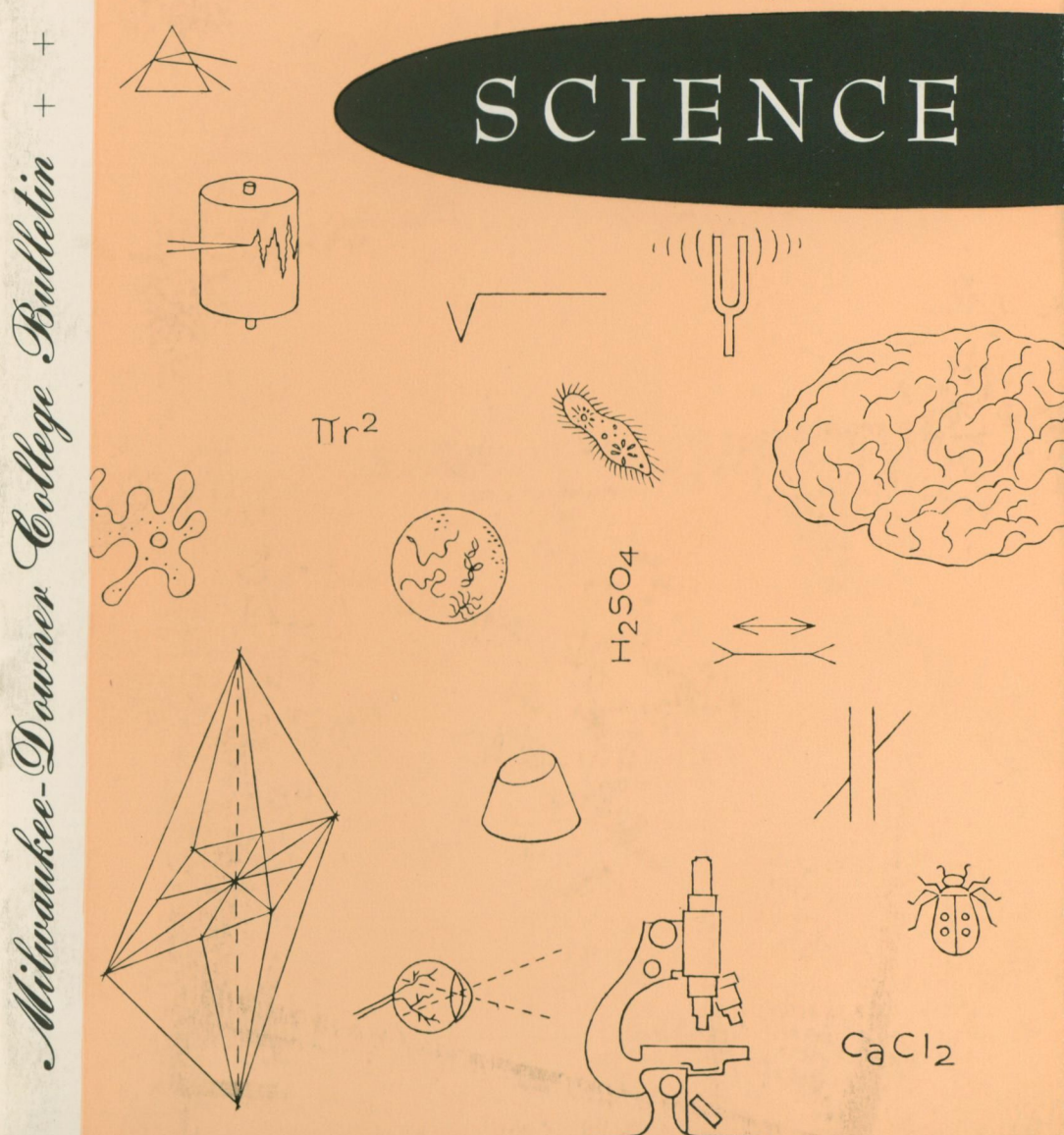
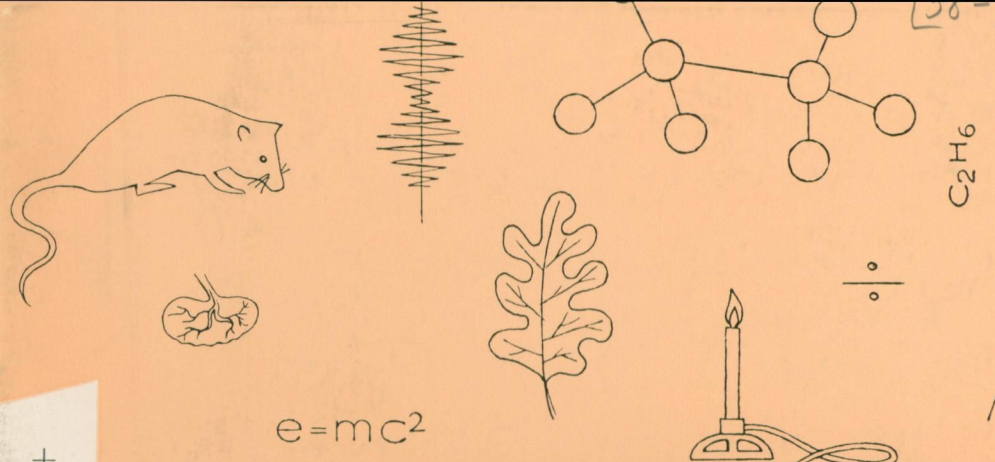
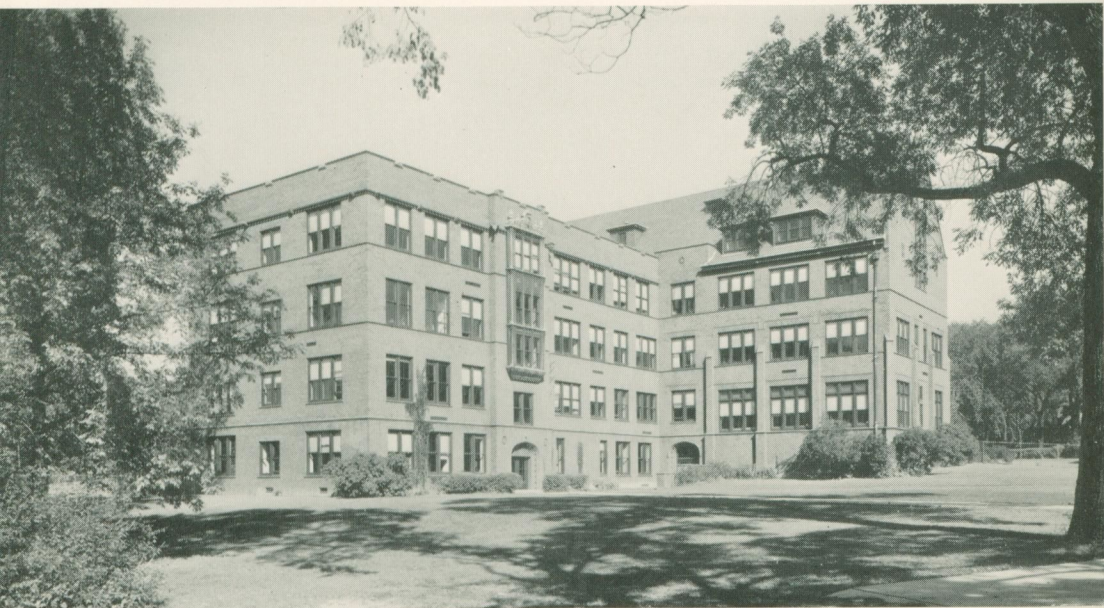


Milwaukee-Downer College Bulletin



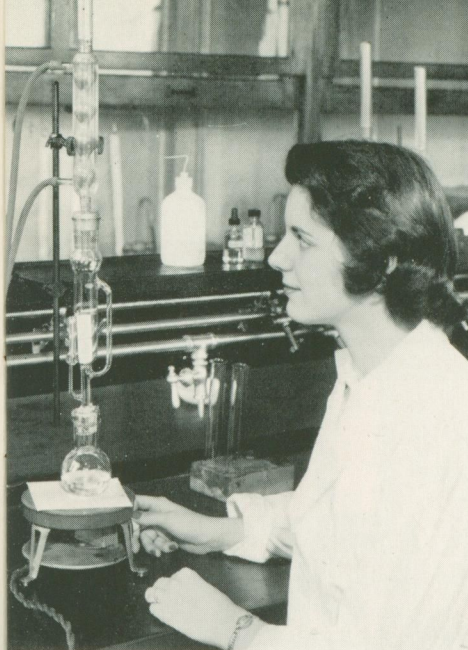
SCIENCE

Sabin Hall, which houses the Science Division



MILWAUKEE-DOWNER COLLEGE BULLETIN
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physiological chemistry

An experiment in Physiological Chemistry is the analysis of milk for fat content. The paper cylinder in the center section of the apparatus has been dipped in milk and allowed to dry. Here ether is being run over the paper continuously to dissolve all the fat. Later the ether is evaporated and the fat is weighed.

new forces

To live in this age without studying science would be like living in London during Shakespeare's day without ever going to the theatre.

New forces are shaping our times. New drugs are lengthening our lives. New devices are lightening our labors. New interests are filling our leisure.

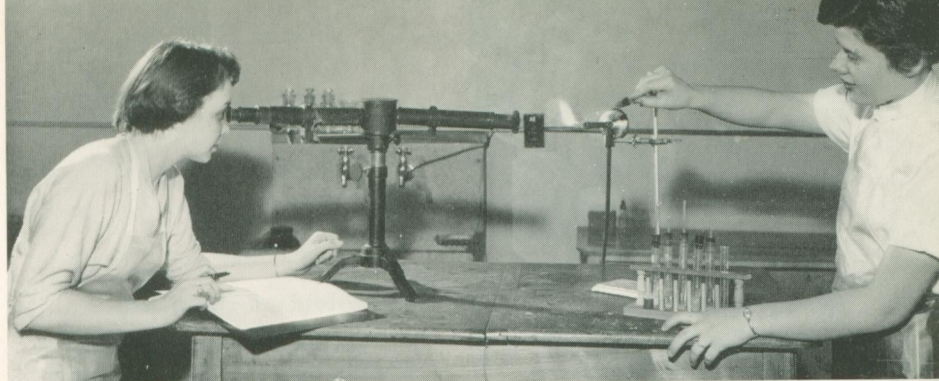
Children play with space helmets and Geiger counters. Men talk of radar and travel in stratosphere airships faster than the speed of sound. Women buy nylon and orlon fabrics and launder them with detergents. Families watch television and cinerama.

Scientists are splitting atoms and are investigating means of harnessing atomic power. The possibilities for further discovery and invention are almost limitless for those with the curiosity and patience to work by the scientific method.

But new problems are arising with this progress. Science could get out of bounds. It is developing forces that are capable of destroying mankind. These dangers will not be averted by condemning scientific advances on moral grounds. We must first develop a knowledge and appreciation of science and then work out ways in which we can guarantee that scientific discovery will be directed to socially useful ends.

Only those who have an understanding of science along with a deep concern for human welfare, for ethical and spiritual values, can safeguard tomorrow.

To provide that kind of liberal education is the objective of Milwaukee-Downer College.



spectroscope

Two students in Physical Science are shown using a spectroscope as part of a procedure to analyze a sample of baking powder. An element may be identified by the characteristic colored lines which may be seen through the instrument when the elements or one of its compounds is held in the flame.

bacteriology

The laboratory below with an adjoining preparation room is used for bacteriology. Every student has the use of a microscope at her own desk, and access to other modern apparatus that makes possible exact experimental work.

Each of these students is performing one of the many different experiments necessary for the analysis of blood.

new products

When a new product appears on the grocer's shelf and adds variety to the housewife's store of foods, the compliments she receives from her family and guests really belong to the long line of scientists who have helped to develop this product.

First the biologist has worked to produce a food suitable for preserving. The botanist develops a good plant, grown for size and color and taste. For example, the hybrid types of corn we know today were not found in wild condition, but produced by man on the basis of genetic research. Indians may have introduced corn to the white man, but it was not the juicy kernel which we eat on the cob.

Along with the botanist the chemist works on photosynthesis, studying the effect of light on growing plants, and using radioactive tracers to study the nature of plant growth.

The physicist's contribution is to develop a process that will preserve the food in a state of garden-freshness. He has worked out techniques of quick freezing by which the ice crystals which form are so small that they do not rupture the cell walls and destroy the protoplasm. Since no changes occur in its structure, the frozen food remains in a natural condition. It does not spoil because bacteria cannot metabolize and grow in such a low temperature.

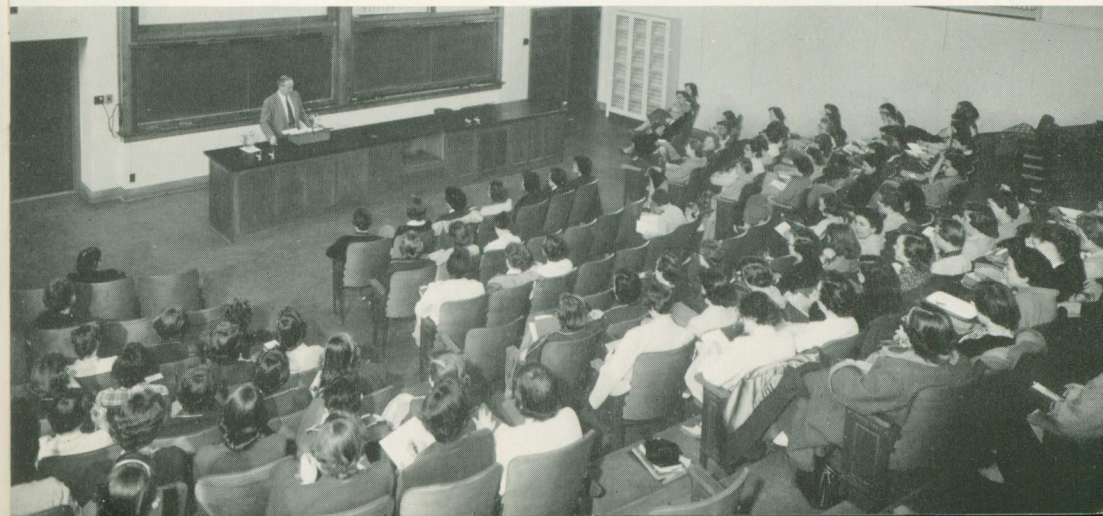
Again the chemist analyzes the result of both the botanist's and the physicist's work to insure that the vitamin content and the natural flavor have been maintained.

Industrial processes are interrelated with the fundamental principles of science. All contribute to the processing and packaging of many foods that add variety and appeal to our meals today. It is even possible that in the future we shall be buying packages of corn, or spinach, or carrots, reduced to the size of a match box. New dehydrating processes will extend the freezing technique, removing by vacuum the water which makes up 80 to 90% of food. Cutting down the volume and weight will reduce shipping and storage costs. Scientists will never cease their research to bring new wonders to our tables.



pillsbury hall

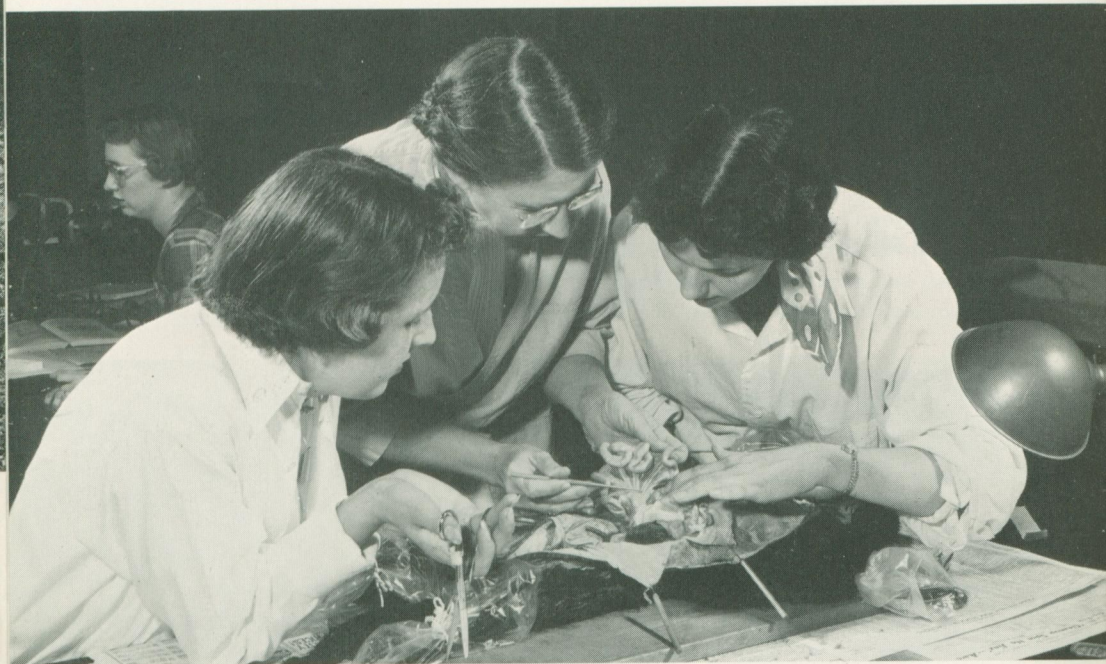
Pillsbury Hall, with 235 seats in amphitheatre style, and with built-in projection booth, has excellent facilities for science lectures and demonstrations. It is also used for general assemblies and programs, including illustrated lectures.



new horizons

At Milwaukee-Downer College the natural sciences and mathematics are as interrelated as in the world of research where all contribute and cooperate. In the laboratories and offices of Sabin Hall it is not unusual to find chemistry and biology faculty members conferring with physics and mathematics or psychology professors, each interested in the work of colleagues and students in other areas. Small classes encourage a quicker tempo of learning and permit flexibility in individual assignment. The science major who is particularly gifted has the privilege of working for departmental honors. She may also elect a "400" course, which often involves research in a field of special interest.

The equipment and facilities in relation to the number of students offer unusual opportunity. Sabin Hall, with its extensive laboratories and scientific apparatus, is surrounded by acres of wooded campus in which botany classes may find specimens



of natural plant and tree growth at their very doorstep. Nearby is Greene Memorial Museum rich in geological specimens. Across the campus is Chapman Memorial Library with its open stacks inviting study in conveniently placed "carrels." The latest scientific journals are available on the magazine shelves, and the reference rooms draw scholars from beyond the college boundaries.

Beginning courses at Milwaukee-Downer have been reorganized and liberalized to benefit both the science major and the non-major. With this broader approach, a student who may not know what she wishes to choose for her field of concentration may discover more clearly where her interests lie. If she wishes to go on in science she will have the foundation. If not, she will have gained an appreciation of the relationship between science and the life she is living. She will have experienced the orderly procedure of the scientific scholar. She will have had a taste of the intellectual appeal of pure science, and she will also have discovered how many practical applications of the research field are all about her: in fabrics and dyes, in eye glasses, cameras, thermometers, barometers, in the water purification plants that protect her community's health, in psychological tests that prevent or correct misfits in employment, in new medicines that heal diseases of the human body and the human mind.

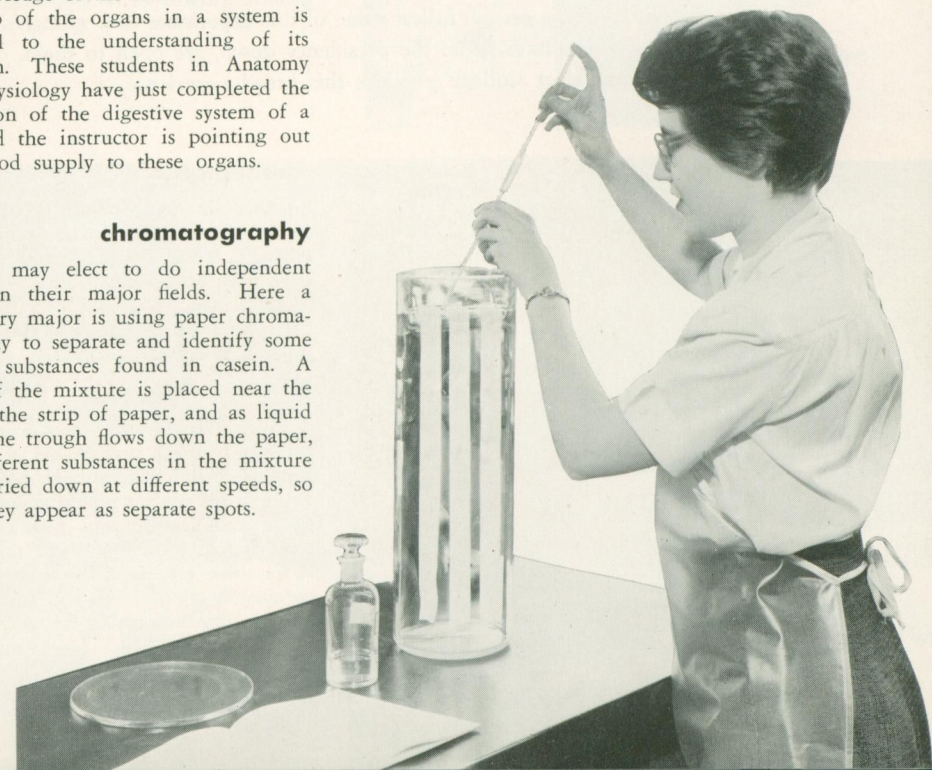
All these and infinitely more had their beginnings in scientific investigation.

anatomy

A knowledge of the structure and relationship of the organs in a system is essential to the understanding of its function. These students in Anatomy and Physiology have just completed the dissection of the digestive system of a cat, and the instructor is pointing out the blood supply to these organs.

chromatography

Seniors may elect to do independent work in their major fields. Here a chemistry major is using paper chromatography to separate and identify some of the substances found in casein. A drop of the mixture is placed near the top of the strip of paper, and as liquid from the trough flows down the paper, the different substances in the mixture are carried down at different speeds, so that they appear as separate spots.



new opportunities

The opportunities open to the girl who has majored in science and mathematics are increasing. While men may still command many of the top positions, women have struggled valiantly and gained a firm foothold in medicine and in all fields of research. It is now up to the women being educated today to hold these gains and expand them.

Circumstances have widened their opportunities. During war years women were called upon to release manpower in critically important professions, and they proved their ability even in such masculine fields as engineering. But it takes more than knowing how to operate a slide rule, more than technical ability to guarantee a bright future for the woman engineer, warns Miss Katherine Stinson, president of the Society of Woman Engineers. "You have to be able to get along with people."

For a man or woman the ability to get along with people is certainly a more likely by-product of an education that is liberal than one that is largely technical. Generous election of courses in literature, languages, history, sociology provides an insight into human nature which science alone cannot offer. To understand one's fellowman is the first step toward being able to get along with him. But an academic understanding is not enough. Daily practice in human relationships occurs in the extracurricular activities of student government, chorus, dramatics, club work, and dormitory living. Girls get the fullest value of this experience in a woman's college where class and club offices, from the presidency down, are open to them.

Milwaukee-Downer College provides this broad experience.

mathematics

Students in Introductory Mathematics are shown studying the equation for an ellipse, a figure which is formed when a cone is cut diagonally.

Mathematics is offered both as a major field and as an important adjunct to the physical sciences.

histology

A unit of the histology course is an introduction to the preparation of permanent tissue slides for microscopic examination. This student is cutting embedded tissue into thin sections with a microtome before mounting them on slides. After these are stained and made into permanent mounts, she will study their cellular structure under the microscope.



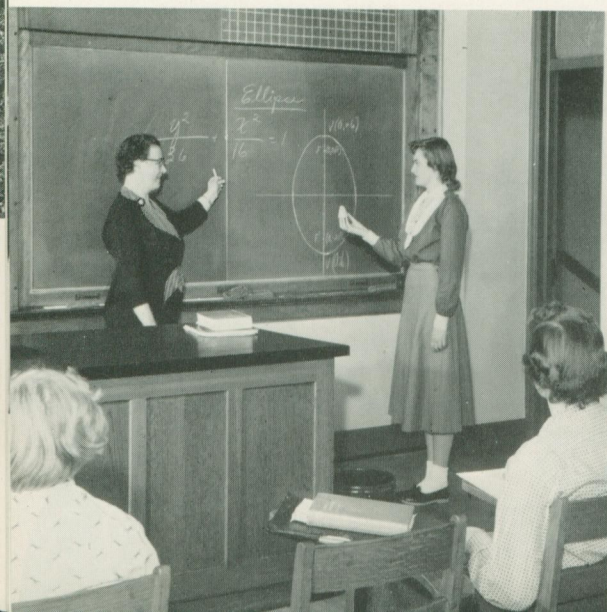
medical bacteriology

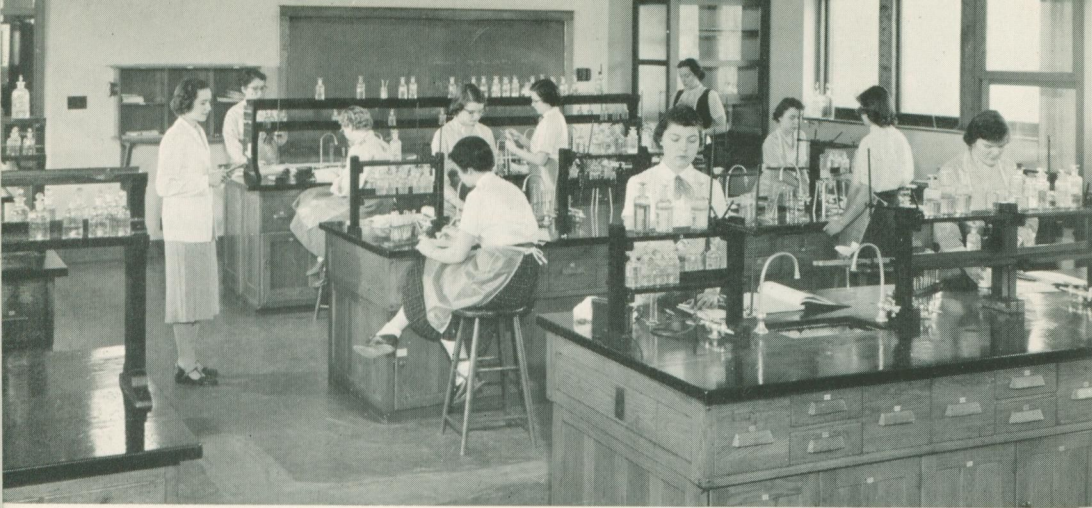
The advanced bacteriology course is planned to fit the needs of the particular students enrolled. The training they receive is not limited to bacteriological techniques only, but includes hematology, with practice in such common clinical procedures as drawing blood, typing of blood, blood counts, and examination of the pathological blood conditions.

Since one of these girls is planning to be a medical technologist and one a nurse, they both will need to learn the technique they are demonstrating.

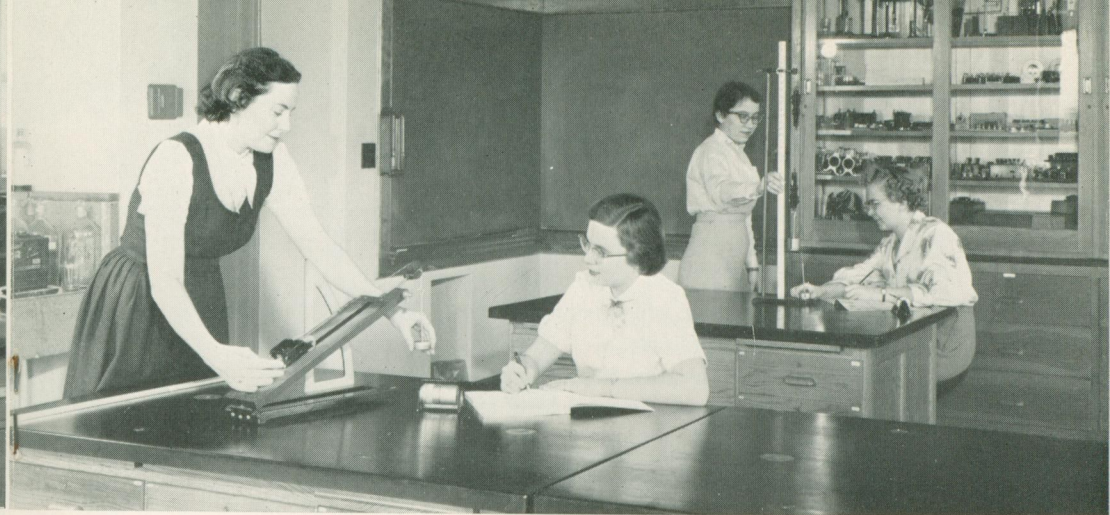
physiology

Experiments can be fun. These students are making a record of normal breathing on the kymograph. It will serve as a control to interpret changes brought about by such activities as running in place, or going up and down stairs. This experiment also includes recording controlled breathing as in singing, reading aloud, coughing, and swallowing.





General Chemistry and Physical Science classes are divided into small laboratory sections.

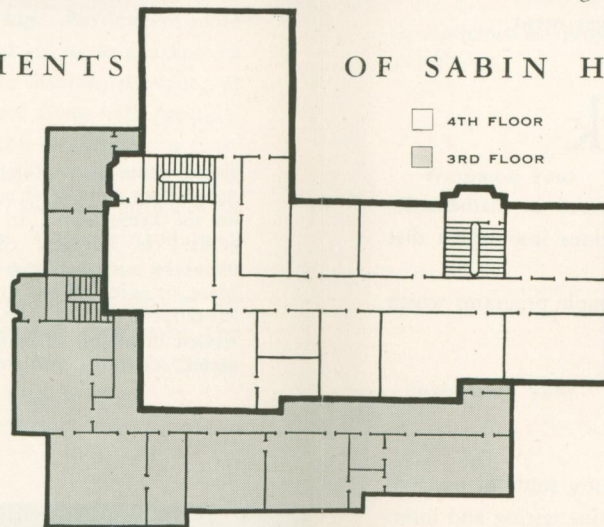


A beginning class in Physics experiments with the inclined plane and the pulley.

SCIENCE DEPARTMENTS OF SABIN HALL

THIRD FLOOR

Biology
 Bacteriology
 Botany
 Zoology
 Psychology



FOURTH FLOOR

Chemistry
 Physics
 Geology
 Mathematics
 Physical Science

A class in Experimental Psychology watches a demonstration of color mixture.



Ferns and club mosses are being studied in the laboratory of General Biology.



new insights

In many jobs you do not really have to know the reason behind the work you are doing. For example, you may operate an IBM machine without understanding higher mathematics, or take X-Rays without having studied physics. These, however, are jobs as assistants or aides, which require only that you follow instructions, and you are generally paid accordingly.

But if you have curiosity, if you have an alert mind, you will not be satisfied with merely pushing buttons, turning dials, or recording numbers. You will want to understand why you are performing this routine.

Learning merely a technique limits you to that technique. But if you understand the principles behind the operation you are performing, you will be able to master difficult new processes yourself or with a minimum of special training. You will not find yourself at a dead end when technological changes occur.

alumnae at work

Graduates of Milwaukee-Downer College who have majored in mathematics or science offer an interesting cross section of the many positions into which that kind of education leads.

The following pages will present examples and will list sample programs which prepare for such positions.

psychology

Fairly new among the professions are those growing out of a study of psychology. They range from the psychological technician's job of routine testing and interviewing, clerical and statistical work, and care and operation of instruments, which may be done by the graduate with only the B.A. degree, to the advanced research of the Ph.D. There are positions of school psychologist, industrial psychologist, clinical psychologist, and consulting psychologist, as well as teachers of psychology, and psychometrists. Practically all demand graduate study beyond the bachelor's degree.

Several Milwaukee-Downer graduates are holding interesting positions in this area. One is a personnel assistant for The Personnel Laboratories. Her duties involve testing and evaluating mental ability, aptitude, and psychological adjustment in order to find the right person for the right job. Two alumnae are psychometrists for the public schools in Milwaukee, testing and evaluating children of all ages in order to help develop their potentialities to the fullest. Sometimes they test sight and hearing as well as emotional and psychological adjustment to determine whether



counsellor

Elizabeth Pillsbury, class of 1937, psychological counsellor in the public school system of Milwaukee, is shown giving a test to a five-year-old by which the psychometrist may evaluate mental ability and her readiness for school.

remedial work may be needed to solve the problems manifesting themselves early in the child's school career. The psychological tests go deeper, however, and may indicate needed environmental change.

A recommended program for a student desiring to do graduate study with a major in *psychology*.

		Credits
freshman year	English Composition	6 or 4
	German or French	8
	Introduction to Physical Science.....	8
	Introduction to Education.....	3
	Fundamentals of Speech.....	2
	Personal Hygiene	1
	Electives	2 or 4
		<hr/> 30
sophomore year	Introduction to Literature or Classics of Western World Literature...	6
	German or French	8
	General Psychology	6
	General Biology	8
	Electives	2
		<hr/> 30
junior year	Anatomy and Physiology.....	3
	Genetics	3
	Western Civilization or History of the United States.....	6
	Introductory Sociology	3
	Music and Art Appreciation.....	4
	Introduction to Religion or Philosophy...	4
	Social Psychology	2
	Electives	5
	<hr/> 30	
senior year	Child Psychology and Development.....	4
	Psychology of Adolescence.....	3
	Abnormal Psychology	3
	Principles of Economics.....	6
	Statistics	3
	Electives	11
	<hr/> 30	

pharmaceuticals

Shirley Johnson (standing), class of 1953, went directly from college into the Parke, Davis & Company laboratories where her work consists of supervising production of sterile media in quantity for the Salk polio vaccine.



medical field

The science graduate finds many career possibilities in the medical field. Doctors, dentists, pharmacists, nurses, medical record librarians, research workers, laboratory technicians, with all their varying degrees of specialization, make up an important team working together for public health. Each of them needs a basic education in science. Some of them, like the laboratory technician, may step right out of college into a job, or take only a year of clinical internship. Others, like the physician, require four or more years of medical education beyond their bachelor's degree. Related fields, like medical social work, require two years beyond the B.A. The possibilities are many, with their varying degrees of special education required. There are enough to challenge all types of individual interest. It is extremely important, however, to lay the necessary foundation of science in your college program if you wish to build future specialization upon it.

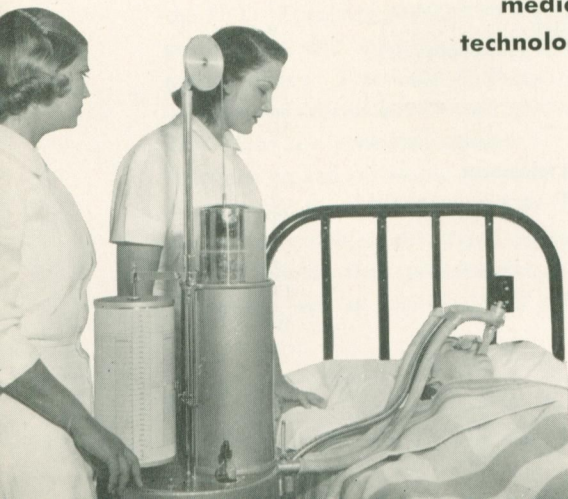
Milwaukee-Downer has graduates at all levels in the medical field. Among them are a number of well established physicians, and of Ph.D.'s engaged in research.

The rewards, both in financial returns and in satisfaction, mount constantly for the young woman who sets her sights high.

medical technology

Sara Sue Son, class of 1946, is a medical technologist at Columbia Hospital in Milwaukee. The picture shows her (left) demonstrating the basal metabolism machine to a student technician. This machine measures the oxygen consumption of the patient at complete rest.

The medical technologist's position requires a year's internship in the laboratory of an accredited hospital training school, followed by a national registry examination. Positions are open in hospital laboratories, doctors' offices, clinics, and industrial plants.



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Suggested program to prepare for positions open to the *chemistry major*.

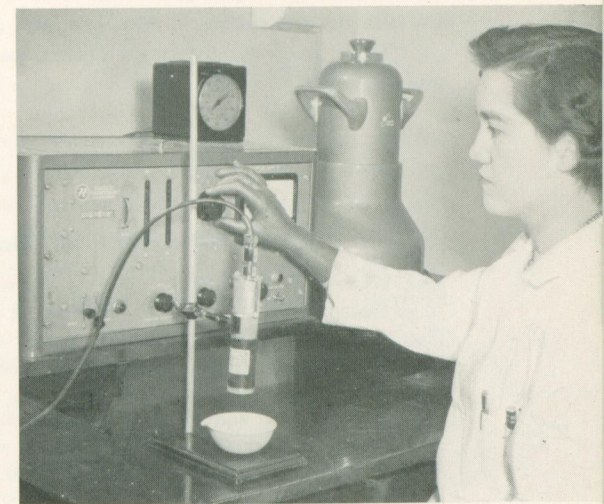
	General Inorganic Chemistry or Introduction to Physical Science.....	Credits 8
	English Composition	6 or 4
	German or French.....	8
freshman year	Introduction to College Mathematics or Western Civilization or History of the United States.....	6 or 8
	Personal Hygiene	1
	Electives	1 to 3
		<hr/> 30
	Chemistry, Qualitative and Quantitative Analysis	8
	Introduction to Literature or Classics of Western World Literature...	6
sophomore year	German or French.....	6 or 8
	General Biology or General Physics or Introduction to College Mathematics...	8
	Electives	0 to 2
		<hr/> 30
	Chemistry, Organic and Physiological.....	7
	Biology	3 to 8
junior year	Art and Music Appreciation.....	4
	Introduction to Religion or Philosophy...	4
	Electives	7 to 12
		<hr/> 30
	Chemistry, Food or Physiological or Physical	3
senior year	Bacteriology	6
	Electives	21
		<hr/> 30

pathology

Gloria Zander, B.A. '48, Milwaukee-Downer, M.A. '50, Wellesley, is working in the Department of Pathology at Marquette University School of Medicine, doing basic research on the pathologic effects of radioactive calcium and strontium in small animals.

In the illustration an ashed sample of a mouse which has been injected with radioactive strontium is being analyzed with a Geiger counter to determine the total amount of the radio-isotope which has been retained.

This particular project is part of a larger program of the Atomic Energy Commission to investigate the effects of various by-products of the manufacture of the atom bomb. Radioactive strontium is one of the worst health hazards because it localizes in the bone, is very difficult to remove, and is a potent producer of bone tumors.



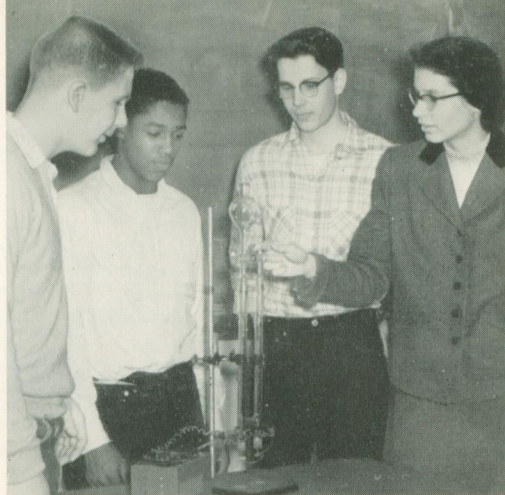
13

teaching

science and mathematics

Colleen Wilson, class of 1954, teaches mathematics and general science in Pontiac High School, Pontiac, Michigan. During the summer she is continuing her study for the master's degree.

In the picture she is demonstrating the electrolysis of water to a class in senior science.



The critical need for teachers of science and mathematics will continue to increase with the rapidly growing school-age population. A bachelor of arts degree, along with the education courses required in your particular state, will qualify you for an initial teaching appointment in elementary or high school. For college or university teaching, at least a master's degree is necessary, and this is also becoming a standard requirement for tenure positions in elementary and high schools. Often a college graduate finds it practical to teach for a year or two in a secondary school and start her post graduate work during summer vacations.

One of the oldest vocations open to women, teaching has also been called the greatest vocation. However, teaching should be chosen only if you enjoy working with young people, if you have patience and self-control, and if you feel a genuine enthusiasm for your subject. A science teacher has the opportunity of continuing her own experimentation, either alone or as a member of a research team, and also has the chance to encourage and develop promising young scientists.

There are few satisfactions greater than the shared enthusiasm of teacher and student.

the aftermath of math

Jean Wightman Funk ('51) pauses in her work as an Organization and Methods Examiner at the Electronic Supply Office, Great Lakes, to chat with husband George, a rising young executive in Management Engineering.

Married in 1954, both the Funks find considerable satisfaction in their Civil Service careers with the U.S. Navy, and enjoy the pleasure of working together in the office as well as at home.



Suggested program to prepare for teaching *mathematics* in secondary schools.

		Credits
freshman year	General Inorganic Chemistry or Introduction to Physical Science or General Physics	8
	English Composition	6 or 4
	German or French	8
	Introduction to College Mathematics.....	7 or 8
	Personal Hygiene	1
	Electives	0 to 2
		<hr/>
sophomore year	Calculus	8
	Introduction to Literature or Classics of Western World Literature...	6
	German or French	6 or 8
	Introduction to Religion or Philosophy...	4
	General Psychology	6
	<hr/>	30 to 32
junior year	Theory of Equations.....	3
	Differential Equations	3
	Western Civilization or History of the United States.....	6
	Related Arts or Art and Music Appreciation.....	4
	Introduction to Education.....	3
	Education Electives	2
	Electives	9
	<hr/>	30
senior year	Methods of Teaching.....	2
	Student Teaching	8
	Mathematics Electives	6
	Statistics	3
	Electives	11
	<hr/>	30

By electing introductory courses in Chemistry, Biology, and Physics, a student will also be qualified to teach *General Science*.

civil service

Civil service offers another area of employment for the mathematics or science major. Examinations are given regularly to determine eligibility for a wide variety of positions in the local, state, and federal government. For example, the inland Naval activity, in its Electronic Supply Office at Great Lakes, Ill., employs 1400 civilians in purchasing, inventory control, technical research and engineering, electronic machine accounting and computing, financial control, administrative services and management positions.

Jean Wightman, class of 1951, passed the Junior Professional Assistant examination given by the Civil Service Commission and qualified as an Organization and Methods Examiner. She is responsible for securing and maintaining all current records on electronic equipment installed on U.S. Naval and Coast Guard vessels, as well as ships loaned to foreign nations by the United States.

industry

Women are being employed increasingly by industry. Large corporations maintain research laboratories where constant investigation is being carried on to test and improve their products and techniques and to develop new ones. They employ scientists and technicians at all levels.

When basic research brings to light some new substance or by-product which can be developed profitably, a whole new corps of employees may be required for applied research and development, then production, promotion, and sales. Engineers, draftsmen, technicians, technical writers for manuals and reports, technical secretaries, all are sought from among applicants who have the required background. Not all of these jobs are open to women, but a surprising number of firms, from textiles to airplane producers, are steadily expanding these opportunities.

In business and commerce, there is analytical research, or computational and statistical work with banks, investment houses, insurance companies. This type of position requires mathematical background.

Margaret Ives, class of 1940



Suggested program for a student desiring to do graduate study with a major in *animal biology*.

		Credits
freshman year	General Inorganic Chemistry or Introduction to Physical Science or General Physics	8
	English Composition	4 or 6
	German or French	8
	Western Civilization or History of the United States	6
	Hygiene	1
	Art or Music Appreciation or Electives	2 or 3
		<hr/> 30 to 31
sophomore year	Introduction to Literature or Classics of Western World Literature	6
	German or French	8
	General Biology	8
	Introductory and Educational Psychology or Experimental Psychology	6
	Organic Chemistry	3
	<hr/> 31	
junior year	Introduction to College Mathematics or Second Foreign Language	7 or 8
	Introduction to Religion or Philosophy	4
	Anatomy	4
	Histology	3
	Art or Music Appreciation	2 or 4
	Electives	10 to 8
	<hr/> 30	
senior year	Foreign Language	8
	Introduction to Bacteriology and Advanced Bacteriology	6
	Genetics	3
	Embryology	3
	Electives	10
	<hr/> 30	

The student interested in *plant biology* would substitute advanced courses in Botany for those in Zoology.

determining Vitamin C by the Bioassay Method

In the research and development center of the American Can Company, Margaret Ives, Ph.D., has extensive quarters and facilities to maintain an animal colony, as well as a completely modern laboratory in which to make the necessary chemical tests for her studies and research. Her work involves biochemistry, nutrition, writing scientific articles and reports, and toxicology. By means of animal feeding studies she tests the safety of materials used in American Can Company containers.