

FOREWORD

It is felt that this set of basic jobs will do much to develop a uniform foundation throughout the Machine Shops of the Vocational-Technical schools in the State of Connecticut. Only fifteen projects were selected so that the instructor's "academic freedom" will not be infringed upon. Experience dictates that these jobs can be easily completed in less than a years time thus allowing ample time for each instructor to develop supplemental material to fit in with his teaching program.

INTRODUCTION

The following set of jobs have been developed and used with much success by the faculty and students of the Machine Shop at the Eli Whitney Regional Vocational-Technical School, Hamden, Connecticut, and were carefully selected to incorporate the various manipulative operations which are expected to be learned in the first year. These projects are all valuable tools which will be constantly used by the student machinist while working at his trade.

The Job Sheet which accompanies each blueprint carefully lists the primary skills which are to be learned with each job thus emphasizing the importance of the manipulating operations which are to be expanded with the making of each project.

The Instruction Sheets, which were developed with the corresponding material by Mr. James Spillane and Mr. Robert M. Reilly, will enable the student to more fully understand the methods of performing the set-ups and operations which are required to make these tools.

These sheets will be a boon to the instructor with a heterogeneous group, the students can advance their own pace by these instruction sheets.

The State of Connecticut has received permission from Mr. R.M. Reilly and Mr. J.F. Spillane to reproduce this book for experimental distribution.

Manipulative Operations

The projects in this manual were carefully selected to give the beginning student experience in the following skills:

LATHE

OPERATION	PROJECT	PAGE
1 Centering stock	(4) Bushing knockout	14
2 Visual alignment of centers	" "	"
3 Face on centers	" "	"
4 Rough turn to caliper dimension	" "	"
5 Turn shoulder to scale	" "	"
6 Turn diameter to micrometer dimension	" "	"
7 Finish filing	" "	"
8 Knurling	" "	"
9 Mounting and removing chucks	(7) Bench block	20
10 Spotting and centering	" "	"
11 Drilling and reaming	" "	"
12 Turn on mandrel	" "	"
13 True work in independent chuck	" "	"
14 Inside facing	" "	"
15 Screw arbor work	" "	"
16 Mount work in collets	(3) Center punch & scrib.	8
17 Turn work in 3 jaw chuck	(13) Planer jacks	47
18 Tapping work with tail center	" "	"
19 Cutting threads, die stock	" "	"
20 Turn taper - compound rest	" "	"
21 Facing and recessing	" "	"
22 Taper turning - tailstock offset	(9) Babbit hammer	29
23 Cut chamfer and fillets	" "	"
24 Cut threads with tool bit	(8) Tap wrench	24
25 Cut left hand threads	" " "	"
26 Turn taper with taper attach.	(14) Lathe centers	50
27 Mount tool post grinder	" "	"
28 Grind centers	" "	"

MILLING MACHINE

29 Cut hexes and squares	(13) Planer jacks	47
30 Mill flats	" "	"
31 Roughing and squaring stock	(12) Parallel clamp	43
32 Squaring ends	" "	"
33 Milling slots with cutter	(10) Th'd tool grind fix.	32
34 Line up work with indicator	{ 11 } "V" Block	36
35 Mill with angular cutters	{ 7 } Planer block	20
36 Face mill flat surfaces	{ 6 } Parallel	17

MANIPULATIVE OPERATIONS (CONT.)

SHAPER

37 Shape work in vise	(6)	Parallels	17
38 Shape square & to decimals	(15)	1-2-3 Block	53
39 Shape angular work	(10)	Th'd tool grind. fix.	32
40 Shape vee shapes	(11)	"V" Block	36
41 Shape to shoulder		" "	"
42 Shape to layout		" "	"

DRILL PRESS

43 Center drilling	(4)	Screw gage	11
44 Mounting and removing chucks	(7)	Bench block	20
45 Drill to simple layout	(1)	Square	2
46 Drill thin stock	(12)	Parallel clamp	43
47 Drill for tapping	(4)	Screw gage	11
48 Spot for transfer	(12)	Parallel clamp	43
49 Countersinking	(4)	Screw gage	11
50 Drill and reaming	(7)	Bench block	20
51 Drill to accurate layout		" "	"

GRINDER

52 Grind flat surfaces	(6)	Parallels	17
53 Mount wheels and dress	(10)	Th'd tool grind fix.	32
54 Grind surface at right angles		" "	"
55 Grind th'd tool with fixture		" "	"
56 Grind to shoulder	(11)	"V" block	36
57 Grind steps in vise		" "	"
58 Grind angles - magnetic block		" "	"

CONTOUR SAW

59 Saw to line	(2)	Drill gage	5
60 Saw to irregular layout	(11)	"V" block	36

MANIPULATIVE OPERATIONS (CONT.)

BENCH AND LAYOUT

61 Prepare work for layout	(4)	Screw gage	1
62 Layout from drawing	"	"	"
63 Scribing and punching	"	"	"
64 Tapping work held in vise	"	"	"
65 Layout from sample	(2)	Drill gage	5
66 File to layout - machine	"	"	"
67 Layout center on rounds	(7)	Bench block	20
68 Sawing by hand	(1)	Square	2
69 Filing by hand	"	"	"
70 Threading with a die	(13)	Planer jacks	47
71 Harden - open flame	(3)	Center punch	8
72 Tempering	"	"	"
73 Tapping to bottom	(9)	Babbit hammer	29
74 Layout with protractor	(10)	T'dtool grind fix.	32

MACHINE SHOP

NAME _____

DATE _____

GROUP _____

9 (A)

Excellent quality in good time
Can figure own set-ups
Instructed only once on new
setups
Willing to do any job
Always working
Keeps machine and area clean
Starts and stops on time
Has tools

8 (B)

Good quality in good time
Can set up own work
Willing to do any job
Always working
Keeps machine and area clean
Starts and stops on time
Has tools

7 (C)

Good quality in fair time
Can set up own work
Willing to do any job
Does not loaf or bother others
Keeps machine and area clean
Has tools

6 (D)

Fair quality or poor time
Has to be spoken to about
wasting Time or cleaning up
Constantly needs help with set-ups

5 or less (F)

Poor quality or extra long time
Bothers others
Has to be spoken to about wasting time
or cleaning up
Does not have necessary tools
Makes poor set-ups