasks were soon replaced with 50-gallon, glass-lined, metal receptacles that greatly expanded production capacity. It was also about this time that the partners secured a bank loan and undertook the first of what would eventually be 18 additions to their plant. In the ensuing years, all but two of the expansions were financed by the company's own cash reserves.

As word spread of the company's high-quality products, university research facilities and pharmaceutical company labs such as Abbott, Lilly, Du Pont, and Merck put in their own orders. Dow Chemical of Midland signed a five-year contract rather than build a distilling facility of its own. Concerned food companies like Libby and Green Giant beefed up their testing programs and suddenly needed large quantities of solvents.

To help keep up with the expanding business, Jackson turned to Dr. William Schroeder, one of his former Upjohn colleagues. Born and raised in New York City, Schroeder had lost both parents by the time he was 14, lived with relatives until he graduated from high school, and, like Jackson, developed a high degree of self-reliance. In 1943, with his high school diploma in hand, he enlisted in the Navy and was assigned to an Ohio State University Navy ROTC program to study chemistry.

Discharged at the end of the war, he went back to Ohio State for an additional year and then, when his money ran out, worked for several years at the Schenley distillery research labs in Lawrenceburg, Indiana. In 1954 he decided to enroll at Purdue University and complete his undergraduate degree. Schroeder was an excellent student and, with the help of his major professor, Dr. Robert Benkesser, secured a scholarship from the National Science Foundation to stay on and pursue a doctorate in chemistry, which he earned in 1958.

At the time, Upjohn was hiring chemists with experience in antibiotic research, and Schroeder applied. William Jackson hired him and became his supervisor. Although Jackson left Upjohn about a year after Schroeder arrived, the two men stayed in contact, and Schroeder and his family made regular weekend visits to Muskegon. In part the visits were social, but as the work at Burdick & Jackson picked up, he spent time helping Jackson and his small crew at the laboratory. For Jackson, Schroeder's visits were an opportunity to engage in discussions about chemistry with a peer, while

Schroeder enjoyed exchanging the internal tensions of a large corporation for a friendlier, more collegial atmosphere.

More than once, Jackson invited Schroeder to come work with him in Muskegon. But, as the father of small children, Schroeder did not feel he could give up his secure position at Upjohn. Finally, in 1965, the time seemed right. Just as Jackson had done before him, Schroeder took a cut in pay in return for an opportunity to become a part owner of the company. Like Jackson's deal with Burdick, there was no written contract, only a verbal agreement honored by all parties.

Shortly after Schroeder came aboard, Orel Burdick and Jack Hennig left the company. Burdick had reached the age where he wanted to retire and proposed that the other owners buy him out over several years. Hennig, whose restless, entrepreneurial spirit had caused him to leave Arnold Ott for what he saw as a better opportunity at Burdick & Jackson, now wanted to join William Barger and Robert Hovey in starting East Shore Chemical Manufacturing Company in Muskegon. Bill Jackson did not feel Hennig should own parts of two companies, one the supplier of the other, and after protracted discussions, it was agreed that Hennig would sell his share of Burdick & Jackson. At about the same time, Gordon DeWall and Wayne Kahrs were given an opportunity to become minority shareholders.

By the late 1960s, the shift in the company's management and ownership was complete. As its largest stockholder, Bill Jackson served as president and chief executive. Schroeder held the title of vice president for research, Kahrs was traffic manager with a variety of responsibilities for organizing deliveries and shipping, and DeWall worked with Schroeder in research.

For the remainder of the 1960s and into the early 1970s, Burdick & Jackson Laboratories expanded its share of the growing purified-solvents market. Employee numbers grew from a dozen to more than 40, but Bill Jackson's hands-on management style remained unchanged. Neither Jackson nor Schroeder had an office. Instead, they had desks, telephones, and file cabinets next to each other in the lab. Instead of memos they communicated by conversation, and any employee could talk with them by simply walking into the lab. By adhering to Bill Jackson's belief in top-quality products, personal attention to employees and customers, and

lab's small, 22-liter glass distilling flasks were soon replaced with 50-gallon, glass-lined, metal receptacles that greatly expanded production capacity. It was also about this time that the partners secured a bank loan and undertook the first of what would eventually be 18 additions to their plant. In the ensuing years, all but two of the expansions were financed by the company's own cash reserves.

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Schroeder enjoyed exchanging the internal tensions of a large corporation for a friendlier, more collegial atmosphere.

More than once, Jackson invited Schroeder to come work with him in Muskegon. But, as the father of small children, Schroeder did not feel he could give up his secure position at Upjohn. Finally, in 1965, the time seemed right. Just as Jackson had done before him, Schroeder took a cut in pay in return for an opportunity to become a part owner of the company. Like Jackson's deal with Burdick, there was no written contract, only a verbal agreement honored by all parties.

Shortly after Schroeder came aboard, Orel Burdick and Jack Hennig left the company. Burdick had reached the age where he wanted to retire and proposed that the other owners buy him out over several years. Hennig, whose restless, entrepreneurial spirit had caused him to leave Arnold Ott for what he saw as a better opportunity at Burdick & Jackson, now wanted to join William Barger and Robert Hovey in starting East Shore Chemical Manufacturing Company in Muskegon. Bill Jackson did not feel Hennig should own parts of two companies, one the supplier of the other, and after protracted discussions, it was agreed that Hennig would sell his share of Burdick & Jackson. At about the same time, Gordon DeWall and Wayne Kahrs were given an opportunity to become minority shareholders.

By the late 1960s, the shift in the company's management and ownership was complete. As its largest stockholder, Bill Jackson served as president and chief executive. Schroeder held the title of vice president for research, Kahrs was traffic manager with a variety of responsibilities for organizing deliveries and shipping, and DeWall worked with Schroeder in research.

For the remainder of the 1960s and into the early 1970s, Burdick & Jackson Laboratories expanded its share of the growing purified-solvents market. Employee numbers grew from a dozen to more than 40, but Bill Jackson's hands-on management style remained unchanged. Neither Jackson nor Schroeder had an office. Instead, they had desks, telephones, and file cabinets next to each other in the lab. Instead of memos they communicated by conversation, and any employee could talk with them by simply walking into the lab. By adhering to Bill Jackson's belief in top-quality products, personal attention to employees and customers, and



Even after the company was well established, Bill Jackson continued to use this laboratory cubicle for his office. (Burdick & Jackson Laboratories)

modest trade publication advertising, the company secured a market share that reached 35 percent at its peak.

Not surprisingly, Burdick & Jackson's success was noted by the larger chemical companies that used their products. One of those was Hoffmann-LaRoche, a drug manufacturing and sales company whose United States operations were headquartered in Nutley, New Jersey. William Jackson's relationship with Hoffmann-LaRoche had begun years earlier when he was hired by the drug giant as a consultant in antibiotics. Once each month, he would travel to New Jersey, talk to chemists at "Roche," and offer them his common-sense ideas for resolving problems. It was, he recalled later, "a real racket.... Because people at work are so close to [it], they can't see the problem." Often, Jackson's consulting work consisted of talking through a problem and helping Roche staff see solutions that were more readily apparent to someone from outside the operation.

By the late 1960s, Hoffmann-LaRoche's representatives were commenting on Burdick & Jackson's remarkable success and jokingly suggesting they should buy the company. The suggestions took on a more serious tone into the 1970s as Burdick & Jackson continued to grow and to maintain its lead over its competitors in this highly specialized market. Although he had not planned

to sell the company at this juncture, Hoffmann-LaRoche's interest was too tempting to be dismissed easily.

Bill Jackson was 55 years old, and it was time to begin planning for the future. In the nearly 15 years that he had devoted to building the company, all profits had been reinvested and no dividends had been paid. Jackson was also mindful of the fact that while major mishaps had thus far been avoided, even the most carefully run chemical operation is vulnerable to devastation by accident or fire. The more he thought about it, the more appealing the Hoffmann-LaRoche interest became.

Finally, in 1974, Hoffmann-LaRoche tendered a firm offer that Jackson took to the other company shareholders with the recommendation that it be accepted. As Bill Schroeder later recalled the moment, Jackson returned from one of his consulting visits and reported the news. "You'll never guess what happened," he said. "They tendered us an offer for the company. We'll have to decide if we want to do it and if we do, what we think we want for it." Schroeder and the other minority owners, DeWall and Kahrs, were younger than Jackson and not as anxious to sell, but they respected his wishes and majority position, and serious discussions commenced.

By December 1974, an agreement was reached. Hoffmann-LaRoche would acquire the assets of Burdick & Jackson for \$2.25 million, but the company's management would not change. Jackson, Schroeder, and the others would continue as before. For the four owners this meant an immediate buyout and fixed annual salaries; for the employees it was an assurance of job security and access to the larger company's hospitalization plan and fringe benefits package. To further sweeten the deal for nonstockholders, each employee received a bonus from the buyout payment.

For the next two years, Bill Jackson continued to guide the company. But by the end of that time he reached the conclusion that he was not cut out to work for someone else, and he informed Hoffmann-LaRoche of his plans to retire. Perhaps concerned that he might take his knowledge of purified solvents to a competitor, Hoffmann-LaRoche negotiated a retirement package for him that included lifetime health-care benefits and a seven-year consulting contract that assured he would work for no one else. Thus, at 57 and financially secure, Jackson turned the leadership of the

company over to Bill Schroeder, who had been named to succeed him as president.

William Jackson's retirement from Burdick & Jackson did not mean the end of his business activity. With the proceeds from the sale of Burdick & Jackson, he invested in a variety of West Michigan and Florida ventures. Successful real estate investments in Muskegon and the Grand Rapids area further embellished the fund that he and Kay planned to use to enjoy their retirement. Other ventures, including small investments in two Hollywood movies, did not go so smoothly, and reminded Jackson that it was not always wise to place his fate in the hands of others by entering fields in which he had limited knowledge.

Jackson's most challenging post-retirement enterprise began in 1975 with an investment in a Florida mobile home park called West Winds, located in Bradenton, south of Tampa on the state's west coast. Jackson, Bill Schroeder, and four other West Michigan businessmen had sunk funds into what they thought was a successful operation. However, they soon discovered that the number of people leasing lots was not as large as they had thought, that poorly constructed water and sewer lines would have to be rebuilt, and that many tenants who had purchased mobile homes were

behind on their monthly payments.

To make matter worse, because they had been permitted to buy their homes with no down payment, several tenants simply walked away when they could not afford to meet their monthly obligations, leaving Jackson and his fellow investors with less income and greater expenses than they had anticipated. After coming up with additional funds to shore up their original investment, the principals agreed that Bill and Kay Jackson would move to Bradenton and manage the park until it was back on a profitable footing.

Restoring West Winds to solvency was a difficult task, but Bill Jackson's entrepreneurial skills ultimately transformed a potential loss into a substantial gain. Because of outstanding mortgage obligations, banks ended up repossessing about 15 percent of the homes. Systematically, Jackson set about repairing the park and attracting a new group of residents. Finally, by 1990 the park was doing well enough that a majority of its residents wanted to purchase it and run it as a condominium. With the eventual sale of all of the lots, Jackson ended up earning more on the West Winds venture than he had from the sale of Burdick & Jackson 15 years earlier.

Commitment to the Community and the Environment

Although they had initially been reluctant to leave Kalamazoo and the comfortable community of Upjohn employees, Bill and Kay Jackson soon made a new home for themselves in Muskegon. Ardent sailors, they moved to a home on Muskegon Lake in the 1960s in order to have more time to sail on Lake Michigan. Bill had sailed as a boy, and as soon as Burdick & Jackson Laboratories was on its feet, he and Kay resolved to take advantage of the vast expanse of water that is West Michigan's greatest natural resource.

Their first vessel was a 27-foot Tartan sailboat named *Dipip*, after diphenyl isophthalate, the first money-making chemical produced by Burdick & Jackson. Later, the Jacksons purchased a 34-foot Tartan named *Nightrain* because of its black hull and for a song by the Les Brown orchestra they both enjoyed. For about 15 years, Bill and Kay spent most of their free summer moments on the lake. Bill sailed in many Queen's Cup races to and from Milwaukee and in the Chicago-to-Mackinac race, and by the time he ceased sailing, he had 36 Lake Michigan crossings to his credit.

Living along Muskegon Lake in the 1960s and sailing through its channel and out into Lake Michigan made Jackson aware of the growing problem of contamination by foundry debris. From his home, he could look across the water at night and watch truck after truck dump the waste into the shallow depths along the lakeshore. Although there was no law at the time preventing the dumping, it infuriated him to see a waterway so despoiled.

It seemed to Jackson that Muskegon Lake had been written off by both the city and the Michigan Department of Natural Resources, and that citizen

action was required to stop the pollution. Jackson was a director of the Muskegon Yacht Club at the time and persuaded the other directors to let him head a committee called Save Our Lakes (S.O.L.). The committee's goal was to engage in a public education program as the first step toward cleaning up the lake.



The Nightrain, the Jacksons' 34-foot black-hulled Tartan sailboat, was a familiar sight on Muskegon Lake for many years. (W.G. Jackson)

With a driver and a photographer, Jackson went around the lakeshore taking what came to be known as "Bill's Dirty Pictures," including one that he describes as a "famous one of those dump trucks out on that spit unloading the most awful-looking

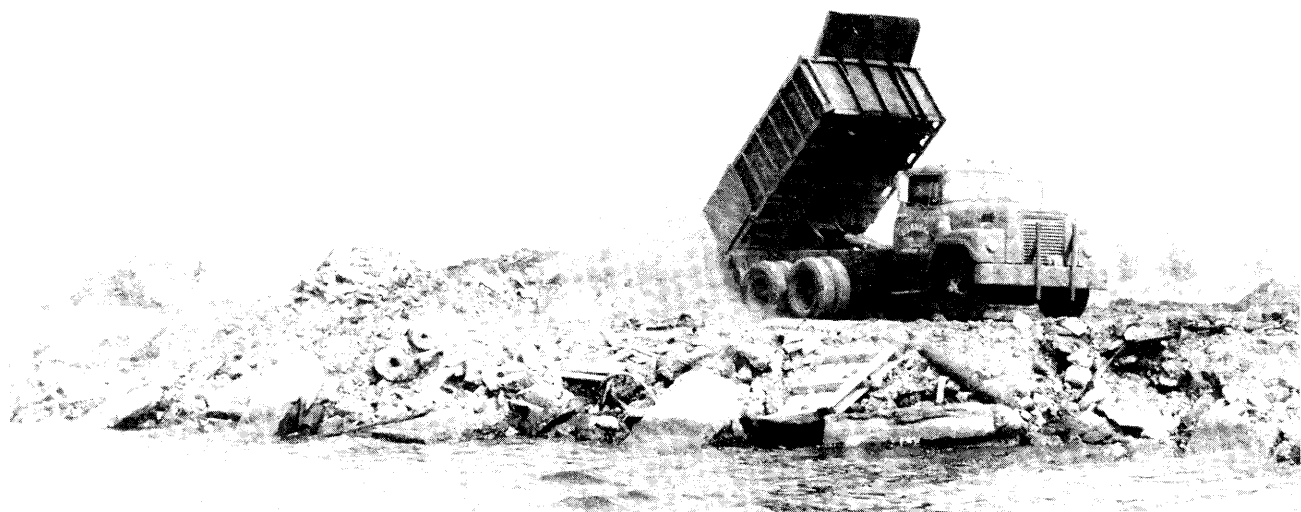


Bill Jackson's love of sailing and the pleasant, relaxing hours he spent on Lake Michigan led him to take a leading role in the effort to clean Muskegon Lake.

bunch of waste you could imagine into the lake." Jackson put together a slide show of the worst images and began to make the rounds of Lions, Kiwanis, and Rotary clubs, Boy Scout troop meetings, and, finally, the Muskegon City Commission. Everywhere he went, new adherents joined his cause, offering to help spread the message.

As support grew outside the Yacht Club committee, Save Our Lakes (S.O.L.) was reorganized as a nonprofit corporation, with Bill Jackson at its head. Members raised funds to continue the battle and hired attorney Peter Steketee of Grand Rapids to lead their legal challenges. The organization's greatest victory came in the early 1970s, when it turned back the plans of Northstar Steel, a division of the Cargill company, to put up a steel mill on the shore of Muskegon Lake. Jackson was among the leaders in the fight to stop construction of the huge, seven-story plant that would occupy a quarter-mile of shoreline. At first, few believed the industrial giant could be deterred, but little by little, S.O.L. gained converts until elected officials could no longer ignore the group. Faced with growing opposition, Northstar decided to build the plant on the east side of the state on the Detroit River near Monroe.

During the fight against Northstar, a second organization, called Save Our Shoreline (S.O.S.), was formed, and Jackson was active in that as well, even as he remained head of S.O.L. After several



Looking across Muskegon Lake from his home, Bill Jackson became increasingly upset as he watched trucks back up and dump their cargo of rubbish into the water. Capturing dumping such as this in a collection of slides known to his friends as "Bill's Dirty Pictures," he began a campaign to educate citizens about the pollution of Muskegon Lake. (W.G. Jackson)

years, however, Jackson felt the time had come to hand the S.O.L. reins over to new leaders. When he was unable to find anyone else willing to take over as chair, he successfully proposed that S.O.L. merge with S.O.S. and turn over its treasury to the newer organization. Since then, S.O.S. has been carrying on the fight.

It was not especially surprising to see Bill Jackson involved in efforts to clean up water pollution. In addition to his affinity for sailing, he had the advantage of not being dependent upon anyone in Muskegon for his business and could take a leadership position without fear of alienating his customers and suppliers. Not only that, but Burdick & Jackson personnel had already developed a reputation for environmental consciousness. Even before Jackson got involved in cleaning up Muskegon Lake, Bill Schroeder and Gordon DeWall had been leaders of a regional effort to end air pollution.

Schroeder had become concerned about Muskegon's polluted atmosphere even before moving to the city, and shortly after his arrival he and DeWall became involved in a group known as Muskegon County Citizens for Clean Air. In 1966, the group manned a booth at a county health fair and solicited signatures to a petition calling upon county commissioners and the state to take action against industrial polluters. As the result of emis-

sions caused by the coal-fired B.C. Cobb electrical generating facility, the Lakey Foundry, and the open burning engaged in by auto garages to dispose of used oil and rags, Muskegon had a serious air pollution problem that, on bad days, cast a fine dust of airborne particles over everything in the downtown area.

To the clean air group's surprise and delight, the community was ready to take action. More than 6,000 citizens signed the petition, which was then used as primary evidence of the degree of citizen concern when the case against air pollution was made to elected officials. Other environmental groups also made their impact felt to considerable effect. Today open burning is banned in Muskegon County, the Cobb plant has only one smokestack instead of the five Schroeder saw when he first came to town, and Muskegon's image as a grimy mill town is being replaced by one where less-polluting industries now prevail, and where development along Muskegon Lake is attracting a growing number of recreation-related businesses and services.

Schroeder's leadership in area environmental causes led to his involvement in a planning group known as Muskegon 2000, which was formed to help guide the city into the 21st century. Established under the auspices of the Muskegon Economic Growth Alliance (MEGA), the new group was divided into several subgroups, one of which was a coordinating council headed by Schroeder that dealt specifically with the environment. Composed of environmentalists, business people, and elected officials, the coordinating council made several recommendations, including the establishment of a university-run lakeshore research and development facility. At first council members thought of attracting either the University of Michigan or Michigan State University to the project, but they quickly realized that their ideal partner was only a few miles away at Grand Valley State University.

Grand Valley had taken its first plunge into water research beginning in 1965 when Indianapolis businessman D. J. Angus donated his 50-foot power cruiser, the *Angus*, to the school shortly before his death. Angus, who had grown up in the Grand Haven area, maintained a home there and returned to cruise the lake each summer. He intended that his gift be used as a floating classroom.

Over the years, a variety of grants and gifts transformed the onetime pleasure yacht into a prop-



This example from "Bill's Dirty Pictures" show makes clear his feeling about the ongoing dumping of industrial refuse. (W.G. Jackson)

erly outfitted research and teaching vessel that operated out of Grand Haven. Angus's friends and associates, including his longtime colleague Robert B. Annis, made annual donations to the university for the upkeep of the *Angus* and to support special projects in the school's biology department.

By 1985, the original *Angus* was undeniably outdated, and GVSU decided to replace it with a more modern successor, which was named the *D. J. Angus*. That same year, the school formally established its Water Resources Institute. Drawing together faculty and student participants from disciplines as diverse as biology, geology, and health sciences, the institute is designed to "preserve, protect, and improve water resources" through a broad range of formal and public education and research projects, and cooperative programs between the university and area governments, businesses, and industries.

Nationally known for its research into the lakes, ponds, and wetlands of the Grand River watershed, the Water Resources Institute is equally noted for student use of the *D. J. Angus*. The donation of the original *Angus* acted as a catalyst in creating student interest in water research. Over the past 30 years, Robert Annis and other members of the D. J. Angus-Sciencetech Educational Foundation board



Retirement has given Bill and Kay Jackson more time for the dancing and travel they both enjoy. (W.G. Jackson)

have helped promote that interest by bringing a group of regional science fair winners from Indiana to Grand Valley once a year for a weekend visit. The students spend a day aboard the *D. J. Angus*, learning water-quality research techniques from Water Resources Institute staff members.

Many area students have likewise discovered aboard the *D. J. Angus*, and on the *Angus* before it, the importance of scientific research and the difference that it can make in quality of life. In 1992 alone, the vessel served nearly 3,500 participants in over 169 events in the Water Resources Institute's Aquatic Science Education Outreach program. With such a heavy workload, the *D. J. Angus* was being used 100 percent of the time, and the university began exploring ways to acquire a second vessel.

Muskegon's idea for a lakeshore research and development facility provided the ideal way to bring university and community interests together. Roger Andersen, a member of the Muskegon coordinating council, had ties to Grand Valley. Through his efforts, an agreement was struck to raise funds to construct and outfit a second vessel to be operated by the Water Resources Institute and headquartered in Muskegon, and to create an endowment that would provide annual operating support. Andersen agreed to chair "Making Waves in Muskegon," the \$1.6 million fund drive, and he asked Bill Schroeder to serve as his co-chair.

Andersen and Schroeder each pledged \$25,000 to launch the fund-drive campaign, and then they set about finding others willing to make similar pledges. At this point, Bill Jackson entered the picture in a dramatic way. By then he and Kay were spending a large part of each year in Florida, but they still came home to Muskegon for the summer months. While they were back in Michigan in 1994, Schroeder invited Bill to join him on a tour of a naval frigate docked in Muskegon Lake. As the two old friends and former business partners walked off the vessel, Schroeder began to talk about his fund-raising effort for GVSU's research and teaching vessel and his hope that Jackson would consider participating. He still clearly remembers the conversation.

"I'd like to have you consider \$25,000," Schroeder recalls saying.

"Yes, I would consider that," his old friend responded. "In fact I might even consider a little more than that."

Schroeder's heartbeat quickened. Maybe, he

recalls musing to himself, he'd go for \$50,000. "Great, Bill. What can I put you down for?"

Slowly, in what Schroeder calls Jackson's inimitable way, his old partner and friend replied, "I think I could go for a quarter of a million."

With Jackson's offer, the dream had taken a giant step toward becoming a reality. The two men talked further about the proposed gift. Bill Jackson saw it as a chance to be a significant factor in making something happen that would perpetuate his effort to clean up Muskegon Lake and pass a better environment on to a new generation. Although he and Kay no longer lived in Muskegon, their daughter and grandchildren made their home in the area, and Jackson still felt close to Burdick & Jackson and the city that had been the scene of his personal business success.

In order to generate another \$250,000 from other sources, Jackson made his gift in the form of a challenge grant. In that way, he believed, he could have the greatest possible impact on cleaning up the lake, a goal that had occupied him for so many years. Thanks to Bill Jackson's gift, "Making Waves in Muskegon" reached its \$1.6 million goal in a relatively short time. Working in conjunction with the Muskegon County Community Foundation, the committee secured more than 200 donations. Among the major gifts were \$250,000 from the Michigan Commerce Department's University Business Research Development Fund obtained through the efforts of Rep. Leon Stille of Ferrysburg, and a \$150,000 grant from the Brunswick Foundation given to mark the 150th anniversary of the Brunswick Corporation, a sporting goods manufacturer that had made Muskegon its headquarters since the early years of the 20th century.

Although it was not Jackson's request, Bill Schroeder and the "Making Waves in Muskegon" fund raisers felt the new GVSU research and teaching vessel should be named for its most important benefactor, and the university concurred. In the future, as the *W. G. Jackson* carried out the university's research and teaching mission, it would serve as a permanent reminder of Bill Jackson's concern for the community and the lakes he cared about so deeply.

At the same time that he made his gift to Grand Valley State University, Jackson further demonstrated his commitment to education by creating a scholarship fund for Iron Mountain High School.



Bill and Kay Jackson currently spend much of each year at their condominium in Cortez, Florida, with summer visits to Muskegon. (W.G. Jackson)

He saw the fund as a way to express his gratitude to Bruce Guild, the high school principal and science teacher who first sparked his interest in chemistry. Annual proceeds from the \$84,000 gift, named the William G. and Kathleen L. Jackson Scholarship Trust, will be used to provide a scholarship for a student with a record of academic achievement and leadership who demonstrates financial need, and for whom the scholarship will provide the opportunity to attend a "college or university known to be of high reputation." In making the gift, Jackson noted that he would have been unable to attend the University of Michigan and the University of Illinois without scholarship help, and that he saw the trust fund as an opportunity to replant the seeds of scholarship and good citizenship that each generation must pass along to the next. In consideration of his environmental and philanthropic efforts and his business success, the Iron Mountain Rotary Club voted him "Native Son of the Year" for 1996.

Recognition for William Jackson's lifelong commitment to proper care of the environment also came from the Muskegon community, where he was among the honorees at the 1996 Muskegon Area Environmental Excellence Awards Banquet. The "Making Waves in Muskegon" campaign that

had been spearheaded by Roger Andersen and William Schroeder was recognized for its successful fund raising effort, and the evening's top honor went to Jackson, who was given the committee's "Lifetime Achievement" award, saluting his decades of environmental work. In their citation, committee members honored Jackson for work that began with a composting project at Upjohn, continued through many years dedicated to cleaning up Muskegon

Lake and making the Burdick & Jackson Laboratories a forerunner in environmental compliance, and was capped by the largest individual gift in the "Making Waves in Muskegon" campaign. The award confirmed what many in Muskegon already know — that William Jackson is an enterprising scientist whose commitment to good science and good business practices have made him an outstanding community citizen.

Sources

Information for this biographical sketch came from interviews with William G. Jackson, William Schroeder, Wayne Kahrs, and Gordon DeWall. Additional information came from the *Muskegon Chronicle* library, and Leonard Engle, *Medicine Makers of Kalamazoo*, McGraw-Hill Book Company, New York, 1961. Photographs were supplied by William Jackson, Burdick & Jackson Laboratories, the University of Illinois Archives, Ferris State University, the Western Michigan University Archives and Regional History Center, the Michigan State Archives, the University of Michigan's Bentley Historical Library, Pharmacia & Upjohn Inc., and the Water Resources Institute at Grand Valley State University. All research materials, including photographs, and tapes and transcripts of the interviews have been placed in the regional historical collections at Grand Valley State University.



The W.G. Jackson will serve as a permanent reminder of Bill Jackson's concern for the community and the lakes he cared about so deeply. (Grand Valley State University)

Specifications of the Research and Education Vessel *W. G. Jackson*

Length:	64 feet 10 inches (19.7 meters)	Generators:	20 KW and 10 KW
Beam:	20 feet (6.1 meters)	Electronics:	2 VHF Marine Radios Ratheon 21XX Radar Ratheon Differential GPS 2 Ratheon Depthfinders
Draft:	5 feet (1.5 meters)		
Crew:	2 (plus science support)		
Engines:	Twin 325 HP Detroit Diesel		

Capable of carrying instructional groups of up to 25 for day trips and research crews of 6 for overnights, the vessel is equipped for trawling and scientific sampling. In its onboard Brunswick Laboratory, the *W. G. Jackson* carries basic as well as advanced scientific equipment, such as:

Bathythermograph	pH Meter
Conductivity Meter	Phleger Gravity Corer
Computers for Analysis	Ponar Grab Sampler
Fish Trawl	Secchi Disc
Forel-Ule Water Color Scale	Turbidity Meter
Kemmerer Water Sampler	Van Dorn Water Samplers