

# ENDICOTT IBM SCHOOL

✦ *Read*

✦ *Listen*

✦ *Discuss*

✦ *Observe*

✦ *Think*



1947 ✦ ✦ ✦ 1948

GENERAL EDUCATION PROGRAM

INTERNATIONAL BUSINESS MACHINES CORPORATION  
DEPARTMENT OF EDUCATION

# ENDICOTT IBM SCHOOL

## *GENERAL EDUCATION PROGRAM*

**T**O MAKE AVAILABLE TO ALL IBM  
EMPLOYEES THE ADVANTAGES OF A  
MODERN EDUCATIONAL PROGRAM

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INTERNATIONAL BUSINESS MACHINES CORPORATION  
DEPARTMENT OF EDUCATION, ENDICOTT, NEW YORK

## INTELLECTUAL INVENTORY

THE COMING OF THE NEW YEAR is a time when business takes inventory of its assets and usually finds it necessary to eliminate the worn and outmoded and to replenish with the new.

How much more important it is to apply this practice to our intellectual inventory. The brain cannot function constructively if it is overburdened with outworn or outmoded ideas and with thinking processes that are obsolete.

The United Nations ushered into our world a new plan for cooperation between all nations and all peoples. This plan calls for improved thinking and for broader and longer-range vision. These things, in turn, call for taking inventory of our mental assets and for clearing our brain cells of all obsolete and unconstructive ideas to make room for more new and progressive thoughts.

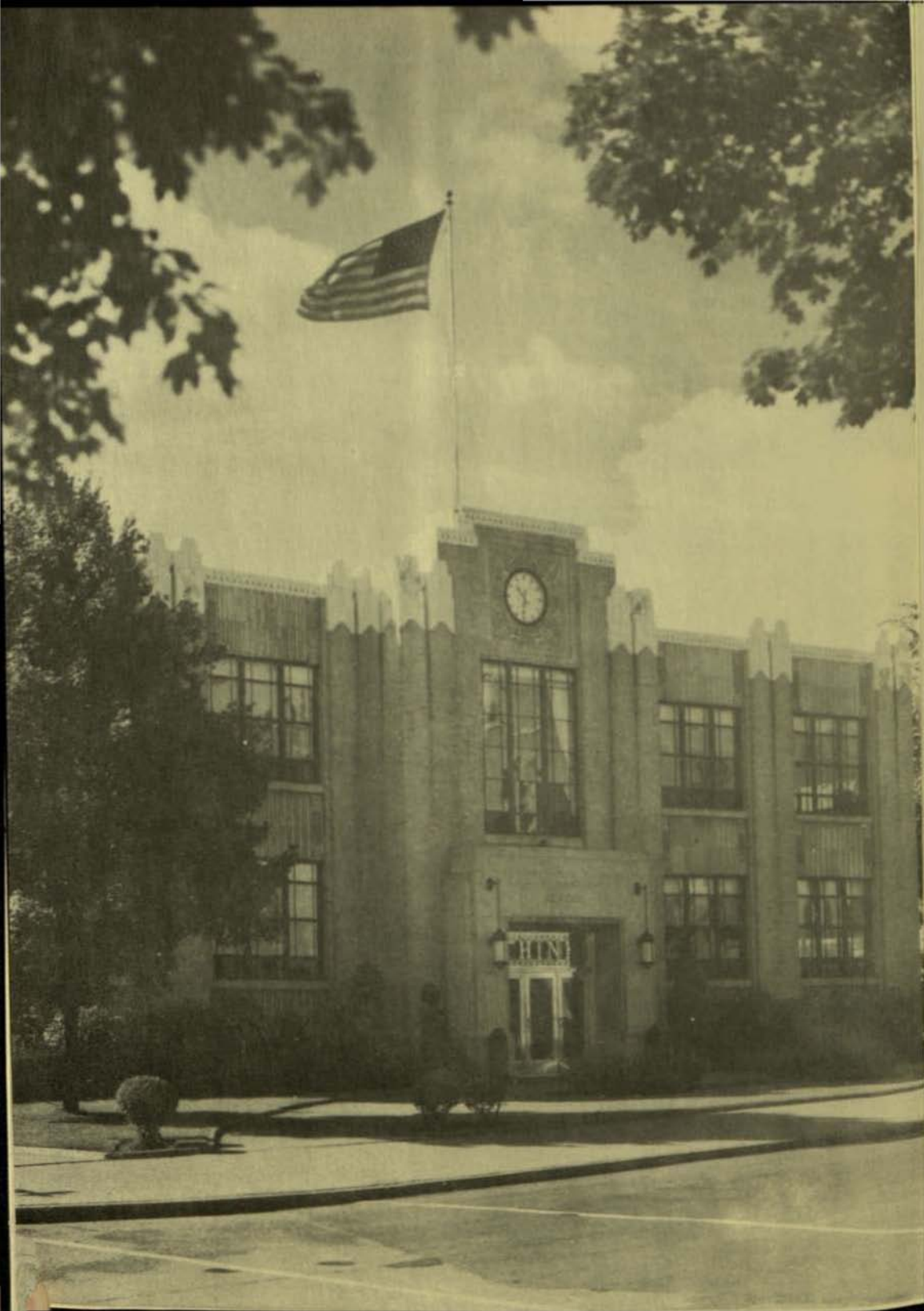
It is our duty to ourselves, to our nation, and to the world to keep our brains well equipped with the finest of ideas and ideals and always be ready to participate in and contribute to constructive plans for the future.

In no other way is it possible for us to give our best cooperation to the United Nations in establishing world peace.

*Hoyle Watson*



THOMAS J. WATSON, PRESIDENT, INTERNATIONAL BUSINESS MACHINES CORPORATION



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## INTERNATIONAL BUSINESS MACHINES CORPORATION

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ROGER R. WILLIAMS . . . . .	<i>General Manager, Plant 4, San Jose</i>

# IBM DEPARTMENT OF EDUCATION

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## EDUCATIONAL OPPORTUNITIES

THE DEPARTMENT OF EDUCATION of the International Business Machines Corporation embraces a world-wide educational program. The headquarters for these educational activities is located in the IBM Education Building in Endicott, New York.

The activities of the Department of Education are grouped into five major divisions:

### *The Division of General and Vocational Education*

Five major types of programs, each designed to provide educational opportunities to employees of our plant, are offered in this division.

(1) GENERAL EDUCATION. The inauguration of the IBM General Education Program fourteen years ago fulfilled one of Mr. Watson's visions of long standing, that of creating for everyone in the organization the opportunity to study and grow with the business. Subjects range from elementary shop courses to advanced developments in new engineering fields and cover the general education fields of the liberal arts. This program is offered to employees in all IBM plants in the United States and Canada and at World Headquarters in New York.

The general education offered by the IBM School attempts to supplement vocational education by enriching the life of the student with cultural interests, by widening his scope of knowledge and thus helping him to meet the enforced changes in vocational and social experiences which are a part of an ever-changing society.

The IBM School has received wide recognition in the world of industry and education not only for the broad educational opportunities which are offered to the individual, but also for its contribution to training programs in industries and schools. In response to the great demand for the IBM School text material from industries and various branches of the Army and Navy as well as technical and vocational schools throughout the country, arrangements have been completed to publish a series of IBM textbooks.

(2) EXTENSION EDUCATION. It is the purpose of the extension education program to provide educational opportunities for IBM employees who, whether they be in the field or plants, are unable to attend regular classes in the Endicott IBM School.

Because of the importance of electronics in present-day industry and the many requests from field employees, a course in Electronics was first made available. Other courses are now in preparation and will be added to the program.

(3) JOB TRAINING.—All employees are provided adequate on-the-job instruction to perform the work assigned to them. The department manager who is responsible for the job instruction given his people is assisted in this work by the Department of Education through job instruction training and materials.

(4) APPRENTICE TRAINING. A three-year apprentice toolmaking course is conducted for carefully selected young men between the ages of 17 and 20 who have an aptitude for mechanical work and who have passed either a vocational or technical high school course. Besides the work of toolmaker, graduate apprentices are today filling important positions throughout our engineering and manufacturing organization.



(5) SUPERVISORY TRAINING. Periodic schools are conducted for all department managers in which the functions of their various departments and of the entire manufacturing organization are discussed. From the materials presented and discussed in these sessions is developed the Reference Manual for Managers. Those in the supervisory capacity are also given short-term training courses in job methods and human relations.

### *The Division of Business Education*

Educational activities are directed into two distinct channels—training IBM Sales and Systems Service representatives, and training representatives of IBM customers. Both emphasize the application of IBM Electric Punched Card Accounting Machines to business and government management and administration.

(1) SCHOOL FOR IBM REPRESENTATIVES. Sales and Systems Service courses cover intensive training on the techniques of selling IBM products, the application of IBM Accounting Machines to the accounting and management functions of business and government, and effective operation of branch office territories.

The selection of men and women for these courses is based upon adequate educational or business experience which will enable them to master instruction covering IBM Accounting Applications, and upon their personality and ability to work with people and to represent effectively the International Business Machines Corporation.

(2) CUSTOMER ADMINISTRATIVE SCHOOL. The classes are of four types:

(a) IBM Accounting for Executives—designed to increase our customers' executives' knowledge of IBM Accounting. One week.

(b) Supervision—this type of class covers all matters pertaining to the supervision and management of an IBM Accounting Machine installation. Two weeks.

(c) Manufacturing Control—during this class the application of IBM Accounting Machines to manufacturing control functions is covered. One week.

(d) Special—as required, special classes are scheduled for groups from the same industry and from similar government functions. Length of these classes is determined by need.

In addition, all IBM sales offices provide instructional facilities for the training of key punch and machine operators. Thousands of IBM customer operators are trained each year.

### *The Division of Engineering Education*

(1) CUSTOMER ENGINEERING TRAINING. In this division, IBM Customer Engineers, during an intensive 16 weeks' course, are trained for the exacting requirements of servicing IBM equipment leased or sold to IBM customers. The selection of the men for this course is based on an adequate technical knowledge and the ability to represent IBM properly in all parts of the world and under all conditions.

(2) DEVELOPMENT ENGINEER TRAINING. Graduates of engineering colleges employed for engineering positions in IBM laboratories and plants are given an intensive one-year training course. This course covers three phases of IBM's activities—Engineering, Manufacturing, and Distribution and is designed to accelerate the young engineer's development within the company.

*The Division of World Trade Education*

Offerings in this division vary in type among the different nations. Schools are located in IBM offices where classes are offered in business, engineering and IBM Accounting Machine operation. In several countries the courses are a part of the university curriculum.

*The Watson Scientific Computing Laboratory*

The Laboratory, located at Columbia University, conducts research and instruction in applied mathematics and numeric calculation. It serves as an exchange center for mathematical and machine methods and mathematical tables.

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*This bulletin describes in detail only the General Education program and inquiries for information regarding the other divisions may be addressed to the Division Head concerned.*

ENDICOTT IBM SCHOOL

GENERAL EDUCATION PROGRAM

C A L E N D A R

1 9 4 7 - 1 9 4 8

FALL TERM, 1947

ENROLLMENT—*August 25 through September 5*

TERM OPENS—*Week of September 15*

RECESS—*Thanksgiving Day*

TERM CLOSES—*Week of December 15*

SPRING TERM, 1948

ENROLLMENT—*January 5-16*

TERM OPENS—*Week of January 26*

TERM CLOSES—*Week of April 26*

# GENERAL INFORMATION

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## WHO MAY ENROLL

The General Education program is an educational opportunity made available to all IBM employees at the Endicott plant.

## HOW TO ENROLL

Enrollment is strictly *voluntary*. After the employee has carefully studied this bulletin and selected the subject he desires to study, he should fill out an enrollment card. A separate card for each subject is necessary. One of these cards is included in this bulletin; additional cards may be obtained from the department clerk or in the School office, Room 102.

## COUNSELING SERVICE

Employees desiring personal counsel and guidance in the selection of subjects or the planning of a "long-term" educational program are invited to call at the office of Mr. Raymond Jarvis, chief instructor, Room 102 of the School, during lunch hour or after work. If a definite appointment is desired, this will be arranged at the convenience of the employee. A survey of his previous educational experience will be made and tests given to determine prerequisite qualifications where desirable. Use of this guidance program is entirely voluntary and is offered to further the service of the Department of Education to employees.

## SCHEDULE

Normally, one enrolls for only one subject; if, however, a student is willing to devote the time in home study and attendance at classes, it is permissible for him to apply for two. However, each student is limited to but *two classes a week*, whether these classes are both in a subject which meets twice a week or in two different

subjects, each meeting but once a week. If there is any reason why two subjects cannot be taken simultaneously, the applicant will receive an explanation from the School office. All subjects listed in the bulletin will be offered, but a minimum number of enrollments is necessary for a class to be formed.

The schedule of classes is made from the enrollments; therefore, it is very important that all enrollments be in the School office by the date indicated on the bulletin boards as the "deadline." Watch for the date!

#### LENGTH OF CLASSES

Classes meet once or twice a week, the number and length of the sessions varying according to the subject. A schedule is given in the description of the individual subjects in this bulletin.

#### TIME OF CLASSES

Classes for the first shift are held at 5:15 and 7:15 p.m. Monday through Friday. Classes for the second shift are held at 2:30 p.m. Monday through Friday.

#### PLACE OF CLASSES

So far as possible, all classes are held in the IBM School. To make certain of the location of the class, the student should consult the bulletin board in the lobby of the school before each session, for circumstances make changes necessary.

#### NOTIFICATION

Applicants will be notified through the factory mail of the date, hour, and place of meeting for the first class. If notification is not received before the first week of school, the applicant should call the School Office.

#### LESSON MATERIAL

There are no fees or tuition charges connected with any of the courses. All necessary lesson materials used in the courses are

furnished by the School. If the course is not completed, however, the materials are to be returned to the School.

With some exceptions, lesson materials are for sale to any employee who may be interested. In most cases, this material is prepared by the Department of Education. Lesson materials are not lent by the school, but all textbooks used in classes, as well as reference books, are available in the School Library, Room 104. These books are for reference use only and are to be used in the reading room. Hours for reading are 8:00 a.m. to 5:30 p.m. The librarian or member of the school staff will be glad to assist employees in finding the desired material.

#### ATTENDANCE

Although enrollment and attendance are voluntary, when an employee enrolls in a class it is important that he strive for the best attendance record possible. When absence cannot be avoided, the student should make an effort to find out the assignment for the following class. This information may be obtained from the School Office by telephoning or by calling at the office. Attendance figures one-third of the final average in most subjects.

#### HONOR ROLL

The highest ten percent of each class constitutes the Honor Roll. The names of the students attaining honor rating will be printed in *Business Machines* at the end of each school term. This honor rating is awarded on the basis of class attendance, class work, and final examination. Honorable mention will be given students attaining an average of 90% or above.

#### RECOGNITION OF STUDENTS

A *report card* is given to each student who enrolls in a class during the term. This report indicates attendance, class grade, examination grade and final average.

A *certificate* is given the student to denote successful completion of a subject. When a student has completed 15 units of study, he will receive a special certificate at one of the formal commencement exercises of the Department of Education. Other certificates will be awarded for each additional 5 units of study above 15, namely, for 20, 25, and 30 units. A unit of credit is determined on the basis of a two-hour class session, once a week, for twelve weeks.

Upon the successful completion of one of the prescribed courses of study, a student will receive an appropriate *diploma* signifying such study.





# COURSES OF STUDY

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## "PLAN YOUR STUDY, STUDY YOUR PLAN"

IF A MARKSMAN wishes to hit the bull's-eye of a distant target, he would not select a short-barrelled shotgun and aimlessly fire in any direction; but rather, he would carefully choose a rifle of sufficient power and accuracy that would carry his shot straight and true to the mark on which he had set his sights. To an even greater degree it is advisable for the student to determine his educational goal, carefully select his course of study, and proceed in a systematic manner to make his mark.

The General Education Program has offered in the past subjects of many varied types, independent of one another, in order to make the program as flexible as possible for the benefit of all students. This practice will still be continued, and *certificates* will be awarded upon the successful completion of single subjects.

However, for the many students who are looking to the future, and, like the marksman, wish to select for themselves suitable equipment that will aid them in their educational experience, there are groups of subjects arranged in sequences as courses of study. These are offered to assist the student in the planning of a course of study over a longer period of time and the proper selection of subjects to fit into his plan.

Those students who complete one of these courses of study, or other similar courses as may be planned through educational counsel with the Chief Instructor, will receive a *diploma* certifying that such a course of study has been successfully completed.

If employees, after looking over the courses of study, believe that they have already completed all the suggested subjects in one

or more of these curricula, they may apply for diplomas, which they will receive if the School records substantiate their claim for credit. Others will find that only one or two subjects are lacking in their past experience and may wish to certify for a diploma by completing those subjects. Every employee is encouraged to survey his past record and discuss educational plans with the Chief Instructor.

The following groups of subjects are arranged in a suggested sequence of study; however, the student may wish to arrange to take two subjects at a time or in somewhat different order, especially if he has already completed some of the requirements.

## INSPECTION

	UNITS
IBM Products	1
Blueprint Reading	1
Shop Mathematics I	2
Precision Measurement I	1
Shop Mathematics II	1
Precision Measurement II	1
Modern Shop Theory I	1
<i>Electives</i>	2
	—
	10

## SCREW MACHINES

	UNITS
IBM Products	1
Blueprint Reading	1
Precision Measurement I	1
Shop Mathematics I	2
Shop Mathematics II	1
Lathe & Hand Screw Machine Theory	1
Automatic Screw Machine Theory I-II	2
<i>Elective</i>	1
	—
	10

## MILLING

	UNITS
IBM Products	1
Blueprint Reading	1
Precision Measurement I	1
Shop Mathematics I	2
Shop Mathematics II	1
Milling Theory I-II	2
<i>Electives</i>	2
	—
	10

## DRILLING

	UNITS
IBM Products	1
Blueprint Reading	1
Precision Measurement I	1
Shop Mathematics I	2
Shop Mathematics II	1
Drilling Theory I-II	2
<i>Electives</i>	2
	—
	10

## GRINDING

	UNITS
IBM Products	1
Blueprint Reading	1
Precision Measurement I	1
Shop Mathematics I	2
Shop Mathematics II	1
Grinding Theory I-II	2
<i>Electives</i>	2
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	10

## EAM ENGINEERING

	UNITS
Electricity I-II	4
M & E Principles	6
	—
	10

## DRAFTING

	UNITS
IBM Products	1
Shop Mathematics I	2
Shop Mathematics II	1
Mechanical Drawing I	2
Mechanical Drawing II	2
Production Illustration I-II	2
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	10

## IBM ACCOUNTING

	UNITS
IBM Products	1
Bookkeeping I-II	2
Industrial Accounting I-II	2
EAM Practice I-II	2
EAM Applications	1
<i>Electives</i>	2
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	10

## SECRETARIAL

	UNITS
IBM Products	1
Typewriting I	1
Typewriting II	1
Shorthand I, II & III	3
Secretarial Practice	1
Practical English	1
Office Principles & Practice	1
<i>Elective</i>	1
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	10

## PERSONAL DEVELOPMENT

	UNITS
IBM Products	1
Practical English	1
Effective Speaking I-II	2
Effective Speaking III	1
Practical Psychology	1
Language I-II	2
Current Affairs Forum	1
<i>Elective</i>	1
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	10

# SUBJECTS

OFFERED IN 1947 - 1948

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TECHNICAL	31-35
BUSINESS	37-42
GENERAL	43-51
EXTENSION	52-53

PRINT READING

BY THE DEPARTMENT OF  
METAL WORKING INDUSTRY

PRECISION MEASUREMENT  
IN THE  
METAL WORKING INDUSTRY

PREPARED BY THE DEPARTMENT OF EDUCATION  
METALWORKING EDUCATION MATRONS COM.

Volume One

PRECISION MEASUREMENT  
IN THE  
METAL WORKING INDUSTRY

PREPARED BY THE DEPARTMENT OF EDUCATION  
METALWORKING EDUCATION MATRONS COM.

Volume Two

SHOP TERMS

PREPARED BY  
THE DEPARTMENT OF EDUCATION  
METALWORKING EDUCATION MATRONS COM.



# SHOP SUBJECTS



## 1001. SHOP MATHEMATICS I

A necessity of life in a mechanical age is a good fundamental knowledge of mathematics. Such a knowledge must be built upon a foundation of the four arithmetic processes as they involve fractions, decimals and percentage. For one who wishes to study the uses of algebra and the equation as well as plane and solid geometry in practical applications, this subject offers excellent opportunities either for the beginner or one who desires a mathematics review. This subject is basic in all shop courses.

*2 hours—two classes a week—12 weeks*

## 1002. SHOP MATHEMATICS II

This subject covers the fundamentals of trigonometry and logarithms and their use in problems. Speed and accuracy are assisted by the use of these tools of mathematics. The subject is designed for both the student new to this type of work and the one who wishes to review his mathematics. This is a basic subject in all shop courses. **PREREQUISITE:** Shop Mathematics I or equivalent.

*2 hours—one class a week—12 weeks*

## 1031. THE SLIDE RULE

The slide rule is a handy and time-saving device for rough checking or estimating. It may be used for multiplying, dividing, determining logarithms, roots and powers of numbers, and figuring many of the trigonometric functions. Students of this subject are furnished with an inexpensive slide rule that may be used for the more common problems. If students have slide rules of their own, however, or wish to obtain one embodying more scales than the one provided, they may use them in the class work. Full instruction on the use of the slide rule is given, and practical problems are used for practice.

*2 hours—one class a week—12 weeks*

### 1101. BLUEPRINT READING

Blueprints are the road maps of the mechanical world. To enable one to read, interpret, and understand the full meaning of blueprints, this course covers the process of making blueprints, the theory of projection used in making drawings, the various lines, symbols and notes appearing on prints. A wide variety of prints furnishes actual reading practice. Additional practice is also given on the conversion of fractions and decimals. A study is made of the more common shop terms found in reading blueprints. This is a basic subject for all shop courses. Lesson material is specially prepared by the IBM Department of Education. A number of models, color slides, and movies are also used as a part of the instruction.

*2 hours—one class a week—12 weeks*

### 1201. PRECISION MEASUREMENT I

The purpose of this subject is to give the student an understanding of the use, care, and adjustment of measuring instruments, the standards back of them, and of the code of tolerances. The following types of measuring instruments will be studied: micrometer and vernier gages, precision gage blocks, fixed gages, thread gages, dial and test indicators. The text material, which was specially prepared by the IBM Department of Education, is supplemented by color slides and movies taken in the shop showing the application of measuring instruments. This subject is basic in all shop courses.

*2 hours—one class a week—12 weeks*

### 1202. PRECISION MEASUREMENT II

Dealing with the more advanced types of measuring instruments, this course is a continuation of the study of precision measurement. The use, care and adjustments of the following instruments are covered: surface plate accessories, sine bars, index heads, comparators, microscopes, optical flats, profilometers, measuring machines and hardness testers. Some of the latest applications in inspection with X-ray and Magnaflux instruments are also discussed. A new text has been prepared by the IBM Department of Education for this subject. This is a major subject in the course of study in Inspection. PREREQUISITE: Precision Measurement I.

*2 hours—one class a week—12 weeks*

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*There Is No Saturation Point in Education*

## 1301. MECHANICAL DRAWING I

Blueprints originate from the mechanical drawings made by draftsmen. This course is designed for those who are interested in learning the technique of mechanical drawing and developing the ability to express ideas on paper. Practice is given in freehand lettering and sketching. The student learns the use of mechanical drawing instruments, the alphabet of lines, line technique, the theory of orthographic projection and designing. Considerable practice is given in the making of mechanical drawings from three-dimensional sketches and drawings.

*2 hours—two classes a week—12 weeks*

## 1302. MECHANICAL DRAWING II

This is a continuation of mechanical drawing in which the more advanced phases of this subject will be presented. Further practice in sketching is given. Mechanical working drawings are made from both prints and parts. **PREREQUISITE:** Mechanical Drawing I or equivalent.

*2 hours—two classes a week—12 weeks*

## 1311. PRODUCTION ILLUSTRATION I

## 1312. PRODUCTION ILLUSTRATION II

Industry has found that a type of print employing what is called "three-dimensional drawing" has proved very useful. This course in production illustration is offered for those interested in developing the ability to make these three-dimensional drawings. It includes freehand sketching, light and shade, perspective, isometric, and finally the production of the easily understood drawings. **PREREQUISITE:** Mechanical Drawing I or equivalent.

*2 hours—one class a week—12 weeks each*

## 1313. PRODUCTION ILLUSTRATION III

This course offers more advanced study than is given in Production Illustration I-II. Perspective drawing covers illustrations, functional drawings, three-point perspective, prepared shading mediums, free-hand drawing, and shading techniques. Line values are stressed together with tones and highlights. Discussion and practice of photo-tracing is also given. Reproduction methods for distribution are shown in an illustrated lecture. **PREREQUISITE:** Production Illustration I-II.

*2 hours—one class a week—12 weeks*



## 1401. DRILLING THEORY I

## 1402. DRILLING THEORY II

This subject presents the most recent drilling theory. It is of value to those generally interested in manufacturing processes. In it are covered the various types of drilling machines and their attachments and uses. Special tools used in conjunction with these drilling machines are also discussed. Lesson material was specially prepared by the IBM Department of Education for use in this subject. Supplementing the text are slides, movies, and shop tours in the plant. This is the major subject in the course of study in Drilling.

*2 hours—one class a week—12 weeks each*

## 1411. MILLING THEORY I

## 1412. MILLING THEORY II

This subject covers the various types of milling machines. It also contains material on attachments, cutters, speeds and feeds, lubrication, and fixtures. The latter half is devoted to more advanced study of the machines and the use of the dividing head. The text is supplemented with color slides, movies, and shop tours in the plant. This is the major subject in the course of study in Milling.

*2 hours—one class a week—12 weeks each*

## 1421. GRINDING THEORY I

## 1422. GRINDING THEORY II

This subject was developed to explain the selection of grinding wheels, the care of modern grinding machines, and the class of work these machines perform. Lesson material for this subject was specially prepared by the IBM Department of Education. Color slides, movies, and shop tours in the plant add greatly to the interest and instructional value of this subject. This is the major subject in the course of study in Grinding.

*2 hours—one class a week—12 weeks each*

## 1431. LATHE AND HAND SCREW MACHINE THEORY

From past experience it has been found that many people have been interested in learning about the bench and turret lathes and hand screw machines but have not wished to continue the study into the course in automatic screw machines. Therefore, this subject of lathes and hand screw machines is of-

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*It Takes Imagination to See Beyond the Horizon*

ferred, covering their various characteristics and special applications. This is a major subject in the course of study in Screw Machines.

*2 hours—one class a week—12 weeks*

#### 1441. AUTOMATIC SCREW MACHINE THEORY I

#### 1442. AUTOMATIC SCREW MACHINE THEORY II

The first term in this important subject covers the types of machines and production possibilities of automatic screw machines in general. The second half deals with methods, attachments, and new applications of the machine. The teaching material includes, besides the text, slides, movies and shop tours. This is a major subject in the course of study in Screw Machines.

*2 hours—one class a week—12 weeks each*

#### 1461. MODERN SHOP THEORY I

This course is designed to give an over-all appreciation of nomenclature of shop terms and operations that are used in modern manufacturing. The course will necessarily cover only a brief study of such machines as drill presses, milling machines, broaches, punch presses, lathe and screw machines, grinders, and tool grinding machines. Shop tours, color slides, and movies will supplement the text material, which has been specially prepared by the IBM Department of Education. This is a basic subject in the course of study in Inspection.

*2 hours—one class a week—12 weeks*

#### 1462. MODERN SHOP THEORY II.

Continuing the study of Modern Shop Theory in the specialized fields, Part II of this subject covers special toolroom machines, gear and cam cutting, die casting, heat-treatment, welding and brazing, electroplating, and foundry. Lesson material which has been specially prepared by the IBM Department of Education will be supplemented by the use of color slides and tours through the various departments in the shop.

*2 hours—one class a week—12 weeks*

#### 1501. ELECTRICAL CIRCUIT DIAGRAMS

Just as there are types of prints and varying symbols used in blueprints for the metalworking industry and architectural drawings in the woodworking



SCHOOL COMMENCEMENT DINNER IN THE IBM COUNTRY CLUB



B M  
OF EDUCATION

ON POINT IN EDUCATION



INTERNATIONAL BUSINESS MACHINES

AUTOMATIC ELECTRIC TIME CONTROL SYSTEMS



industry, so there is a type of print and a different set of symbols used in diagrams to describe electrical circuits. The technique of reading these diagrams makes them as easy to interpret and understand as those of the ordinary blueprint or architectural drawing. Although this subject does not deal with the fundamentals of electricity, it does provide the student with sufficient background and understanding of electrical terms and symbols to gain the ability to interpret electrical circuit diagrams.

*2 hours—one class a week—12 weeks*

#### 1601. THE IBM CARD

The operating unit, the IBM Card, is the functional means of operating the IBM Electric Accounting Machine and causes it to produce accurate and complete accounting and statistical reports. The development and manufacture of this card, therefore, must be done under the closest scrutiny from the selection of the raw paper stock to its final packing and distribution. This course covers every step in the manufacture of the IBM card—its history and development, the design and layout, the testing of paper stock under all conditions, the photo-engraving of the printing cylinders, the design and manufacture of presses, the quality control of cards, the use of the card in the accounting procedure of its own process, and finally the packing and distribution.

*2 hours—one class a week—12 weeks*

#### 1831. STATISTICAL QUALITY CONTROL I

#### 1832. STATISTICAL QUALITY CONTROL II

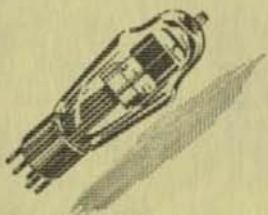
This course is designed to give the fundamental statistical concepts applicable to the control of quality, and application of these concepts to practical manufacturing problems. It includes a study of the normal distribution curve, the control chart, the percent defective chart, sampling methods, and how these tools are used to analyze test results, to measure variation, to establish standards of performance and to control quality. The application of these methods is illustrated by examples.

*2 hours—one class a week—12 weeks each*

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*The Pioneers of Today Are Building the Pioneers of Tomorrow*

# TECHNICAL SUBJECTS



## 2001. PRE-ENGINEERING MATHEMATICS I

## 2002. PRE-ENGINEERING MATHEMATICS II

A review and refresher course in mathematics starting with algebra and including plane geometry, solid geometry, trigonometry, and some calculus. This course is offered primarily for those students who will find a review in those branches of mathematics of prime importance for study in such courses as Engineering Electronics and Engineering Mechanics.

*2 hours—one class a week—12 weeks each*

## 2101. ELECTRICITY I

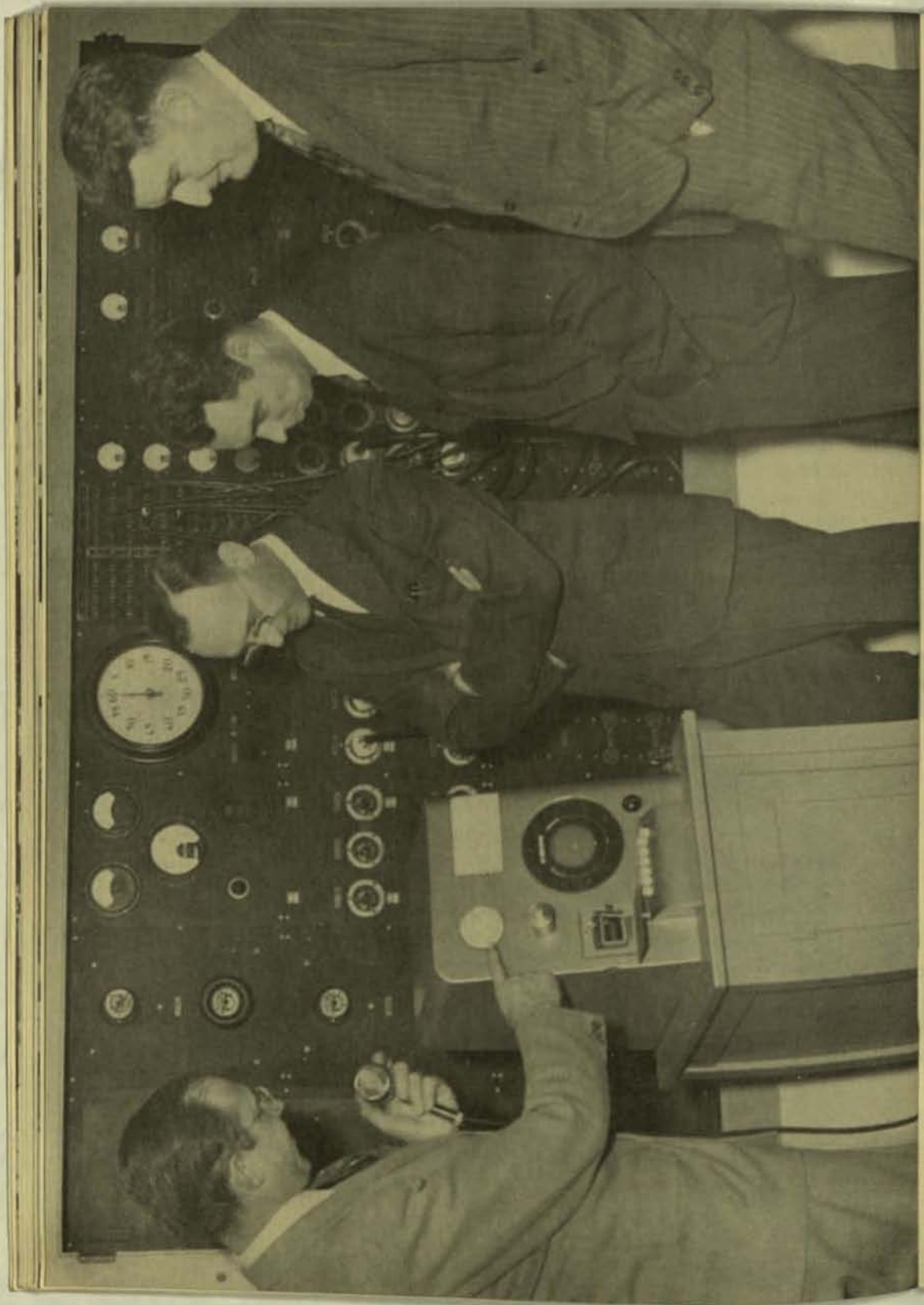
## 2102. ELECTRICITY II

The age of electricity has hardly begun, yet it promises to expand to unbelievable proportions. The rapidly growing field of radio-electronics and television and its industrial power and control applications offer almost unlimited possibilities—all stemming from the basic study of electricity. The fundamentals of electricity, ranging from magnetism through A.C. and D.C. circuits to motors and generators, are covered in classroom lectures and discussions supplemented by demonstrations, slide films, and moving pictures. Lesson material was prepared by the IBM Department of Education. **PRE-REQUISITE:** Shop Mathematics II or equivalent.

*2 hours—two classes a week—12 weeks each*

## 2121. FUNDAMENTALS OF RADIO THEORY

This is a general subject covering the theory of radio transmission and reception. During the first part it centers on the discussion of tubes and other circuit components such as coils, condensers, transformers, etc. The fundamentals of radio transmitters are discussed, and the design factors of modern radio receivers are covered by analyzing the purpose and functions of each



stage or tube in the receiver. Many general-interest subjects are also covered, such as record players, hi-fidelity amplifiers and sound systems, television and frequency modulation. This is a broad subject; it is not intended to teach the student to become a serviceman but rather to cover in a general manner one of the most common applications of electronic tubes.

*2 hours—one class a week—12 weeks*

#### 2131. FUNDAMENTALS OF RADIO OPERATING I

This course is principally to teach the International Morse Code. Also featured are basic radio theory, radio operating procedure and requirements. Sending keys, headphones, receiving and sending set are available for class use. No previous knowledge of the code is required for this course.

*2 hours—two classes a week—12 weeks*

#### 2132. FUNDAMENTALS OF RADIO OPERATING II

This course supplements Fundamentals of Radio Operating I and teaches theory, construction of simple receivers and transmitters, operation and radio law. Practice to increase code speed will be a part of this course. The course will assist the student in preparing for the government examination for an Amateur Operator's License. **PREREQUISITE:** Fundamentals of Radio Operating I or the equivalent (code speed—5 words per minute).

*2 hours—one class a week—12 weeks*

#### 2141. ENGINEERING ELECTRONICS I

#### 2142. ENGINEERING ELECTRONICS II

This subject deals first with the theoretical factors and design details of many types of electronic tubes; secondly, with the practical application of these tubes to various types of industrial equipment. The behavior and characteristics of various types of tubes are discussed, together with their advantages and disadvantages when applied in control circuits. The subject covers fundamental principles of many types of special tubes such as mercury vapor rectifiers, beam power tubes, screengrid thyatron, cold cathode, phototubes, cathode ray, television, and X-ray tubes. Other topics include application of tubes and fundamental circuits of half-wave and full-wave rectifiers, filters, voltage doublers, regulated power supplies, inverters, remote control, amplifiers, cathode ray oscilloscopes, oscillators, frequency and amplitude radio transmission.

*2 hours—one class a week—12 weeks each*

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*The Mind Grows by What It Feeds On*



## 2201. METALLURGY I

## 2202. METALLURGY II

The number of new alloys developed during the past few years increases the desire for knowledge of these materials. In the first part of the course the properties of metals and alloys are discussed, covering such topics as physical testing, composition and engineering properties of metallic materials, and specifications of metals. The second part is devoted to ferrous metallurgy, covering such topics as manufacturing, fabrication, heat-treatment and applications of steels.

*2 hours—one class a week—12 weeks each*

## 2211. PLASTICS I

## 2212. PLASTICS II

The extensive present-day use of plastics as basic industrial materials has definitely placed them on an equal footing with the older, fundamental raw materials. The history, origin, and raw material sources of plastics are covered; also their physical, chemical, and electrical properties and limitations, methods of fabrication and fundamentals of design. Experiments in molding and testing plastics along with case studies of plastic parts supplement the text material.

*2 hours—one class a week—12 weeks each*

## 2221. PLASTICS DESIGN I

## 2222. PLASTICS DESIGN II

The purpose of this subject is to study the design of molds and dies for plastics. An important phase will be the study of good practice in this field. The subject is offered as advanced study in plastics, and it is essential that all those enrolling have had either the first course in plastics or its equivalent.

*2 hours—one class a week—12 weeks each*

## 2301. ENGINEERING MECHANICS I

## 2302. ENGINEERING MECHANICS II

This subject is for those who desire to get a foundation in the facts and theory of practical mechanics. Instruction is given in the methods of applying these fundamentals to basic mechanisms. Problems are taken from practical examples in various applications and are discussed and explained with fundamental principles. The course covers such topics as forces, simple machines, levers, hoisting devices, trusses, friction, screw threads, pulleys, gears, work, energy, and power. PREREQUISITE: Pre-Engineering Mathematics.

*2 hours—one class a week—12 weeks each*

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*Education Enables Men to Keep Abreast of the Times*

## 2640. ENGINEERING FORUM

This is a series of lecture and discussion meetings offered to those interested in new engineering and scientific developments. Guest engineers from other companies will be invited to speak before the group and lead discussions on recent advances in their field. Notices will be mailed to enrollees announcing the subject, speaker, and time of meeting. *One class a month*

MECHANICAL AND ELECTRICAL PRINCIPLES  
OF IBM ELECTRIC ACCOUNTING MACHINES

These courses are designed to explain the mechanical and electrical principles of IBM Electric Accounting Machines. Each unit of a machine is studied, and its mechanism, circuits, and functions are thoroughly explained. These courses are now grouped together in such a way as to permit the study of directly related machines without studying the whole line of equipment. Groups as shown may be studied independently and taken in any sequence desired.

- 2½ hours—one class a week—12 weeks*
- |       |   |   |
|-------|---|---|
| 2711. | { | Electric Key Punch  |
|       |   | Motor-Drive Duplicating Punch                             |
|       |   | Alphabetic Duplicating Punch                              |
|       |   | Alphabetic Duplicating Printing Punch                     |
| 2721. | { | Sorter  |
|       |   | Special Sorter Devices                                    |
|       |   | Collator  |
| 2731. |   | Electric Accounting Machine, Type 285, with Summary Punch |
| 2741. | { | Automatic Comparing Reproducing Punch                     |
|       |   | Electric Document-Originating Machine                     |
|       |   | Alphabetic Interpreter                                    |
| 2751. |   | Alphabetic Accounting Machine with Automatic Carriage     |
| 2761. |   | Type 601 Electric Multiplier                              |
| 2771. |   | Type 602 Calculating Punch                                |

2781. PRINCIPLES AND APPLICATIONS OF THE  
AUTOMATIC CARRIAGE

This course shows the use of the 921 Automatic Carriage through various applications using forms which require the paper to be advanced by rapid line-spacing or ejection. The mechanical principles of operation and the purpose of adjustments are demonstrated. Covered in detail, the method of controlling the carriage by electrical circuits is applied to standard everyday applications.

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*To Think Is to Achieve*



# BUSINESS SUBJECTS



## 3001. IBM PRODUCTS

The object of this course is to give the IBM employee a comprehensive picture of the company and the part its machines play in the business world and governmental agencies, together with the basic facts about the applications of these machines. While it is primarily a lecture course, the student is afforded an opportunity to take part in several demonstrations of the use of many IBM products. The history of the company is developed from the time of its inception to the present day. All branches of the organization's products are considered, and sufficient time is spent on each type of equipment to familiarize the student with its applications. Lesson material was specially prepared by the IBM Department of Education.

*2 hours—one class a week—12 weeks*

## 3111. TYPEWRITING I

This instruction is given in answer to many requests for a course in which the student might learn the keyboard and develop a minimum speed of twenty words a minute. The outline for the course includes: getting acquainted with the IBM Electric Typewriter, correct posture, good typing habits, learning the keyboard (touch system), and care of the typewriter. It is a practice course, with no assigned homework. Motion pictures supplement verbal instruction in typing technique.

*2 hours—two classes a week—12 weeks*

## 3112. TYPEWRITING II

This is a practice course, with no assigned homework, on the IBM Electric Typewriter. Students qualify on the basis of previous typing experience, as time does not permit teaching the keyboard but rather the special skill required for rapid operation of the Electric Typewriter. Speed drills are conducted, as well as practice on business letters, reports, manuscripts, and

transcribing from the dictaphone. Minimum speed of 40 words per minute is the goal of this course. Motion pictures supplement the instruction in typing technique. **PREREQUISITE:** Typewriting I or equivalent. (Employee typists are not eligible for this subject.)

*2 hours—two classes a week—12 weeks*

### 3201. ELECTRIC KEY PUNCH PRACTICE

Those who wish to learn the operation of IBM key-operated card punching equipment will be interested in this subject. An explanation of the IBM Accounting Method is given in order to provide an understanding of the use of the various machines. Considerable practice is given on exercises, at which time the operators learn good key-punching technique. The complete process is studied from the original written record to verification and sorting. Lesson material has been specially prepared by the IBM Department of Education.

*2 hours—two classes a week—12 weeks*

### 3301. SHORTHAND I

### 3302. SHORTHAND II

Shorthand is an interesting, time-saving, easy-to-learn method of speed writing which has proved of great value in the business world. The ability to jot down notes, important calls, significant memoranda, complicated instructions, and business letters is an asset. This subject is for beginners who have never studied shorthand before. The Gregg system of shorthand will be followed. The degree of proficiency attained depends entirely upon the individual's interest and willingness to practice. At least one-half hour a day outside of class should be devoted to the practice of this subject.

*2 hours—one class a week—12 weeks each*

### 3303. SHORTHAND III

This provides advanced study for those who already have a practical knowledge of shorthand, yet wish to improve their speed and brush up on their vocabulary and phrases. This subject is primarily intended for Gregg writers, but others will find the course helpful in improving their speed in taking dictation. **PREREQUISITE:** Shorthand II or equivalent. (Employee stenographers and secretaries are not eligible for this subject.)

*2 hours—one class a week—12 weeks*

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*Every Day Is a Pioneering Day*

## 3304. TRANSCRIPTION

Many students of typing and shorthand have felt the need for a course which combines and co-ordinates these two subjects for a better understanding of their use. This course is designed for increased speed and accuracy in typing from shorthand notes. The lessons include a review of shorthand and typing as well as English and punctuation. **PREREQUISITE:** shorthand rate of 80 words a minute; typing rate of 35 words a minute. (Employee stenographers and secretaries are not eligible for this subject.)

*2 hours—one class a week—12 weeks*

## 3401. PRACTICAL ENGLISH

This subject is of particular interest to those who conduct either conversations or correspondence with others. It is an aid in improving their ability to speak and write clear, correct, and effective English. Special emphasis is given to the use of the dictionary.

*2 hours—one class a week—12 weeks*

## 3421. SECRETARIAL PRACTICE

A subject offered to afford an opportunity of broadening knowledge of business procedures. Among the topics taught are: stenographic work, mechanical details of the business letter, answering letters without dictation, attending to the mail, telephone and telegraph, filing and alphabetizing, business and office organization. **PREREQUISITES:** working knowledge of Shorthand and Typewriting.

*2 hours—one class a week—12 weeks*

## 3431. OFFICE PRINCIPLES AND PRACTICE

This subject is offered to those who are interested in gaining a knowledge of the theory of office organization and management. It is designed to familiarize the student with modern office practice and the development of office routines and forms. Practice in organizing and planning the layout of an office is provided in the form of projects.

*2 hours—one class a week—12 weeks*

## 3511. BOOKKEEPING I

## 3512. BOOKKEEPING II

The fundamentals of bookkeeping and accounting are studied, and practice is derived through the use of a set of accounts to be maintained by each

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*Thought Begets the Will to Create*

student. The use of these sets will involve journals, ledger, posting, trial balance, statements, and commercial paper. A portion of the class period each week is devoted to individual instruction by the instructor in checking these practice sets. *2 hours—one class a week—12 weeks each*

## 3531. INDUSTRIAL ACCOUNTING I

## 3532. INDUSTRIAL ACCOUNTING II

This is an advanced study developing for the student modern accounting practice from the fundamentals learned in Bookkeeping. Those individuals who feel a need of a review in accounting principles will find that the text used in this course completely covers the elements of accounting as well as the advanced principles. Practice in this subject is obtained through the use of case studies and a series of projects to be completed by the student which involve the accounting process, cash and receivables, investments, fixed assets and depreciation, liabilities, capital and surplus, partnership, consolidated statements, balance sheet and liquidation and estate accounting. PREREQUISITE: Bookkeeping or equivalent. *2 hours—one class a week—12 weeks each*

## 3541. AUDITING I

## 3542. AUDITING II

This subject is designed to teach the fundamentals of auditing. It is assumed that the student has a good background of accounting practices on which he can base the more advanced phases of auditing. The subjects studied are: procedure, working papers, audits of accounts receivable, inventories, fixed assets, deferred items, current liabilities, fixed liabilities, net worth, profit and loss statement, and reports and examinations. PREREQUISITE: Industrial Accounting or equivalent. *2 hours—one class a week—12 weeks each*

## 3611. PRINCIPLES OF ECONOMICS I

## 3612. PRINCIPLES OF ECONOMICS II

Economics is the study of business activity from the standpoint of public welfare. These courses undertake first to explain the present-day organization and operation of industry, and second, to consider how far the present situation needs correction from the standpoint of efficiency in production and

justice in distribution. These courses are concerned with an historical and analytical study of the principles, followed by a discussion of practical economic questions, such as the tariff, money and banking, the labor problem, etc.

*2 hours—one class a week—12 weeks each*

3701. ELECTRIC ACCOUNTING MACHINE PRACTICE I

3702. ELECTRIC ACCOUNTING MACHINE PRACTICE II

This subject is provided to acquaint those who are interested in the principles of operating IBM Accounting Machines. The students set up the control panels and produce on the machine a representative group of reports. The following machines are studied: Key Punches, Sorters, Numeric Accounting Machines, Alphabetical Accounting Machines, Auxiliary Equipment, Transfer Posting Machine. Lesson material has been specially prepared by the IBM Department of Education. PREREQUISITE: IBM Products.

*2 hours—one class a week—12 weeks each*

3711. ELECTRIC ACCOUNTING MACHINES APPLICATIONS

This subject is offered for those who are interested in acquainting themselves with the applications of IBM accounting. The course will be of special interest to those students who have completed EAM Practice and are interested in furthering their knowledge in the use of IBM machines in accounting procedures. The following topics are covered: accounts payable, accounts receivable, billing, sales, payroll and labor accounting, inventory and material accounting, plant and equipment accounting. PREREQUISITE: EAM Practice I-II or equivalent.

*2 hours—one class a week—12 weeks*

3810. MANUFACTURING CONTROL

With today's increasingly higher cost of labor and materials, the appreciation and application of scientific management methods is essential to profitable manufacturing operations. Modern manufacturing methods which transform basic raw materials into usable products by the coordinated use of manpower and machine tools present a management problem of a nature which challenges the ability of an executive. The solution of these problems forms a study which has many practical applications to the everyday problems in a manufacturing plant. While emphasis is placed upon the use of IBM

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*Education Is the Only Lever Capable of Raising Mankind*



Electric Punched Card Accounting Machine Methods, basic principles with wide application form the basis for discussion. The course is conducted by members of the Consulting Staff of the Division of Manufacturing Control Education, who from their relations with many manufacturing organizations throughout the country are able to present a practical discussion of the common problems and modern techniques for their solution.

*2 hours—one class a week—12 weeks*

### 3831. INDUSTRIAL ORGANIZATION

Economical manufacturing depends on an efficient industrial organization. The successful operation of an industrial organization is dependent upon the members' of that organization having knowledge and experience in the science of manufacturing. This course will prove of interest to those wishing to gain a better knowledge of the many divisions of our manufacturing organization and their relation to one another. These divisions include production control, manufacturing, assembling, cost analysis, purchasing, receiving, material handling and storage. The text is supplemented by interesting talks by IBM executives who discuss their particular divisions and explain their relationship with the other divisions of our manufacturing organization.

*2 hours—one class a week—12 weeks*

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*Nothing Great Was Ever Achieved Without Enthusiasm*

# GENERAL SUBJECTS



## 4001. EFFECTIVE SPEAKING I

## 4002. EFFECTIVE SPEAKING II

The purpose of this course is to develop in a practical way the art of speaking for conversation and public speech. Every student is expected to talk at every meeting of the class. The student is given assistance in overcoming fear, thinking out a talk, personality improvements, selecting and preparing a speech. Dinner meetings may be held to give practice under actual conditions.

*2 hours—one class a week—12 weeks each*

## 4003. EFFECTIVE SPEAKING III

The course in Effective Speaking III assumes the nature of a clearing house of problems that may still remain after the elementary speaking course, whether they are technical or personal. Students have weekly practice in making short talks and throughout the term collect materials, outline and prepare for a more lengthy speech given near the close of the term. **PREREQUISITE:** Effective Speaking I-II or equivalent.

*2 hours—one class a week—12 weeks*

## 4101. PRACTICAL PSYCHOLOGY

How do people learn? What are emotions? What is the difference between a normal and an abnormal person? Are there distinct types of personalities? These are just a few of the topics that will be discussed in the Practical Psychology Course, designed for those who are interested in human behavior. A systematic approach to such a study gives us a better understanding of ourselves and of our fellow human beings. The course combines lectures with classroom discussions and reading assignments from *Psychology and Life*.

*2 hours—one class a week—12 weeks*



## 4111. PHILOSOPHY

If you are a serious student of science, history, economics, politics, social progress or human welfare, you will appreciate the new course in philosophy. A study of philosophy is a study of the thinking of men who have had great influence in the world. Today's modern world has its roots in the philosophical minds of the past. Discussions on morality, politics and man's relation to his universe are as refreshing today as they were among the early Greeks and Romans. Philosophy is literally translated as the "love of wisdom," and within its scope are to be found discussions of problems that attract the curiosity and interest of active human minds. Through the study of philosophy, you can gain a greater appreciation of the meaningfulness of the world in which you live.

*2 hours—one class a week—12 weeks*

## 4201. FIRST AID I

The purpose of this course is to provide sufficient training in first aid to enable anyone who has studied it to act in case of an emergency and prevent a fatality due to lack of immediate attention. This subject is taught by an accredited Red Cross instructor. The regular text is supplemented by a fine group of first aid sound movies and color slides. Students successfully completing the course are awarded a certificate by the American Red Cross.

*2 hours—one class a week—11 weeks*

## 4202. FIRST AID II

Intended to fix more firmly in the student's mind the first aid principles covered in First Aid I, intensive review of that work composes about half the classroom time. The other half is devoted to practice in the administration of emergency measures. Descriptions of accident and sickness situations are given to the students, and splints, bandages, artificial respiration, etc., are applied by the students to give them valuable practice in the proper handling of all such cases. A certificate from the American Red Cross is awarded to students successfully completing the course.

*2 hours—one class a week—6 weeks*

## 4301. FRENCH I

## 4302. FRENCH II

French is the world's most cultural language and has long been one of the most popular subjects in the United States. It is a universal language under-

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*Every Time a Man Uses His Mind He Strengthens It*

stood practically everywhere in the world. As France rises reborn from the ravages of military occupation and resumes its place as one of the leading nations of the world, the French language will continue to hold a high place in the world of international affairs and commerce. The traditional friendship of the United States and France lends interest and enthusiasm to the study of French.

*2 hours—one class a week—12 weeks each*

4303. FRENCH III

4304. FRENCH IV

A basic foundation in French grammar is developed in the first two terms of French I and II. As a practical application of this language, it is desirable to be able to read and speak fluently the language studied. Therefore, in these advanced courses all classroom conversation between students and instructor will be in French. PREREQUISITE: French I and II or equivalent.

*2 hours—one class a week—12 weeks each*

4311. GERMAN I

4312. GERMAN II

As the scars of war heal, German regains its place as one of the important languages for Americans to know. The language of some 80 million people, German is important in the postwar period, and its value in the technical and business world remains high. This is a splendid opportunity to learn the fundamentals of one of the world's most important tongues.

*2 hours—one class a week—12 weeks each*

4321. PORTUGUESE I

4322. PORTUGUESE II

Besides being the language of Portugal, Portuguese is the language of our "good neighbor" and sister-republic, Brazil. Brazil is a land of unlimited natural resources and a people rich in a pioneering spirit which is fast developing their nation industrially. Brazil is approximately the same size as the United States and contains forty per cent of the population of Latin America. Brazil's ever-growing influence in Inter-American affairs and in the world has caused Portuguese to become highly useful. The growing number of educational institutions offering courses in the language of Brazil reflects the expanding role of that country in world affairs. Here is an opportunity to be in the forefront of the North Americans learning this useful tongue.

*2 hours—one class a week—12 weeks each*

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*Good Thinking Is a Rich Personal Satisfaction*

## 4341. SPANISH I

## 4342. SPANISH II

Long a popular language in the schools of the United States, Spanish is serving a great many public and business people today in their personal and commercial dealings with our fellow Americans of Spanish America. Inter-American co-operation is growing in direct proportion to our mutual understanding, which is fostered by a knowledge of our national languages. The mere fact that Spanish is the tongue spoken in eighteen of the Pan-American nations indicates that a knowledge of Spanish is practical and advantageous in the world of today.

*2 hours—one class a week—12 weeks each*

## 4343. SPANISH III

## 4344. SPANISH IV

A basic foundation in Spanish grammar is developed in the first two terms of Spanish I and II. As a practical application of this language, it is desirable to be able to read and speak fluently the language studied. Therefore, in these advanced courses all conversation between students and instructor will be in Spanish while in the classroom. PREREQUISITE: Spanish I and II or equivalent.

*2 hours—one class a week—12 weeks each*

## 4401. CLOTHING.

This course consists of a series of meetings dealing with clothing problems of common interest to the group. By means of demonstrations, discussions, lectures and trips, the following units are covered: colors most becoming to you (including individual color readings), line and design best suited to your figure and features, buying clothes for satisfaction, what to expect of various fabrics, and repair and alteration of clothing. Study is adjusted to the demands of the class.

*2 hours—one class a week—12 weeks*

## 4431. INTERIOR DECORATING

These meetings will deal with the creation of pleasant, useful, up-to-date home interiors. Discussions will be adapted to the needs and desires of the group. A portion of each meeting will be devoted to demonstrations, lectures and movies, and the remainder of the time will be used for group discussion,

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*Five Steps to Knowledge: Read, Listen, Discuss, Observe, Think*

questions and work on individual problems. If the group desires, the following subjects will be considered: making the best of what one has; providing each member of the family with a place for his favorite activities; personality in home decoration; treatment of walls, floors and windows; consistency in style, including period furniture; refinishing and rebuilding old furniture; slipcovering; and pictures and accessories.

*2 hours—one class a week—12 weeks*

#### 4501. HOME PLANNING

Increasing numbers of employees are vitally concerned with the many problems of planning, building, buying, or remodeling a home. The object of this course is to acquaint interested individuals with the proper knowledge related to the selection of site and house plans; sound financing; important details of construction; various types of heating; plumbing and electrical facilities; modern appliances; landscaping. Each subject will be presented in lecture form by individuals who are specialized in the particular field. Following each lecture, there will be a general discussion period during which the students may ask questions of the guest speaker.

*2 hours—one class a week—12 weeks*

#### 4511. ARCHITECTURAL DRAWING

It is not unusual that sometime in a man's life, he possesses an ardent desire to build a home of his own. A feeling of community importance, self-satisfaction, and family interest, come to the man who is living in his own home. If he plans his own home, and closely follows it to completion, to the other interests is added an element of pride. The aim of this class is two-fold: first, to give the student a practical conception of architectural construction and methods of drawing, and second to create in him a desire to build a home of his own that will combine beauty and utility. **PREREQUISITE:** Mechanical Drawing I or equivalent.

*2 hours—two classes a week—12 weeks*

#### 4512. ARCHITECTURAL BLUEPRINT READING

This class follows very closely the architectural drawing class in that the drawings made by the architect or draftsman are presented in blueprint form, and the symbols, characters, etc., indicated on the prints have a special meaning. The interpretation and meaning of all symbols for heating, plumbing,

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*Thinking Means Winning*

electrical work, air conditioning, landscaping, and other related subjects will be identified and translated into quantities and values.

*2 hours—one class a week—12 weeks*

#### 4513. ARCHITECTURAL SPECIFICATIONS

This class complements the Architectural Blueprint Reading and Drawing classes due to the need for necessary information to properly interpret the drawings and prints. All information cannot be contained on the drawings; so it becomes necessary to supplement them with written instructions and descriptions of methods of construction, quality and type of material to be used and a fully explained statement as to what the contractor shall do to build or erect the structure desired. Specifications under this heading will be discussed, criticized, explained, changed, etc., as may suit the particular problem. All work will be limited to residential plans only.

*2 hours—one class a week—12 weeks*

#### 4521. GARDENING AND LANDSCAPING

Increased interest in home gardens and home planning and improvement has prompted the offering of a course in practical gardening and home landscaping in sufficient time to permit application in the Spring. This course will cover a variety of interesting subjects including: vegetable gardens, seeds and plants, hot beds and cold frames, fertilizers, garden maintenance, insect and disease control, strawberries and bramble fruits, lawns, walks and drives, bulb and annual gardens, and perennial gardens.

*2 hours—one class a week—12 weeks*

#### 4601. PHOTOGRAPHY I

Photography offers a medium of expression which represents in some measure our feelings and desires. The interest evinced in photography has made it one of America's favorite avocations. In this course there will be an opportunity to improve personal photographic technique. The lecture and demonstration course will cover the developing and printing of pictures as well as the history and theory of photography. Some of the other subjects covered are: uses of lenses, camera technique, enlarging, portrait and studio lighting, flashlight photography, and composition. So far as possible, practical demonstrations and laboratory work will be given in these subjects to make the course of greatest interest to the beginner.

*2 hours—one class a week—12 weeks*

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*No Man Ever Attained Greatness Who Did Not Think for Himself*



## 4621. ART APPRECIATION

What is art? When is it good and when not? These controversial questions can be approached through study of the outstanding works of the past and of today. Through demonstrations and illustrated lectures this course surveys the entire range of graphic and plastic art, including drawing, painting, sculpture, architecture, commercial art, advertising layout, and industrial design. It is intended not merely to provide cultural background, but also to give the basis for applying principles of art in business, in the home, and in everyday life.

*2 hours—one class a week—12 weeks*

## 4633. MUSIC THEORY

In answer to many requests, a course in music theory is again offered. This subject presents the fundamentals of music, including a knowledge of notation and terminology covering all signs and symbols from the lines and spaces to the first steps in harmony. Through this study, persons who are musically inclined, and desire to know these fundamentals, can increase their knowledge and technical appreciation of music.

*2 hours—one class a week—12 weeks*

## 4635. MUSIC READING

This course provides advanced study for both vocalists and instrumentalists who have completed the course in Music Theory. (Theory teaches one to recognize and define the three names of each note, all signs and symbols, etc., in a theoretical manner.) Music Reading enables one to read, to interpret, to understand, to get experience through singing, to acquire the power of hearing the printed page through the eye and of seeing it through the ear. Rhythm in all forms will be thoroughly discussed and systematically drilled. The vital matter in music reading is the power to get thought from the representation, and it demands mathematical accuracy of thought and instantaneous transformation of thought into oral expression. PREREQUISITE: Music Theory or the equivalent.

*2 hours—one class a week—12 weeks*

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*Learn to Use Knowledge*

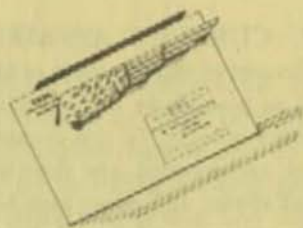
## 4711. CURRENT AFFAIRS FORUM

The aim of this course is to keep abreast of as many important events and issues as possible by lecture, illustration, and discussion in a thorough and objective manner. In this course the news and events will be analyzed, discussed, and digested, and their implications to our future emphasized. Examples of events and issues may be: housing, recreation and leisure time, scientific progress and its effect on our social living, conservation of natural resources, education for all, group controls versus individualized controls, politics, planning, local problems, the peace and reconversion, population trends, crime, health for all, etc. A well-informed, alert citizen makes a better citizen. Text material will be assigned from *Think* magazine, pamphlets, articles, radio, illustrations, and other sources.

*2 hours—one class a week—12 weeks*

\* \* \*

## EXTENSION SUBJECTS



### 6521. ELEMENTARY ELECTRONICS

This is the first course to be offered for correspondence study under the extension program. Other courses are now in preparation and will be announced when available.

Electronics by present usage may be defined as a science dealing with the action of electrons in vacuum or gas-filled tubes. Because of the rapid expansion of the field of electronics, this subject is receiving widespread attention. In this course, the theories involved and the principles of operation of the various electron tubes are explained thoroughly. The lessons used in this course have been prepared by the IBM Department of Education. These lessons are profusely illustrated and provide detailed explanations of phenomena which might otherwise be considered difficult to understand. Considerable attention has been given to the elimination of all non-essential mathematics.

Naturally, the use of some mathematics is necessary, and enrollees should have a knowledge of elementary algebra and high school physics or elementary electrical principles.

While classroom study with discussion and practice is the best method of studying a new subject, there are occasions when this method is not feasible. A home study extension course is the alternative. Correspondence study has the advantage of adaptability to your own requirements. You can study as often as you desire, according to the time available to you for study.

You may enroll in this course at any time of the year. Enrollment cards may be obtained from your manager. After filling in an enrollment card for this course, return it to your manager, who will send it to the Division of General and Vocational Education in Endicott, New York.

After receipt of your enrollment card, we will mail to you: a textbook, five lessons, stationery, and a booklet containing general information about

the course. After studying the first lesson and the assigned portion of the text indicated at the beginning of this lesson, you must write the answers to the ten questions at the end of the lesson on the stationery supplied to you. When we receive this answer paper, we will grade it and return it to you together with lesson six. We will send additional lessons to you as we receive your answer papers. Thus you will always have five new lessons on hand for study at all times. The complete course consists of 24 lessons.

In order to test your progress, regular quizzes based on the text and the lessons are given after the completion of each five lessons. These quizzes are of the multiple-choice type and are to be answered without the aid of the text or the lessons.

Employees successfully completing this course will receive a certificate of the same type as that given for all other IBM general education subjects. In addition to this, credit of three units will be given toward an IBM general education certificate.



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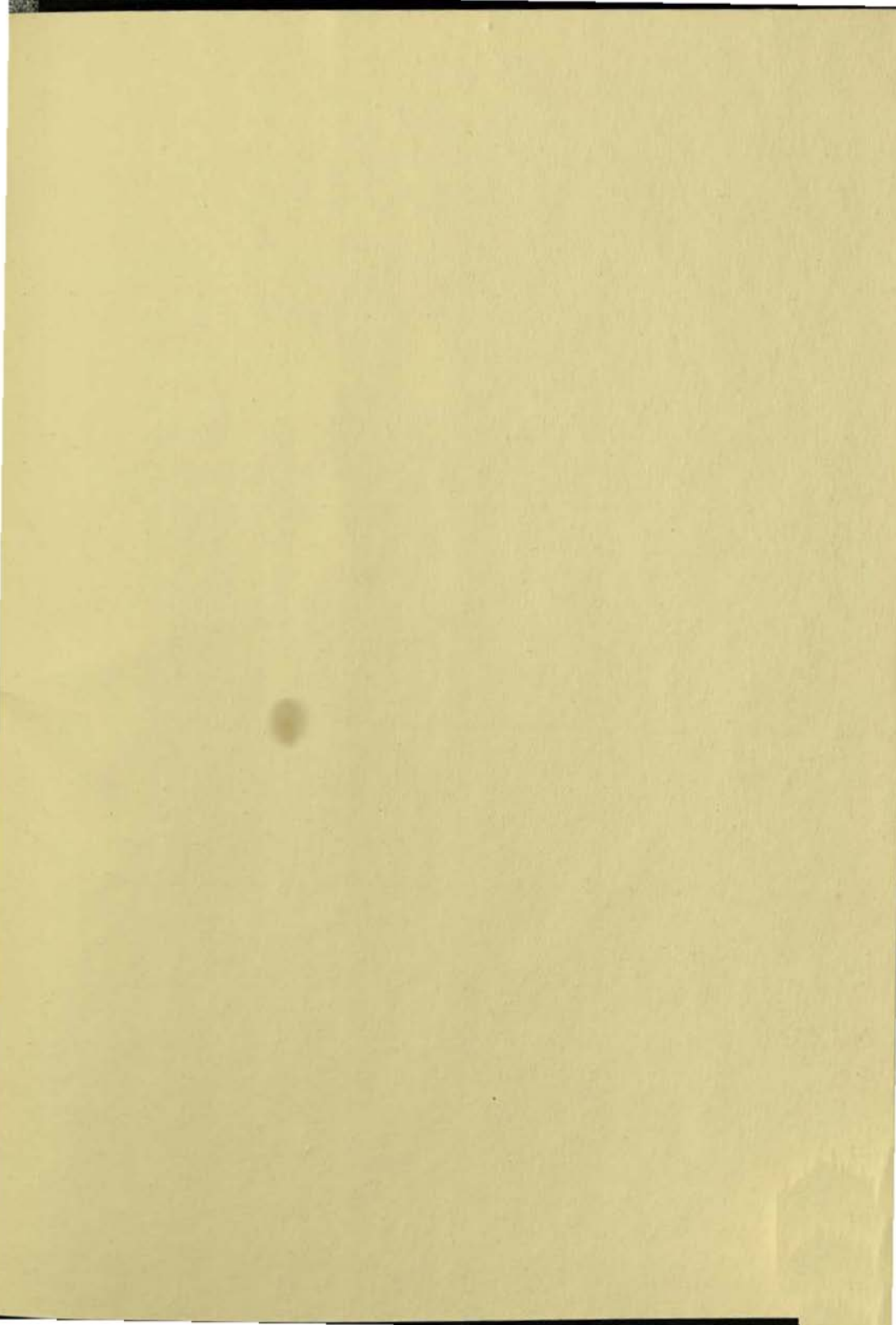
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