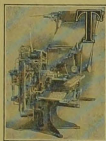


The Bureau of Printing, Manila

SYSTEM OF APPRENTICE INSTRUCTION IN THE MANILA BUREAU OF PRINTING

By SAMUEL H. MUSICK, *Craftsman Instructor, Bureau of Printing*



THE Manila Bureau of Printing has instituted a system of apprentice instruction which is a radical departure from all known methods of vocational training. The practicability of its scheme has received world-wide approval. Leaders in the graphic arts and instructors in institutions devoted solely to teaching printing and its allied trades have expressed admiration at the fullness of its details and the coherence of its parts. Instructors in Harvard University, impressed with the thoroughness of the Bureau's system, have signified their intention of using its material in connection with this year's course in printing in the Harvard Graduate School of Business Administration.

The efficacy of the system is best evidenced by the evolution from an all-American force in 1902 to the present one composed

The printed word is the greatest contribution to man's storehouse of knowledge. The gift of knowledge is man's inalienable possession. Its benefits can be freely imparted, but its substance can not be bartered or given away

of 94 per cent of Filipino workmen. Of this native element, apprentices constitute 63.63 per cent. All of the mechanical work of the Bureau of Printing is being performed by Filipinos, Americans acting only in a supervisory capacity.

Apprentice instruction places the Bureau of Printing in a position unique among the world's printing offices. No other public or private *producing* establishment in existence is operated with so large a percentage of students comprising its technical force. In American and European printing offices the apportionment of apprentices to journeymen is on a basis of from 1-to-15 to 1-to-5, whereas in the Bureau of Printing the present ratio is 1 $\frac{3}{4}$ apprentices to 1 native craftsman.

The Bureau, however, is not primarily a school of printing. It furnishes all the printing and binding for the Philippine Government and certain work for local stations of the United States

A Battery of Linotypes, Composing Division, with Filipino Operators



Army and Navy. Among its customers are the various Insular bureaus and offices, the Philippine Legislature, 38 provinces, and 725 municipalities. Its modern equipment consists in part of twenty linotypes; thirty cylinder, platen, embossing, and automatic printing presses; fifty bookbinding machines; twenty-five stereotyping and electrotyping machines; a photo-engraving plant equipped for line, half-tone, and color-process engravings; a machine shop; and a power plant in duplicate. The plant is valued at ₱1,000,000.

During the last decade the business of printing and publish-

The printing press is the great contributing factor to the progress of the human race. The industrial success and intellectual advancement of all nations may be measured by the quantity and quality of their printed matter

ing has advanced from a comparatively obscure position to sixth place among American industries. In 1909, the last year for which statistics are available, its products were valued at \$1,500,000,000.

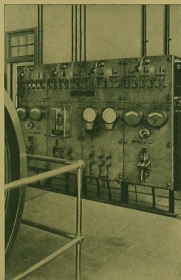
Coincident with the amazing growth of the printing industry there has been rapid development along the line of technical education in order to improve the quality of workmanship. Printing courses have been established in public and private schools, in which this vocational work is now being carried on in many States of the Union. The Congress of the United States has also recognized the need of industrial instruction in the skilled trades. There is now pending in that body a measure which provides that the Government shall establish and exercise control over trade schools in all parts of the country.

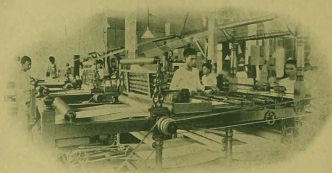
The Bureau of Education is in charge of all industrial education in the Philippines with the exception of printing and its allied trades, which are in the hands of the Bureau of Printing. Both Bureaus are under the supervision of the Secretary of Public Instruction.

The principle of the instruction imparted in the Bureau of Printing is to form a systematic and coordinate sequence, and, to accomplish this, all the operations of each trade are divided into specialties and subspecialties, which are segregated into classes in the order of their relative importance.

The manner in which the specialties and subspecialties are

*Marble Switchboard, Power Plant Division
Erected by Apprentices*





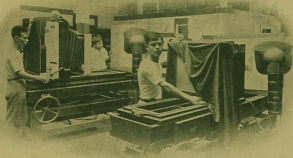
Ruling Machines in the Bindery

arranged for each of the eight trades taught in the Bureau of Printing is shown in Plates I and II. Numbers are assigned to specialties and letters to subspecialties. Plates I and II pertain to the photo-engraving trade, which is divided into 41 specialties and 154 subspecialties.¹ The same general scheme is applied to each of the trades, the number of specialties and subspecialties in each division being as follows:

Trade.	Specialties.	Subspecialties.	Total.
Printer	47	258	305
Pressman	45	136	181
Bookbinder	74	196	270
Photo-engraver	41	154	195
Stereotyper and electrotypist	40	140	180
Total	247	884	1,131

Fifty-five specialties and 265 subspecialties are taught in the

¹ In explanation of the hiatus from 32 to 101, it may be stated that the numbers assigned to specialties are the same for both the apprenticeship and cost-accounting systems of the Bureau, viz, 1 to 100, inclusive, for chargeable specialties; 101 and upward for nonchargeable specialties. A further division of chargeable specialties is made in those divisions having both machine and hand specialties, as follows: Machine, 1 to 50, inclusive; hand, 51 to 100, inclusive. This system of numbering enables the abstractor to make all entries from the workman's daily time ticket (Plate III) without reference to an explanatory list of specialties, and its advantages will be apparent when it is understood that machine and hand rates are segregated and that nonchargeable specialties ordinarily are not abstracted.



Graduate Apprentices As Operators

auxiliary trades of engineer, machinist, and electrician, making a grand total of 302 specialties and 1,149 subspecialties in the eight trades mentioned.

The specialties of each trade are distributed over seven periods, or four years in all. During the first three years (six periods of six months each) the student is designated as an "apprentice," and in the final period of one year he is known as a "junior craftsman." This provides ample time in which the student may familiarize himself with each specialty of the trade. It is not contended that within that time a superior workman can be evolved from the crude material, but the four-year period of systematic instruction has proven adequate for turning out workmen who have assimilated a general knowledge of all the specialties of their trades. Graduate apprentices are also given opportunities to demonstrate their fitness for the positions of copy editor, proof reader, work-order writer, computer, estimator, and such other assignments as require workmen of wide experience. A comprehensive technical reference library, available to all, affords an excellent medium for self-education in office administration and organization, the relations of the various printing trades to each other, and the physical qualities of the more important printing-office materials. The value of the information contained in this library is impressed upon the mind of the apprentice, and he is urged to consult it freely.

Bureau of Printing apprentices have a distinct advantage in not being required to devote any part of their time to running

errands, "sweeping out," and other tasks that usually occupy the greater part of the first year of apprentices elsewhere.

Although this is an age of specialization, it is believed that the most efficient workman is one trained in all of the operations pertaining to his trade, making him more adaptable as a competent specialist. This method also provides a mobile force, advantageous alike to employer and employee.



A Class 6 Apprentice

A system of instruction whereby each workman becomes thoroughly conversant with all of the details of his trade makes him superior to that neglected class which is subjected to a monotonous grind on one class of work. It places him thoroughly in line with the principles of so-called scientific management, because during his apprenticeship he unconsciously acquires much of what such systems are now endeavoring to establish.

The first class period of six months is considered ample in which to determine an apprentice's fitness for the trade to which he has been assigned. If he shows inaptitude, particularly with respect to mechanical details, he is advised to seek other fields of labor. Justice to the employee as well as to the employer demands frankness in a matter that influences the formative period of a boy's life. If an apprentice demonstrates aptitude during his first class period but is unable to qualify for promotion within the prescribed period of six months, he is retained in the class until he has thoroughly mastered the specialties of that class period. The extension, however, in no case exceeds three months. If, after three months' extension, an apprentice fails to qualify for



Imposing Forms for Press

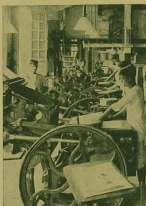
promotion, he is separated from the service. It has been demonstrated that changing an apprentice's classification, with a corresponding increase in compensation, confers a mark of distinction and gives him an incentive to maintain his interest in the work. As new kinds of work are introduced at the beginning of each class period, it may readily be surmised that an apprentice will put forth his best efforts to master the specialties of his current class in order to advance from the monotony of a class-end period to the welcome change afforded by new duties.

A prerequisite to the success of any apprenticeship system is the employment of instructors who are thoroughly skilled in their work. They must have not only unusual ability and the faculty of imparting their knowledge, but also, what is more important, the disposition to impart that knowledge in the freest manner and to the fullest extent.

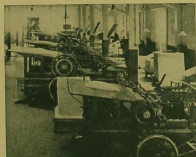
In the Bureau of Printing the attitude of a craftsman instructor toward an apprentice is similar to that of a teacher and pupil in a school. The instructor instills into the mind of the student the importance of exerting every effort toward attaining efficiency. The apprentice is given a scheduled task and shown the proper manner in which it should be performed. He is never permitted to become a mere animated machine. Instructors take a personal interest in the work of each apprentice, carefully explaining every operation. The apprentice is never forced to acquire his knowledge through chance contact with other workmen.

A competent craftsman instructor or supervisor should be

[Continued on page 378]



A Row of Platen Presses



Some of the Cylinder Presses

PLATE I

MANNER IN WHICH ALL OPERATIONS OF EACH TRADE ARE SEGREGATED INTO SPECIALTIES AND SUBSPECIALTIES. THE EIGHT TRADES TAUGHT IN THE BUREAU OF PRINTING CONSIST OF 302 SPECIALTIES AND 1,149 SUBSPECIALTIES. INSTRUCTION IN EACH TRADE IS IMPARTED ACCORDING TO AN INVARIABLE SCHEDULE (SEE PLATE II)

PHOTO-ENGRAVING SPECIALTIES

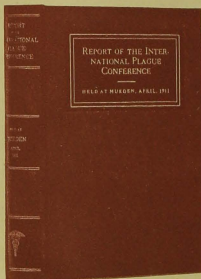
CHARGABLE		
1. Alignment.	23. Etching, etc. line.	22. Photographing half-tone, special (reproduction of pencil drawings, etchings, and steel or copperplate prints).
2. Alighting.	(a) Etching line print.	23. Photographing, line:
(a) Drilling anchor holes.	(b) Reetching etching.	(a) Focusing line.
(b) Countersinking anchor holes.	(c) Powdering and burning in line work.	(b) Calibrating and sensitizing plate.
(c) Outlining anchor marks.	(d) Preparing and mixing etching solutions.	(c) Fixing plate in plate holder and making exposure.
(d) Trimming anchor marks.	24. Finishing, half-tone.	(d) Developing negative.
3. Beveling, plain:	(a) Spotting.	(e) Clearing out developer with cyanide.
(a) Adjusting mechanism.	(b) Extending corner lines.	(f) Intensifying negative.
(b) Alighting plate with line gauge and clamping down.	(c) Burnishing.	(g) Clearing negative.
(c) Beveling, burning plain border.	(d) Spotting.	(h) Final intensification.
(d) Cutting ground or white line.	(e) Extending corner lines.	(i) Final clearing.
(e) Beveling, leaving black and white line border.	(f) Burnishing.	24. Printing negative:
4. Beveling, special (Etching):	(g) Outlining for cut outs.	(a) Sawing and polishing metal.
(a) Adjusting mechanism.	(h) Trimming cut outs.	(b) Coating metal with sensitizing solution.
(b) Alighting plate with line gauge.	(i) High-lighting.	(c) Printing negative.
(c) Cutting black and white lines in multiple or extended lines.	25. Finishing, line:	(d) Making up print.
(d) Making raised border line by barring up.	(a) Spotting.	(e) Washing and developing out plate after printing.
(e) Cutting raised line down to printing surface and giving white line.	(b) Trimming.	(f) Burning or baking in enamel.
(f) Beveling.	(c) Requiring.	(g) Remounting print.
5. Blocking or mounting:	(d) Correcting.	(h) Preparing and mixing line and half-tone printing solutions.
(a) Adjusting mechanism.	27. Mounting:	
(b) Center punching for countermarks.	(a) Adjusting mechanism.	25. Proofing:
(c) Drilling countermarks for back heads.	(b) Guide marking.	(a) Black and white.
(d) Finishing blocking wood smooth on one side.	(c) Inside mortising.	(b) Color.
(e) Nailing cuts to blocks.	28. Mounting or grouping original copy:	26. Reducing.
(f) Finishing means type high.	(a) Grouping of copy for half-tone reproduction.	27. Reetching:
(g) Trimming and separating blocks.	(b) Grouping or arranging objects for half-tone reproduction, color work, and dry-plate photography.	(a) Copy.
(h) Sandpapering corners and raw edges.	29. Photographing, color spotting; making color record negatives:	(b) Negative.
(i) Boring out large blanks.	(a) Color sensitizing dry plates.	(c) Plates.
(j) Blocking or mounting to register.	(b) Focusing color copy.	28. Reeling:
6. Cut-out:	(c) Exposing color sensitized plates through color film.	(a) Adjusting mechanism.
(a) Tooling outline.	(d) Developing record negative.	(b) Line work.
(b) Reeling.	(e) Clearing and fixing record negative.	(c) Half-tone out cut work.
(c) Trimming.	(f) Intensifying record negative.	(d) Sharpening roller line.
(d) Cutting cardboard mat to die.	(g) Reducing record negative.	29. Stripping negatives:
(e) Trimming negative by mat.	(h) Printing transparencies from record see above.	(a) Coating negative with rubber.
(f) Tooling outline.	(i) Developing transparencies.	(b) Coating negative with collodion.
(g) Reeling.	(j) Clearing and fixing transparencies.	(c) Cutting and separating negative film.
(h) Trimming.	(k) Intensifying transparencies.	(d) Stripping, reversing and transferring negative film to plate glass.
7. Densifying (liberating, designing, lettering):	(l) Reducing transparencies.	(e) Preparing and mixing etching solutions.
(a) Pen.	(m) Preparing dye solutions for color sensitizing.	30. Transparencies.
(b) Wash.	(n) Preparing and mixing chemicals.	21. Vesselling:
(c) Air brush.	(o) Solenoid views.	(a) Chilling.
(d) Colors.	(p) Outside views.	(b) Tooling.
(e) Preparing black and white copy for color reproduction.	(q) Copying prints, enlargement or reduction.	(c) Etching.
(f) Coloring transparencies.	(r) Preparing copy from several pictures or subjects for half-tone reproduction.	(d) Reeling.
8. Etching, copper, half-tone:	(s) Making transparencies.	(e) Trimming.
(a) Fixing die.	(t) Finishing print.	(f) Underlaying.
(b) Staging and re-etching.	(u) Preparing and mixing chemicals.	32. Zinc overlays:
(c) Trial proof.	(v) Solenoid views.	(a) Coating zinc to die.
(d) Preparing and mixing etching solutions.	(w) Copying prints, enlargement or reduction.	(b) Clearing and polishing.
9. Etching, copper, line:	(x) Making transparencies.	(c) Drying.
(a) Etching line print.	(y) Finishing print.	(d) Pulling offset on zinc.
(b) Reetching etching.	(z) Preparing and mixing chemicals.	(e) Reetching zinc offset.
(c) Powdering and burning in line work.	22. Photographing/half-tone:	(f) Powdering and burning in.
(d) Preparing and mixing etching solutions.	(a) Focusing copy.	(g) Etching.
10. Etching, half-tone, color:	(b) Calibrating and sensitizing plate.	
(a) Flat-etch.	(c) Adjusting screen.	
(b) Trial proof.	(d) Fixing plate in plate holder and fitting exposure.	
(c) Staging and re-etching.	(e) Developing negative.	
(d) Preparing and mixing etching solutions.	(f) Clearing negative.	
11. Etching, zinc, half-tone:	(g) Intensifying negative.	
(a) Flat-etch.	(h) Clearing and cutting negative with enamel.	
(b) Trial proof.	(i) Final intensification.	
(c) Staging and re-etching.	(j) Preparing and mixing chemicals.	
(d) Preparing and mixing etching solutions.		
12. Etching, zinc, half-tone:		
(a) Flat-etch.		
(b) Trial proof.		
(c) Staging and re-etching.		
(d) Preparing and mixing etching solutions.		
NONCHARGABLE		
100. Cleaning machinery.	300. Mixing and preparing chemicals.	100. Waiting for repairs (with name of machine.)
101. Corrections, office.	306. Practice work.	100. Waiting for work (will not be allowed unless complete reports immediately to the Foreman.)
102. Inspecting apparatus.	307. Supervising, inspecting finished product, and similar work.	
104. Laborer.		

PLATE II

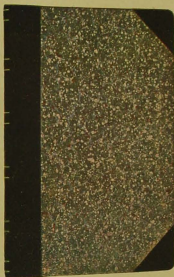
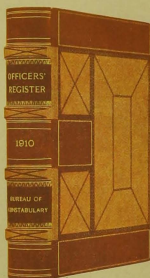
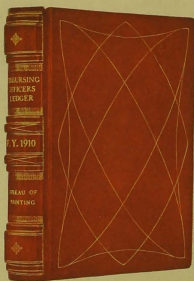
SHOWING THE MANNER IN WHICH SPECIALTIES AND SUBSPECIALTIES ARE DIVIDED INTO CLASSES IN THE ORDER OF THEIR RELATIVE IMPORTANCE, MAKING A SYSTEMATIC AND COORDINATE SEQUENCE OF INSTRUCTION

APPRENTICE THREE YEARS, DIVIDED INTO SIX CLASSES OF SIX MONTHS EACH		
Class 4 (Entrance).	Class 3.	Class 2.
24. Printing negative (line): (a) Sawing and polishing metal. (b) Coating metal with sensitizing solution. (c) Printing negative. (d) Rinsing up print. (e) Washing and developing out plate after printing. (f) Barring or baking in enamel. (g) Retouching print. (h) Preparing and mixing line and half-tone printing solutions. 13. Etching, zinc line. (a) Etching line print. (b) Retouching etching. (c) Finishing and barring in line work. (d) Preparing and mixing etching solutions. 5. Blocking or mounting. (a) Adjusting mechanism. (b) Cover gasching for counterblanks. (c) Setting counterblanks for rack heads. (d) Flaying blocking wood smooth on one side. (e) Walling cuts to blocks. (f) Finishing smooth type high. (g) Trimming and squaring blocks. (h) Sandpapering corners and raw edges. (i) Routing out large blanks. (j) Blocking or mounting to register. 10. Mixing and preparing chemicals.	25. Routing. (a) Adjusting mechanism. (b) Line work. (c) Half-tone cut out work. (d) Sharpening raster bits. 11. Mortising. (a) Adjusting mechanism. (b) Outside mortising. (c) Double mortising. 29. Stippling negative (line). (a) Cutting and squaring negative film. (b) Stripping, removing, and chandelizing negative film to plate glass. (c) Preparing and mixing stippling solutions. 10. Mixing and preparing chemicals.	24. Printing negative (half-tone). (a) Sawing and polishing metal. (b) Coating metal with sensitizing solution. (c) Printing negative. (d) Washing and developing out plate after printing. (e) Barring or baking in enamel. (f) Retouching print. (g) Preparing and mixing line and half-tone printing solutions. 22. Zinc overlay. (a) Walling zinc in zinc. (b) Cleaning and polishing. (c) Dring. (d) Pulling off zinc on zinc. (e) Backing zinc offset. (f) Mixing and barring in. (g) Etching. 23. Etching copper line. (a) Etching line print. (b) Retouching etching. (c) Powdering and barring in line work. (d) Preparing and mixing etching solutions. 10. Mixing and preparing chemicals.
Class 2.	Class 2.	Class 1.
29. Stippling negative (half-tone). (a) Cutting negative with rubber. (b) Coating negatives with collodion. (c) Cutting and squaring negative film. (d) Stripping, removing, and transferring negative film to plate glass. (e) Preparing and mixing stippling solutions. 12. Mounting or grouping original copy. (a) Grouping negative for printing. 12. Etching zinc half-tone. (a) Flat chisel. (b) Flaying and retouching. (c) Trial proof. (d) Preparing and mixing etching solutions. 3. Barring, zinc. (a) Adjusting mechanism. (b) Allowance plate with line gauge and clamping down. (c) Barring, having plate holder. (d) Cutting ground or white line. (e) Barring, marking black and white line holder. 4. Barring, special lining. (a) Adjusting mechanism. (b) Lining plate with line gauge. (c) Cutting black and white lines in multiple or extended lines. (d) Making raised border line by barring up. (e) Cutting round line down to printing surface and greasing white line. (f) Barring. (g) Barring. (h) Spetting. (i) Trimming. (j) Repairing. (k) Correcting. 23. Proofing. (a) Black and white. 10. Mixing and preparing chemicals.	1. Alternators. 2. Adapters. (a) Drilling anchor holes. (b) Counterdrilling anchor holes. (c) Outlining anchor marks. (d) Tinning anchor marks. (e) Cutting anchor lines. 3. Etching, copper half-tone. (a) Flat chisel. (b) Flaying and retouching. (c) Trial proof. (d) Preparing and mixing etching solutions. 37. Rewriting. (a) Fisher. 31. Finishing, half-tone. (a) Spetting. (b) Sanding corner lines. (c) Burrblasting. 6. Cut down. (a) Tooling outline. (b) Bunting. (c) Trimming. 1. Cutting circles or ovals. (a) Cutting cardboard mat to size. (b) Trimming negative by mat. (c) Toning outline. (d) Stating. (e) Trimming. 31. Vignetting. (a) Outlining. (b) Tooling. (c) Etching. (d) Bunting. (e) Trimming. (f) Collodizing. 10. Mixing and preparing chemicals.	23. Photographing, line. (a) Collodizing and sensitizing plates. (b) Flaying plate in plate holder and tining exposure. (c) Developing negative. (d) Clearing out developer with cyanide. (e) Intensifying negative. (f) Clearing negative. (g) Final intensification. (h) Final clearing. 21. Photographing, half-tone. (a) Focusing copy. (b) Collodizing and sensitizing plates. (c) Adjusting screen. (d) Flaying plate in plate holder and tining exposure. (e) Developing negative. (f) Clearing negative. (g) Intensifying negative. (h) Clearing and retting negative with cyanide. (i) Final intensification. (j) Final clearing. 22. Mounting or grouping original copy. (a) Grouping of copy for half-tone reproduction. 21. Photographing, half-tone, special reproduction of possible drawings, etchings, and steel or copper-plate prints. 10. Mixing and preparing chemicals.
JUNIOR CRAFTSMAN ONE YEAR		
This period shall be devoted to a review of the work of apprenticeship. In addition, elementary work shall be cover on the following specialties should there be sufficient work to afford the opportunity and the junior craftsman have demonstrated more than average proficiency in all of his previous work.		
20. Photographing, dry-plate work. (a) Interior views. (b) Outside views. (c) Copying prints, enlargement or reduction. (d) Preparing copy from selected portions or subjects for half-tone reproduction. (e) Making transparencies. (f) Mounting prints. (g) Preparing and mixing chemicals. 14. Mounting or grouping original copy. (a) Mounting or arranging sheets for half-tone reproduction. (b) Copy. (c) Negatives. 17. Transparencies. (a) Copy. (b) Negatives.	23. Photographing, color separating; making color record negatives. (a) Color sensitizing dry plates. (b) Mounting original copy. (c) Exposing color sensitized plates through color filters. (d) Developing record negatives. (e) Clearing and fixing record negatives. (f) Intensifying record negatives. (g) Printing transparencies from record negative. (h) Developing transparencies. (i) Clearing and fixing transparencies. (j) Intensifying transparencies. (k) Reducing transparencies. (l) Preparing dye solutions for color sensitizing. (m) Preparing and mixing chemicals. 31. Etching, half-tone, color. (a) Flat chisel. (b) Trial proof. (c) Flaying and retouching. (d) Preparing and mixing etching solutions.	15. Finishing, half-tone, color. (a) Setting. (b) Etching corner lines. (c) Bunting. (d) Outlining for cut outs. (e) Setting line on mat. (f) High lighting. 23. Proofing. (a) Color. 22. Enlarging. (a) Drawing, outlining, designing, lettering: (b) Pen. (c) Wash. (d) Air brush. (e) Color. (f) Preparing black and white copy for color reproduction. (g) Coloring transparencies. 10. Mixing and preparing chemicals.

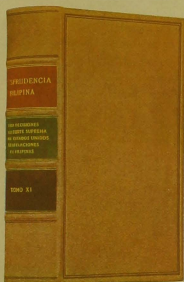
REPRODUCTIONS OF BOOKBINDINGS IN NATURAL COLORS



FULL TEXODERM

HALF-BOUND RUSSIA, MARBLE
PAPER SIDESFULL BOUND, RUSSIA ENDS
AND BANDSFULL-BOUND RUSSIA.
EXTRA HUBS

REPRODUCTIONS OF BOOKBINDINGS IN NATURAL COLORS



FULL SHEEP



FULL LEVANT MOROCCO,
HAND TOOLED



GILT-EDGING, ORNAMENTAL DESIGNS

THESE TWO PAGES OF COLORED PLATES WERE REPRODUCED DIRECT FROM THE OBJECTS BY THE THREE AND FOUR COLOR PROCESS OF ENGRAVING. THE PLATES WERE ENGRAVED AND PRINTED BY APPRENTICES AND GRADUATE APPRENTICES OF THE BUREAU OF PRINTING, UNDER THE SUPERVISION OF AMERICAN CRAFTSMEN INSTRUCTORS. THE SAME CLASS OF WORKMEN, UNDER THE SAME WORKING CONDITIONS, BOUND THE BOOKS WHICH ARE THE SUBJECTS OF THE ILLUSTRATIONS

PLATE III

WORKMAN'S DAILY TIME TICKET

Date..... I certify on my official oath that the time noted on this ticket is correct.

Rate of pay, \$..... Name.....
Craftsman, Junior Craftsman, Apprentice, Helper.PHOTO-ENGRAVING
DIVISION

REGULAR TIME

A. M.					P. M.						
Work Order Number.	Time.	Part	Specialty Number; also Quantity when Ordered.	Office Use.		Work Order Number.	Time.	Part.	Specialty Number; also Quantity when Ordered.	Office Use.	
				Hand.	Mach.					Hand.	Mach.
	8.00						1.00				
	8.06	1					1.06	41			
	8.12	2					1.12	42			
	8.18	3					1.18	43			
	8.24	4					1.24	44			
	8.30	5					1.30	45			
	8.36	6					1.36	46			
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	9.00	10					2.00	50			
	9.06	11					2.06	51			
	9.12	12					2.12	52			
	9.18	13					2.18	53			
	9.24	14					2.24	54			
	9.30	15					2.30	55			
	9.36	16					2.36	56			
	9.42	17					2.42	57			
	9.48	18					2.48	58			
	9.54	19					2.54	59			
	10.00	20					3.00	60			
	10.06	21					3.06	61			
	10.12	22					3.12	62			
	10.18	23					3.18	63			
	10.24	24					3.24	64			
	10.30	25					3.30	65			
	10.36	26					3.36	66			
	10.42	27					3.42	67			
	10.48	28					3.48	68			
	10.54	29					3.54	69			
	11.00	30					4.00	70			
	11.06	31									
	11.12	32									
	11.18	33									
	11.24	34									
	11.30	35									
	11.36	36									
	11.42	37									
	11.48	38									
	11.54	39									
	12.00	40									

D. K. For the Foreman.

ACCURATE TIME MUST BE KEPT.

(SEE OTHER SIDE FOR NUMBERED SPECIALTIES AND INSTRUCTIONS.)

Upon beginning work, the employee enters the work-order number and the specialty number in the respective columns. If the time of beginning is 8 o'clock, the work-order and specialty numbers are entered opposite the first part or period—8.06 o'clock. Each period consists of six minutes, and the time printed is the last minute of the period. Should work on a different specialty on the same work order be started at 8.30 o'clock, then that specialty number is entered in the space directly opposite 8.36. One entry of a work-order number is sufficient, and this entry is made at the time of beginning a new work order. It is not necessary to mark off the time on this ticket, as the form has been ruled to obviate such work. All numbers must be carefully verified.

PHOTO-ENGRAVING DIVISION

WORKMAN'S DAILY TIME TICKET

SPECIALTIES

Chargeable

1. Alterations.
2. Anchoring.
3. Beveling, plain.
4. Beveling, special (lining).
5. Blocking or mounting.
6. Cutouts.
7. Cutting circles or ovals.
8. Drawing (illustrating, designing, lettering).
9. Etching, copper, half-tone.
10. Etching, copper, line.
11. Etching, half-tone, color.
12. Etching, zinc, half-tone.
13. Etching, zinc, line.
14. Finishing, half-tone.
15. Finishing, half-tone, color.
16. Finishing, line.
17. Mortising.
18. Mounting or grouping original copy.
19. Photographing, color operating; making color record negatives.
20. Photographing, dry-plate work.
21. Photographing, half-tone.
22. Photographing, half-tone, special (reproduction of pencil drawings, etchings, and steel or copperplate prints).

Chargeable—Continued

23. Photographing, line.
24. Printing negatives.
25. Proofing.
26. Reengraving.
27. Retouching.
28. Routing.
29. Stripping negatives.
30. Transparencies.
31. Vignetting.
32. Zinc overlays.

Nonchargeable

101. Cleaning machinery.
102. Corrections, office.
103. Instructing apprentices.
104. Laborer.
105. Mixing and preparing chemicals.
106. Practice work.
107. Supervising, inspecting finished product, and similar work.
108. Waiting for repairs (write name of machine).
109. Waiting for work (will not be allowed unless employee reports immediately to the foreman).

DESCRIPTION OF WORKMAN'S DAILY TIME TICKET

Arrangement.—The face of the ticket contains a complete record of the day's work, as well as all data pertaining to the compensation and status of the workman. This information is valuable to the instructor in determining the rating for "quantity" and to the inspector or computer in cases of excessive time. It enables the abstractor to complete and total all entries at a glance.

Sexagesimal notation.—Calculations are greatly simplified by dividing the time into six-minute periods, or the hour into tenths. The abstractor is further aided by reason of the heavy line under each fifth period, which divides the workday into half-hour periods.

Advantages of the printed horizontal lines.—The original Bureau of Printing time tickets were printed without horizontal lines under the different periods. These were drawn by the workman upon the completion of each work order or specialty. This work was not only objectionable to the workman, but the completed ticket, particularly for small work, was in many cases so badly accomplished and soiled as to greatly increase the work of abstracting. The elimination of this work through the printing of the horizontal lines has reduced the number of entries to the minimum.

The "Part" column.—The "Part" column enables the abstractor to determine at a glance how many tenths of an hour are consumed. The value of this time for any wage is quickly obtained by referring to a prepared table of computations, with the different rates of pay as headings of columns and the parts from 1 up as a guide column.

How to obtain quantity.—It is necessary at times to know the quantity of production. Provision is made for such information in the "Specialty" column.

Specialties, and how numbered.—Plate I shows the manner in which specialties are numbered. As all data required for abstracting purposes are shown on the face of the ticket, this system enables one Filipino clerk to abstract the daily time tickets of several hundred workmen.

(Owing to limited space, only a reduction of the front of the time ticket is shown on the opposite page. The actual size of the ticket is 7 by 8½ inches. The reverse sides of originals contain detailed instructions relative to making out the ticket, as well as a complete list of specialties of each mechanical division. Plates I, II, and III refer to photo-engraving operations.)

How chargeable time is gathered.—Chargeable hours only are gathered unless information is desired on a nonchargeable specialty. The total of nonchargeable hours is obtained by subtracting the gathered chargeable hours from the pay-roll hours.

Miscellaneous advantages of a time ticket.—It constitutes the most accurate record of a workman's efficiency.

It is the only means of accurately determining the cost of the individual job.

It is indispensable in formulating a scale of charges, for without reliable data as to costs the fixing of charges would be mere guesswork.

It provides accurate information relative to the status of a work order.

able to classify and make allowances for the idiosyncrasies of the boy in his charge. He must be able to determine, at the expiration of the first class period of apprenticeship, whether his charge is fitted to continue at the trade to which he is assigned. Inability to comprehend mechanical details, continued indifference, failure to make an honest effort to take advantage of the craftsman's instructions, and perfunctory performance by listless "time servers" are carefully noted. Such delinquents are separated from the service to make room for applicants who will show more interest in their work.

Strict discipline is maintained at all times. Upon entrance each apprentice is given a pamphlet containing the office rules. Infractions of the rules and cases of carelessness and insubordination are made a matter of record. Verbal reprimands by



A Stage of Binding Called Forwarding

craftsmen instructors are not permitted. Adverse reports in the form of letters of reprimand are sent to the offending employees, who are given opportunity to make statements in their own behalf. Adverse reports are also made in cases of errors which are manifestly due to carelessness or inattention. These reports are filed, and when the employee's efficiency record is compiled a deduction is made for each. Letters of commendation are given to apprentices for exceptionally meritorious work.

Instruction in the operation and the ordinary adjustment of machinery is imparted by the immediate instructor, while the technical knowledge of a machine and its parts is acquired from the chief machinist. All power-driven machinery of the Bureau of Printing is inspected three times a year, according to a dated schedule. Two of these inspections are made for

the purpose of reporting on the condition in which machinery is cared for by the operator, and at the third inspection the machine is completely overhauled for purposes of instruction.

The Bureau of Printing Desk Book is the only technical publication used in connection with apprentice instruction. It has been indorsed by American and foreign publishers and is recognized as a standard work of reference in the printing trades.

For the information of all employees—apprentices, junior craftsmen, and craftsmen—a comprehensive list of technical

terms and definitions peculiar to each trade is posted in a conspicuous place and is accessible at all times. With these definitions, printed instructions are also provided relative to the performance of the more intricate operations of each trade.



The Difficult Process of Finishing

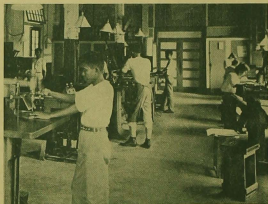
Each apprentice is orally examined by his foreman as to his knowledge of such terms and definitions, and none is promoted who does not possess information to the extent of securing a passable rating.

Apprentices are required to attend a public night school in English unless excused by the Director of Printing. Excuses are granted in those cases in which apprentices may wish to receive instruction in a private school or from a private tutor, when they have completed the intermediate course of study prescribed by the Bureau of Education, or when they satisfactorily pass a test in English. All apprentices who have been excused from night-school attendance are required to continue the reading of standard English literature and to render a monthly report thereof, in writing, to the Director of the Bureau of Printing.

Where the art of printing remains undeveloped, the common people exist in a condition of serfdom, for their ignorance, prejudice, and superstition require the placing of their political destinies in the hands of the few

After an employee has assumed the duties of a craftsman, additional responsibilities are placed upon him and every effort is made to inspire him with the confidence necessary to enable him to act in a minor executive capacity, such as assistant to the foreman or in charge of a group of workmen.

Apprentices are selected for appointment from lists of eligibles certified by the Bureau of Civil Service of the Philippine Government. In making selections, physical as well as educational qualifications are taken into consideration. The educational test is a simple one, given in either English or Spanish, and is waived in the case of graduates of intermediate and high schools. Those taking the Spanish examination must possess at least a slight knowledge of English. The examination is known as the third grade, and comprises the following subjects and weights: Spelling, 20; arithmetic, 20; letter writing, 20; penmanship, 20; copying from plain copy, 20; total weights, 100. To be eligible for appointment, applicants must obtain an average rating of 70 or more. Minimum and maximum age limits are 15 and 20 years, respectively. Each appointee must be in good physical condition and must weigh not less than 46 kilos (112 pounds) and be at least 155 centimeters (5 feet 1 inch) in height. His general fitness for an indoor occupation must be unquestioned.



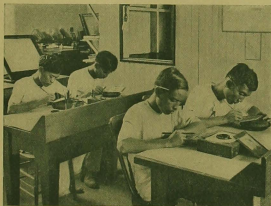
Electrotyping and Stereotyping Division

ing, 20; penmanship, 20; copying from plain copy, 20; total weights, 100. To be eligible for appointment, applicants must obtain an average rating of 70 or more. Minimum and maximum age limits are 15 and 20 years, respectively. Each appointee must be in good physical condition and must weigh not less than 46 kilos (112 pounds) and be at least 155 centimeters (5 feet 1 inch) in height. His general fitness for an indoor occupation must be unquestioned.

The product of the printing press is indispensable to every literate member of the human family. Without it, the world would stagnate, history would become tradition, and posterity would be robbed of its inheritance.

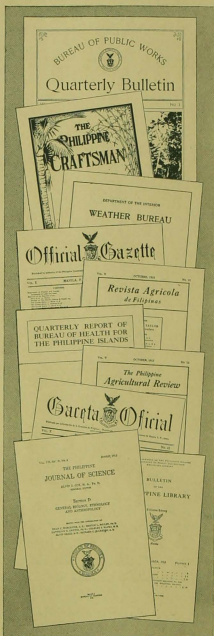
As the civil-service examination for apprentices is the same for all branches of the printing trades, the matter of the apprentice's assignment is influenced to some extent by his physical qualifications, although his wishes are given consideration if he indicates a preference and is deemed otherwise qualified for the work.

Apprentices are rated on quantity of work; quality of work; aptitude and adaptability; habits, character, and conduct; and attendance and physical condition. Promotions from one class to another are made when the apprentice has qualified in all the specialties included in his current class. The recommendation of the foreman is accepted as proof of fitness, being based on daily observation of the quantity and quality of the work of each apprentice, which renders further examination unnecessary. The Bureau's daily time ticket (Plate III) is also of much value in determining the rating for quantity. The apprentice must have completed the full period of six months, as the class period is extended in an amount of time equal to that which may have been lost for any cause whatsoever.



Finishing Half-tones and Etchings

The printing law of the Philippine Islands provides that native apprentices, from the date of their entrance into the third year of apprenticeship, for each year of honest, faithful, satisfactory, and continuous service in the Bureau of Printing,



Current Government Publications

shall be entitled to receive, at the end of the next succeeding year of honest, faithful, satisfactory, and continuous service, extra compensation as follows: Twenty centavos per diem for each full day of actual service rendered at a daily wage of ₱1.20 or more but less than ₱2.40; 40 centavos per diem for each full day of actual service rendered at a daily wage of ₱2.40 or more but less than ₱3.20; and 60 centavos per diem for each full day of actual service rendered at a daily wage of ₱3.20 or more. An apprentice separated from the Bureau of Printing after such extra compensation has been earned and before it becomes due shall not be entitled to receive any part thereof unless such separation shall be on account of lack of work, permanent disability, or death, in which event such apprentice, or his estate in case of death, may, on the recommendation of the Director of Printing, approved by the Secretary of Public Instruction, receive the extra compensation accumulated at the time of separation. The law further provides

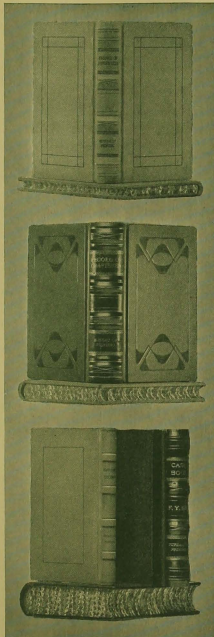
that the services of such apprentices shall be deemed continuous until such apprentices are definitely separated from service in the Bureau of Printing.

The per diem compensation and bonus of apprentices, junior craftsmen, and craftsmen are as follows:

Designation.	Wages.	Bonus.
Class 6.....	P0. 80	None.
Class 5.....	.90	None.
Class 4.....	1. 00	None.
Class 3.....	1. 20	None.
Class 2.....	1. 40	P0. 20
Class 1.....	1. 80	.20
Junior craftsmen...	2. 25	.20
Craftsmen	2. 50	.40

It will be noted that no extra compensation (bonus) is allowed until the completion of the second year of apprenticeship.

The Bureau of Printing has been a vocational school of the best kind for the Filipinos who have entered its service. They have learned the value of continued and earnest application to one of the most useful of arts, and to seek for superiority and excellence in their work. While the Bureau has been indispensable in the effective performance of the work of the Government, yet it has



Various Kinds of Blank Books

had even greater value as a training school for the Filipinos. It has been effective in improving the art of printing throughout the Islands and has also been a most useful instrumentality in extending the use of the English language through its dissemination by the intelligent and progressive young Filipinos who go from its service to engage in enterprises of their own or as the employees of others.

The success which has attended the technical training of apprentices in the Bureau of Printing has demonstrated beyond peradventure that the application of *system* to vocational training will produce efficient workmen in *any* of the skilled trades.

The Bureau of Printing was established in 1901 upon the recommendation of Hon. W. H. Taft, Governor of the Philippine Islands. Hon. Elihu Root, Secretary of War, selected Mr. John S. Leech, of Illinois, a division chief in the Government Printing Office, to prepare complete specifications for a plant equipped for every operation known to letterpress printing. These were presented by Mr. Leech to the War Department within three months, when the first shipments of equipment and supplies were made. The continuity of his Philippine service has been interrupted but once, when, in 1908, he was transferred by the President of the United States to effect the reorganization of the Government Printing Office at Washington. In that institution he substituted modern business procedure for obsolete methods and provided, for the first time in the history of that office, a uniform scale of printing charges which admitted of but one interpretation and placed all participating requisitioners on an equal basis.

The instructions to the Philippine Public Printer included not only the installation of a plant to handle the Government work, but also required the instruction of Filipinos in the printing trades. This has been accomplished through the system herein described, and, of the various governmental activities with which he has been identified during twenty-four years' service under the American Government, Director Leech considers the Bureau of Printing system of apprentice instruction his most effective work.