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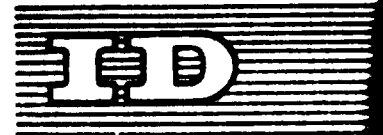
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Implementation of Industrial Projects and  
Related Systems

Beirut, Lebanon, 10 - 26 August 1970

SYSTEMS AND SYSTEMS DESIGN<sup>1/</sup>

Systematic Approach to the Development  
of Business Information Systems

"APPENDICES"

by

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The Netherlands Automatic Information  
Processing Research Centre, Amsterdam

<sup>1/</sup> The views and opinions expressed in this paper are those of the author and do not necessarily reflect the views of the secretariat of UNIDO. This document has been reproduced without formal editing.

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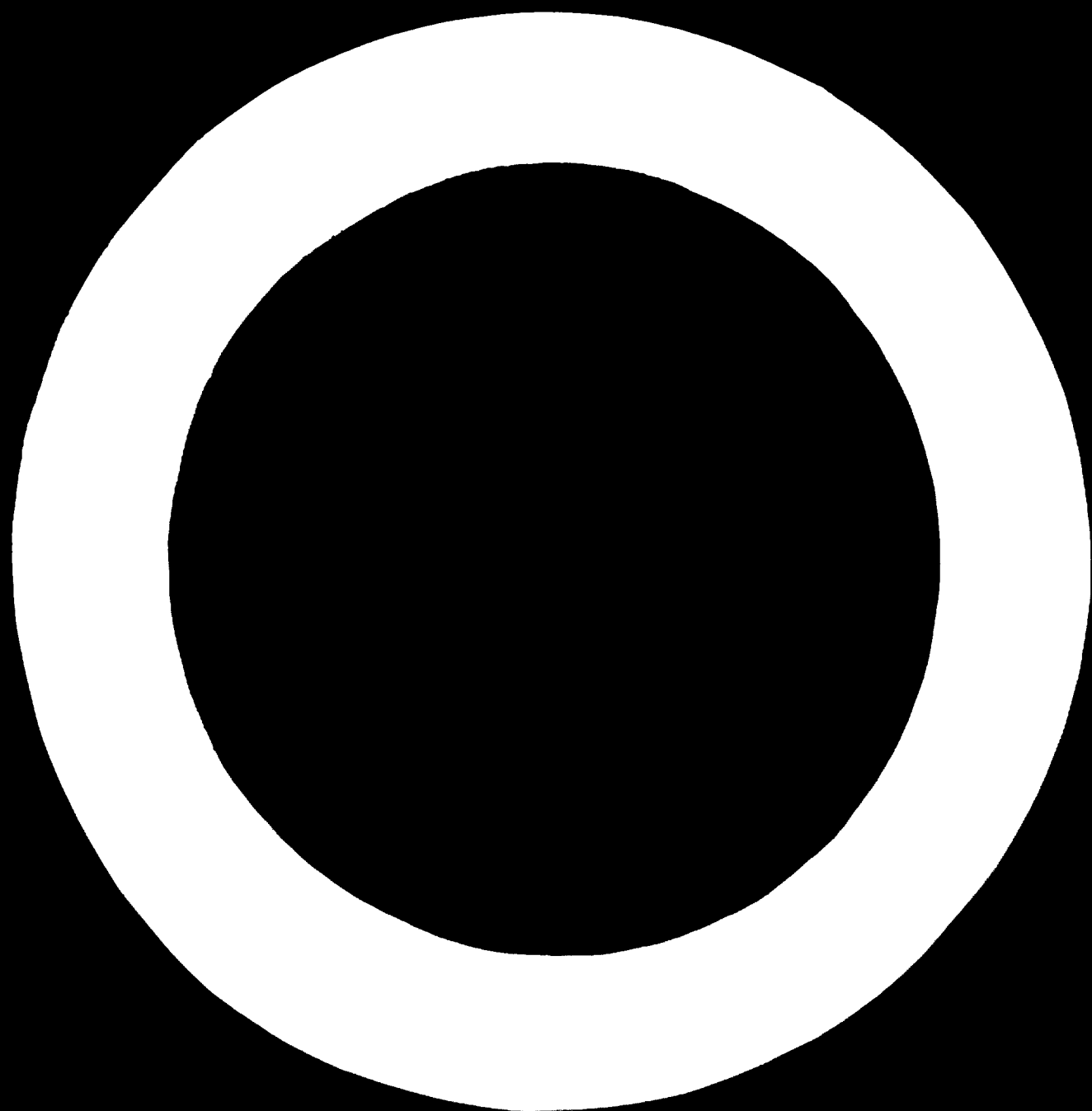


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**ANALYTICAL METHODOLOGY IN  
ADMINISTRATIVE AUTOMATION**

**Survey of sub-analyses to  
be distinguished**

SURVEY OF SUB-ANALYSTS TO BE DISTINGUISHED

Survey of material for courses

Summary "Survey of sub-analyses to be distinguished"

Literature

**ANALYTICAL METHODOLOGY IN  
ADMINISTRATIVE AUTOMATION**

**General preliminary analysis**

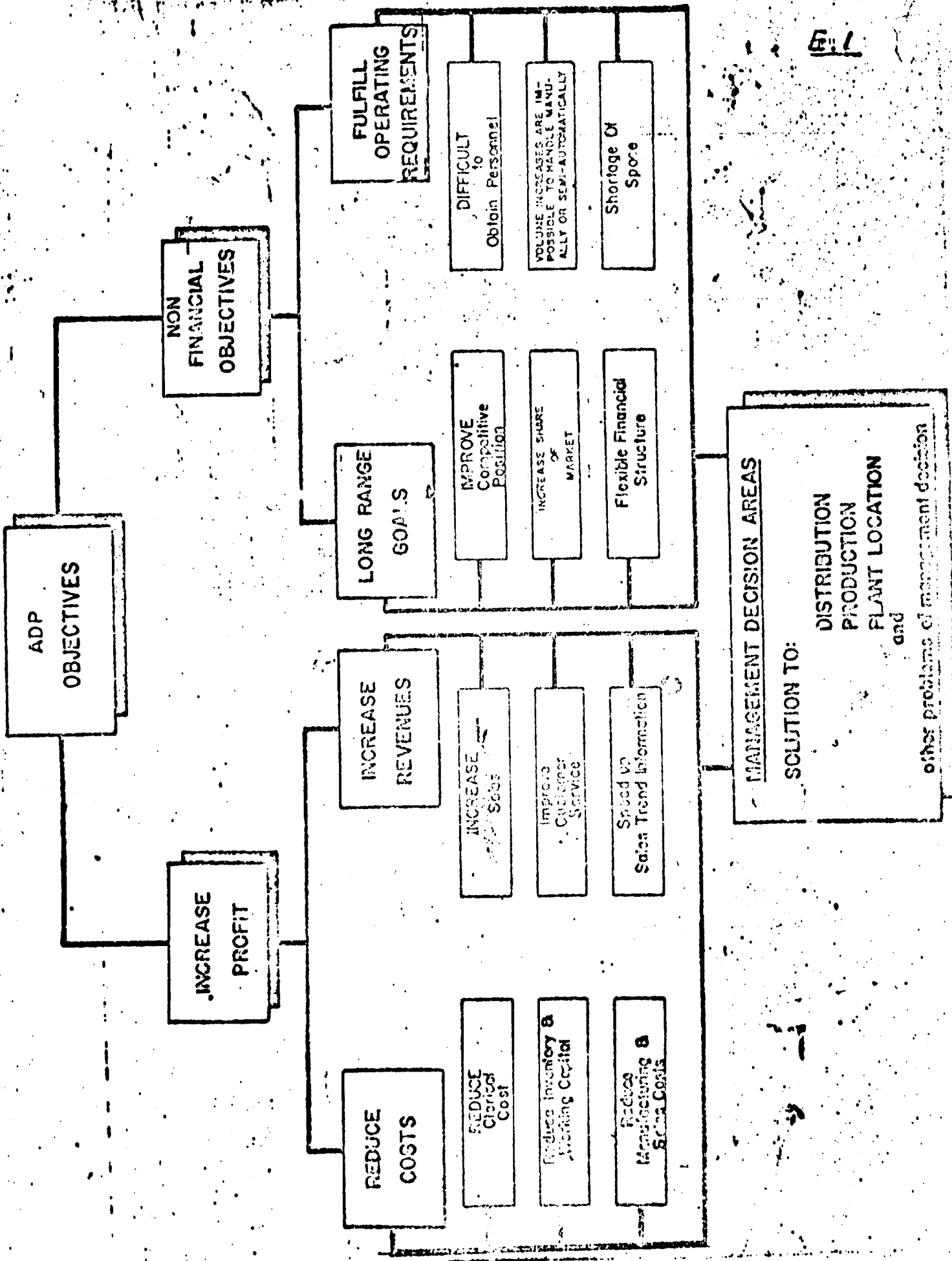


**GENERAL PRELIMINARY ANALYSIS**

**Survey of material for courses**

1. Giving order for the analysis
2. Introduction on aims, size and organization
  - Aim, functions and activities
  - Size of the business
  - Organization of the business
  - Procedures of the business
  - Administration of the business
3. Inventory of inadequacies of the organisation
  - Diagram "ADP Objectives"
4. Determination of desirability for further analysis
5. Reporting on the results of the analysis

**Literature**



10/1

**ANALYTICAL METHODOLOGY IN  
ADMINISTRATIVE AUTOMATION**

**Feasibility study**

FEASIBILITY STUDY

Survey of material for courses

1. Determination of information, procedure and expenditure of the existing system
  - Total expenditure of the existing procedure
2. Development of alternative system
3. Determination of efficiency of the alternative system
  - Assessment of savings on personnel of payroll department
  - Graphic representation of determination of total value
  - Determination of total value advantages
  - Calculation of switching-costs
  - Comparison of costs
  - Analysis of present costs at various volume levels
  - Estimate of cost under proposed system various volume levels
  - Comparison of present and proposed system various volume levels

System for feasibility study (Lesh, F.J.)

- Area clerical and equipment costs sheet (AC and ECS)
- Computer potential profile sheet (CPPS)
- Preliminary cost data sheet (PCDS)
- Computer benefits data sheet (CBDS)
- Preliminary installation costs data sheet (PICDS)
- Feasibility time estimate sheet (FTEG)

Literature

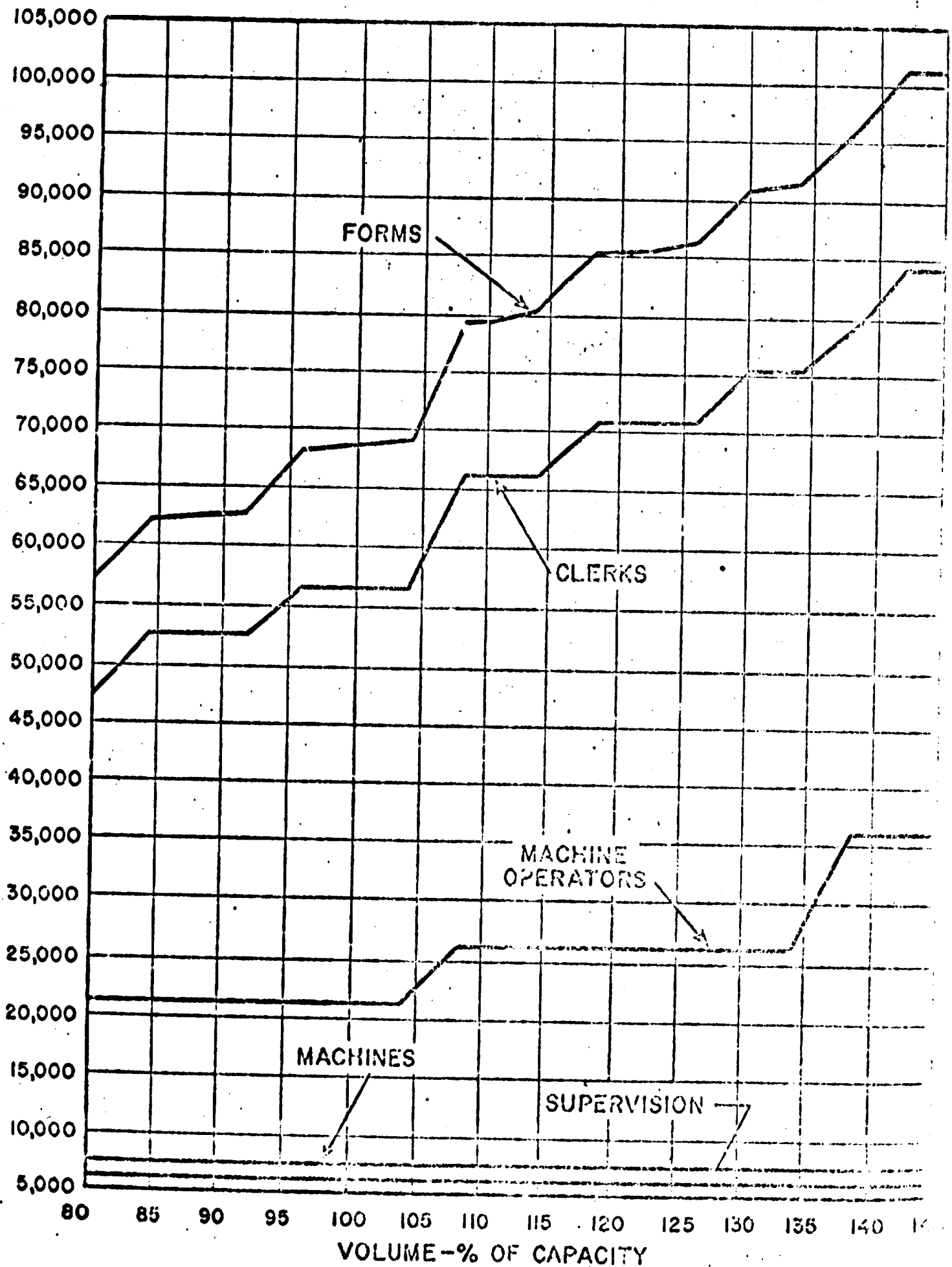
Lesh, F.J.

Shortcuts in conducting a computer feasibility study for small and medium size companies  
New York, Diebold Group, 1961. 26 pp.

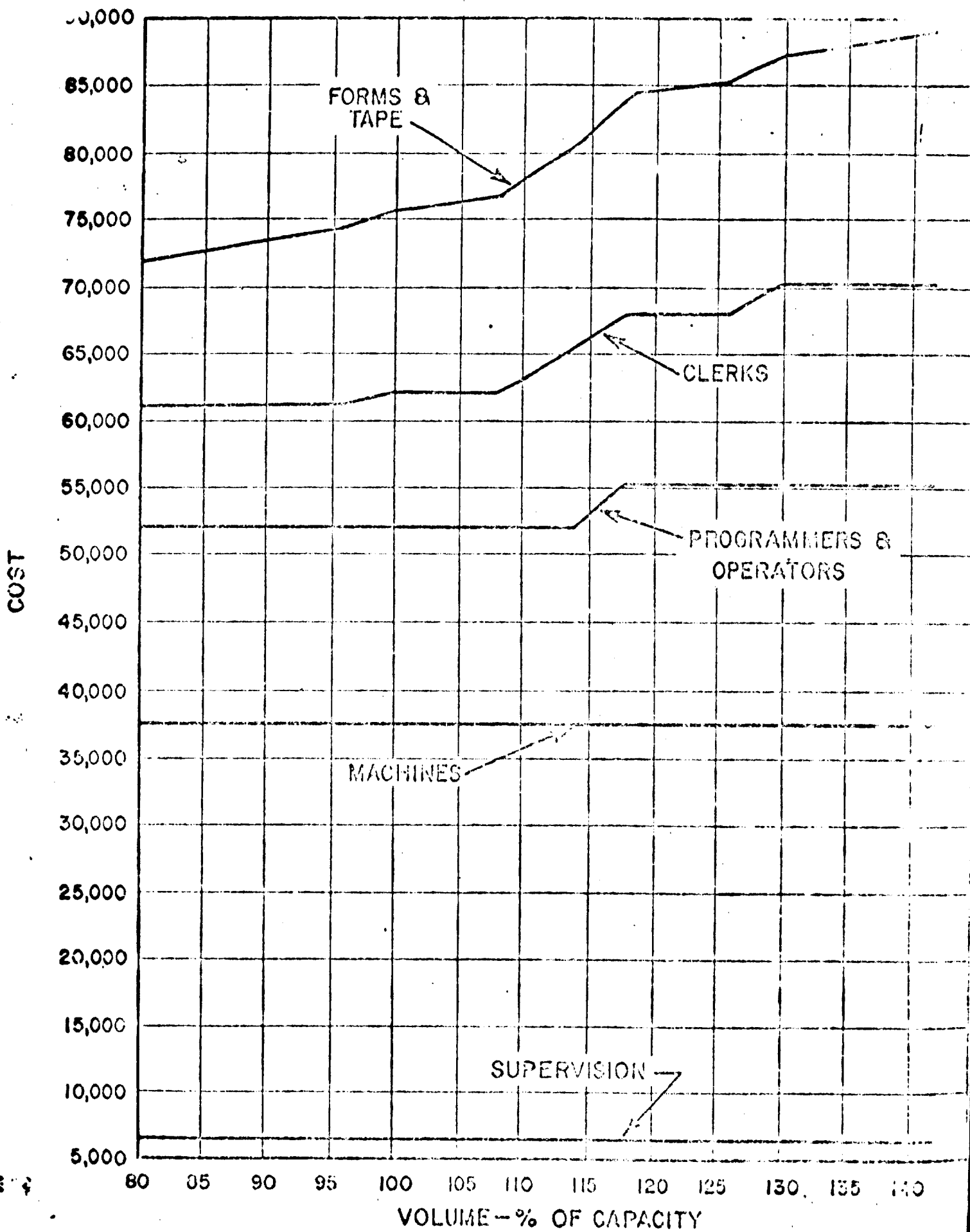
Trail, J.R.

Analysing the desirability of acquiring an electronic computer  
In - The Internal Auditor  
20 (1963) No. 1, p.37 t/m 48.

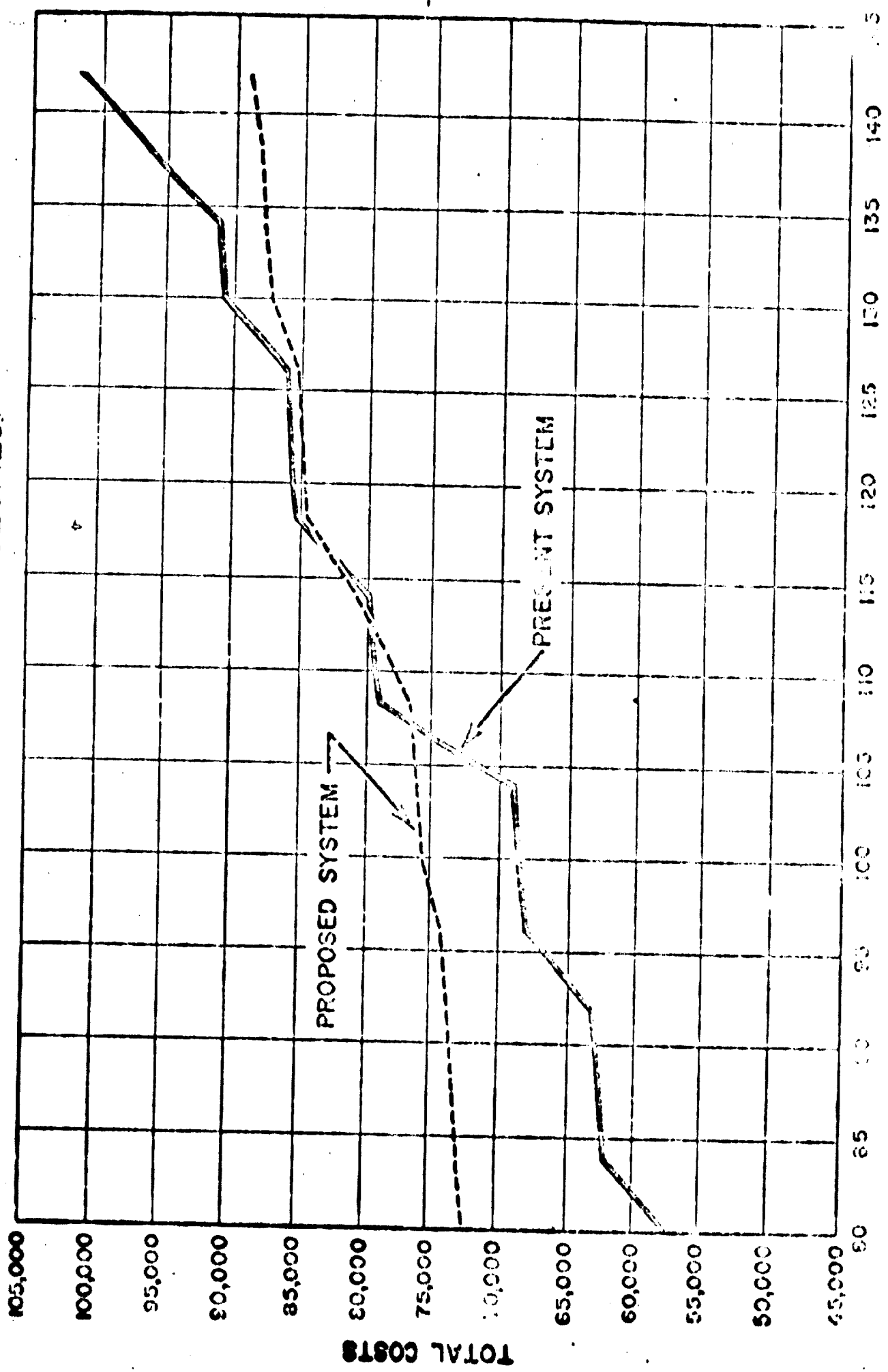
# ANALYSIS OF PRESENT COSTS AT VARIOUS VOLUME LEVELS



# ESTIMATE OF COST UNDER PROPOSED SYSTEM VARIOUS VOLUME LEVELS



# COMPARISON OF PRESENT AND PROPOSED SYSTEMS AT VARIOUS VOLUMES.



VOLUME-% OF CAPACITY

TOTAL COSTS

# AREA CLERICAL AND EQUIPMENT COSTS SHEET (AC & ECS)

3423

Company \_\_\_\_\_ Prepared by \_\_\_\_\_  
 Project Number \_\_\_\_\_ Date \_\_\_\_\_

SURVEY AREA	Annual General Cost	Annual Key Punch Control Cost	Annual Other Data Engineering Planning Computer Cost	Annual Key Punch Master Control Cost	Annual Other Data Processing Machine Cost	Estimated Total Annual Operating Equipment Costs
	(A)	(B)	(C)	(D)	(E)	(F)
Sales Sales Budget Sales Order Statistics Market Research Product Planning Advertising Office Salaries & Other Personnel Production Planning, Scheduling, Control Traffic Inventory & Production Records Engineering Billing Accounts Receivable Purchasing Accounts Payable Inventory Control Stores Control Accounting Budgets Costs Payroll Other Expenses General Data Processing Department Key Punch Other Machines						
<b>TOTALS</b>						



**COMPUTER POTENTIAL PROFILE SHEET (CPPS)**

Bunny Area \_\_\_\_\_ Prepared by \_\_\_\_\_  
 Company \_\_\_\_\_ Date \_\_\_\_\_  
 Project Number \_\_\_\_\_ Information Sources \_\_\_\_\_

CHARACTERISTICS OF CLERICAL WORK	General Potential for Clerk Eliminations From Computer Application Will Vary From		
	Poor	→ Fair	→ Excellent
Training Time Required	Long	Medium	Short
Time Before Clerk is Experienced	Long	Medium	Short
Desk Machine Operations (Comp. Calc., Adding, Typing-Min. Correspondence Variety)	Few	Medium	Many
Adjustment Factors (Pricing, Pairs, Planning, Scheduling)	Many	Medium	Few
Some Clerk Copulative Operations (Number of Pieces of Paper Handled)	Few	Medium	Many
Number of Clerks Doing Same Operations	Few	Medium	Many
Pure Routines of Paper Work	Low	Medium	High
Simple Classifying			
Simple Sorting			
Simple Collating			
Simple File Reference			
Simple Adding Information			
Simple Withdrawing Information			
Simple Checking			
Simple Arithmetic Calculations			
Simple Filing			
Exceptions			
"Man-Computer" Factors	Many	Medium	Few
Typing	Many	Medium	Few
Contact with Customers			
Verbal			
Manager			
Customer's Demographic			
Communication			
Cash Handling			
Training			
Mail			
Coding			
Supervising Machine			
Demand of Concentration of Clerk's Operations	Low	Medium	High
Percent Degree of Mechanization of Data Processing	High	Medium	Low

\* Depending on the specific situation there are many exceptions to the high of generalizing





PRELIMINARY INSTALLATION COSTS DATA SHEET (PICDS)

SUMMARY AREA	Systems Design and Programming						Classical & Machine Operator Conversion Costs				Equipment Rental Conversion Costs				Magentic Over Costs	Per. Over Costs	Misc. Other Post Costs	Est. Total Post Costs for Survey Area		
	Time Required in Man Months						Clerical		Mach Oper Costs		Total		Other Equip						Total Equip Rental Costs	
	Number of Programs	Aver Man Months Program	Total Prog Man Months	Total Systems Design & Prog Man Months	Design	Editing	Misc	Key Punch Verifier	RAM Comp	Other Equip	Key Punch Verifier	RAM Comp	Other Equip	Other Equip					Other Equip	Other Equip
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)		
Totals																				

Other installation costs (more on a company-wide basis)  
 Site Preparation Cost  
 Personnel Procurement & Training Cost  
 Travel Expense  
 Misc Fixtures (Control Table, Magnetic Tape Racks, Tape Trucks, etc)  
 Misc Peripheral Equipment (Bursters, Decollators, Filmwriters, etc)  
 Misc. Other Installation Costs

Estimated Company Total Installation Cost

F2

**FEASIBILITY TIME ESTIMATE SHEET (FTES)**  
(in Man Months)

Company \_\_\_\_\_ Prepared by \_\_\_\_\_  
 Project Number \_\_\_\_\_ Date \_\_\_\_\_

Individual Survey Area, Combination of Survey Area, The Study as a Whole	Definition of Objectives	Select Specific Study Areas	Analysis Present Systems & Procedures	Rethink Present System	Design New System	Select Equipment*	Cost Analysis	Evaluate Benefits and Costs	Schedule Installation Activities	Prepare Report	Estimated Total Man Months
(A) Individual Survey Areas	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Combinations of Survey Areas											
For the Study as a Whole											
Totals											

\*Equipment selection either general size, type, and cost of equipment, or specific manufactured equipment.

**ANALYTICAL METHODOLOGY IN  
ADMINISTRATIVE AUTOMATION**

**Preparation of the systems  
analysis**

## PREPARATION OF THE SYSTEMS ANALYSIS

### Survey of material for courses

Summary "example of an integral design systemology".

- Systemology for the designing of a controlling system.

1. Determination of the systems analysis technique

- Total (management) systems
- Systems integration flow chart
- Manufacturing control system
- Dynamics of the business system
- Steps in system design
- Describing the system under study

2. Determination of systems analysis techniques

- Basic document systems analysis
- Diagram of documentation system

3. Determination of utilization of systems analysis

- Organisation for within company study
- Typical functional flow of design

System for Systems Analysis (SOP)

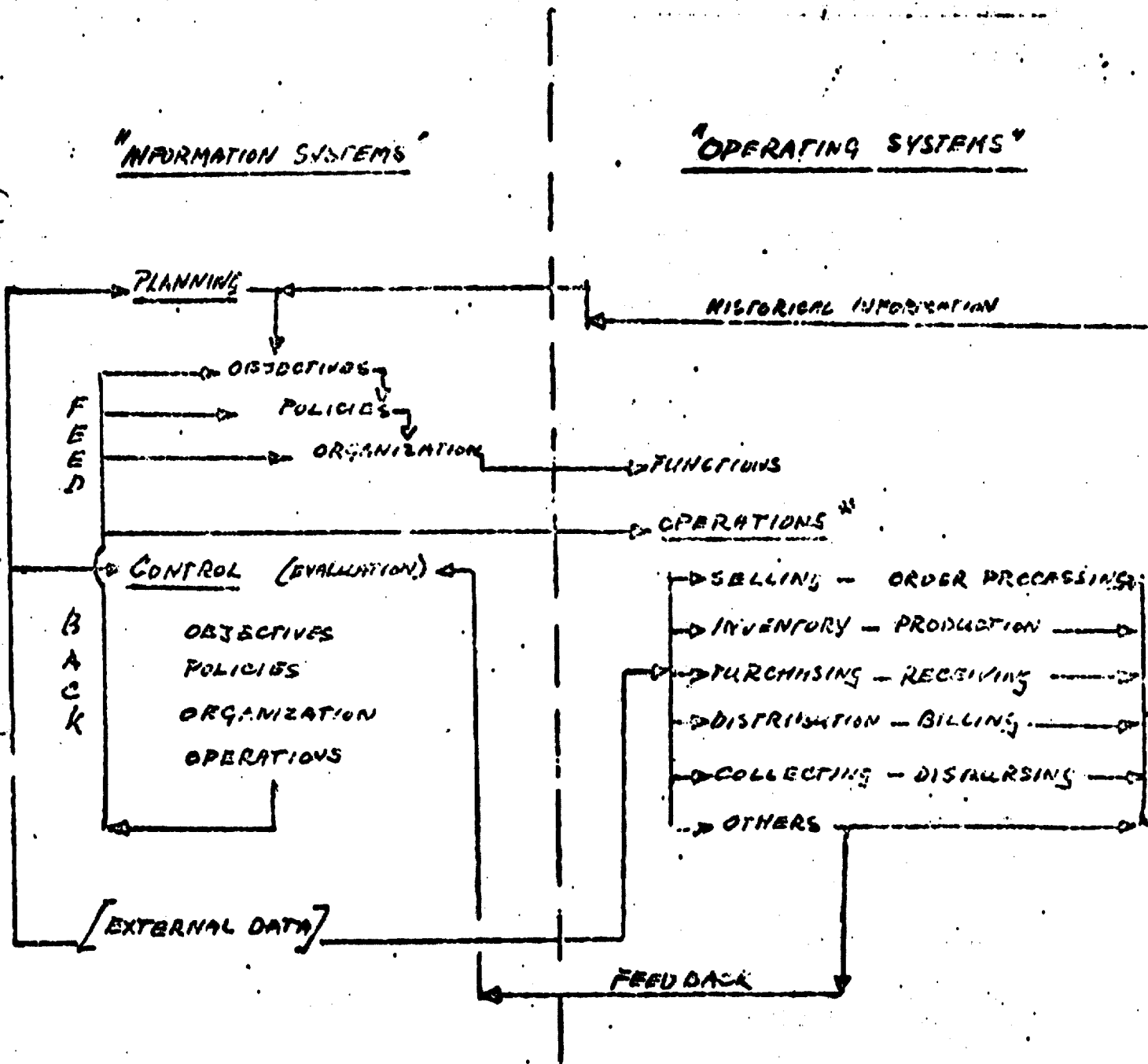
- Structure of reporting
- Structure of documentation
- New system plan

### Literature

Brandon, D.H.  
Management standards for data processing,  
Princeton, N.H., etc. van Nestrand, 1963. 404 pp.  
(chapters I through III)

International Business Machines Corporation  
"Study Organization Plan" (SOP), 5 vols.  
The Method Phase - I, II, III,  
Reference Manual Documentation Techniques

TOTAL (MANAGEMENT) SYSTEMS



\* "SYSTEMS" IN THE TRADITIONAL SENSE - NAMELY, RELATED SERIES OF OPERATING PROCEDURES

TOTAL SYSTEMS

AMERICAN DATA PROCESSING INC.  
DETROIT, MICHIGAN, 482

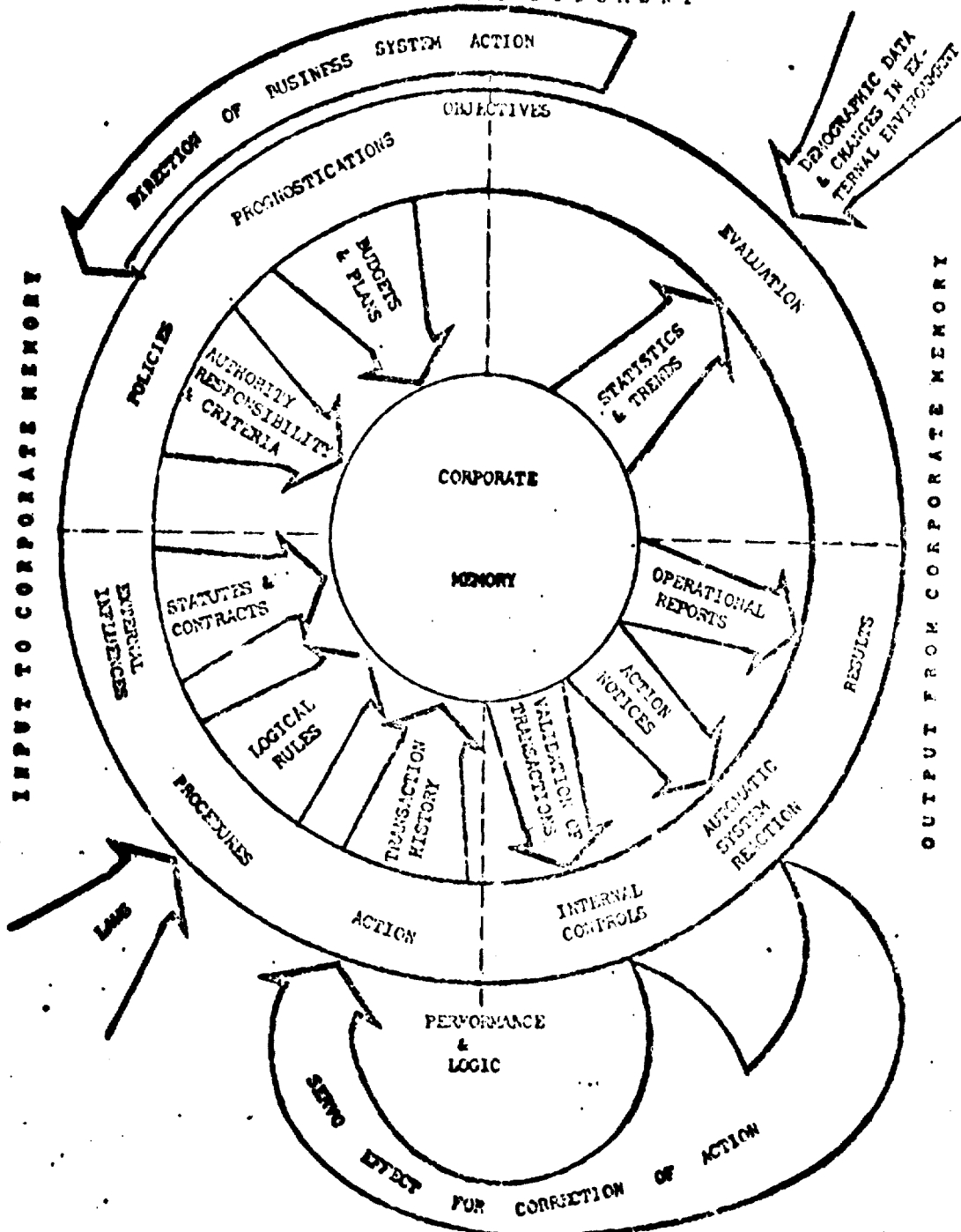






DYNAMICS OF THE BUSINESS SYSTEM  
DECISION AND JUDGMENT

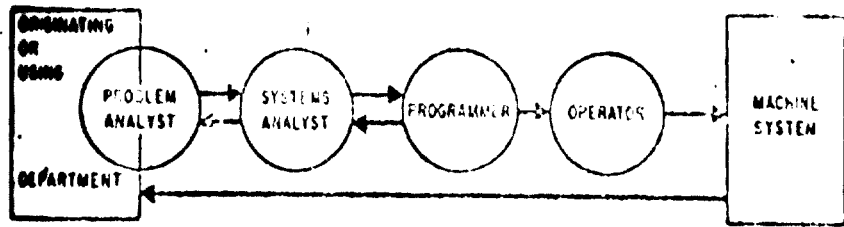
E3/1



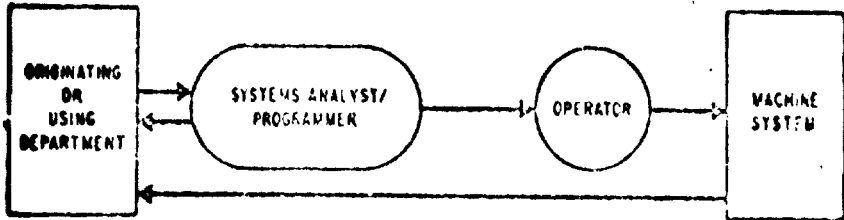
A.4.65.6.ii



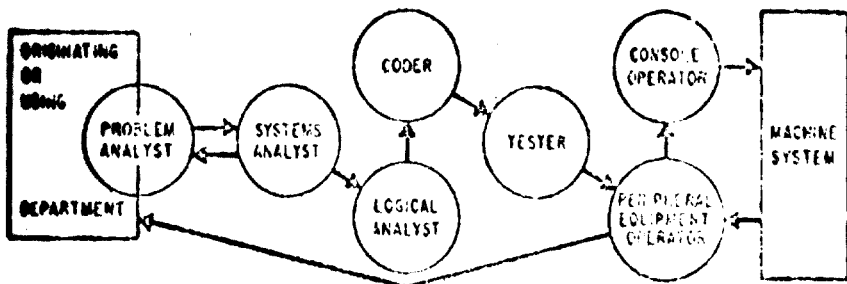
MANAGEMENT STANDARDS FOR DATA PROCESSING



A. NORMAL CHAIN - MEDIUM (AVERAGE) SYSTEM



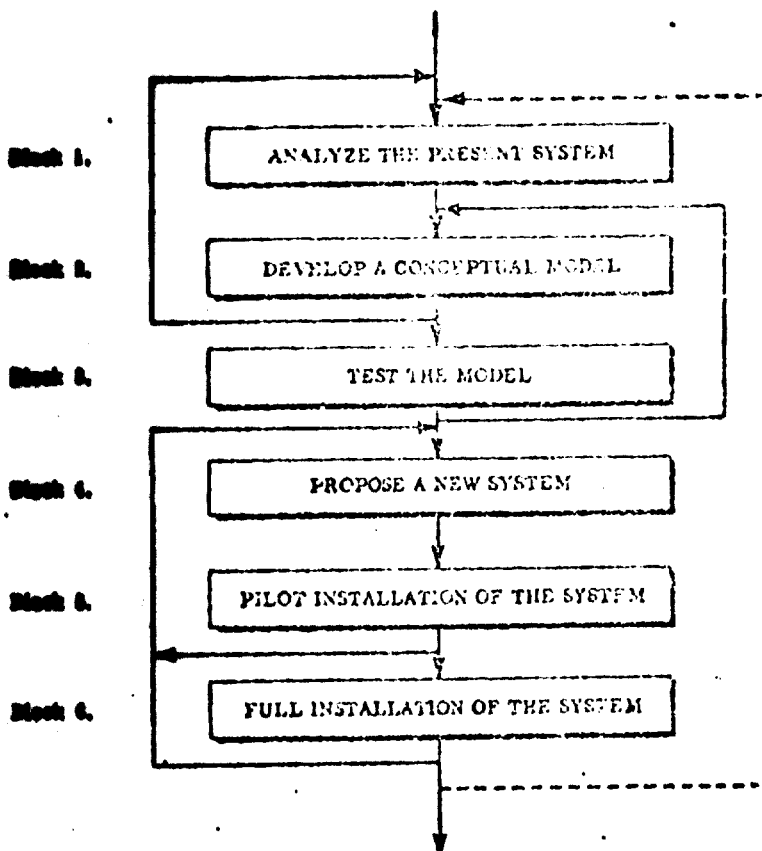
B. FUNCTIONAL INTEGRATION - SMALLER SYSTEM



FUNCTIONAL ORGANIZATION - LARGE SYSTEM

Typical Functional Flow of Design.

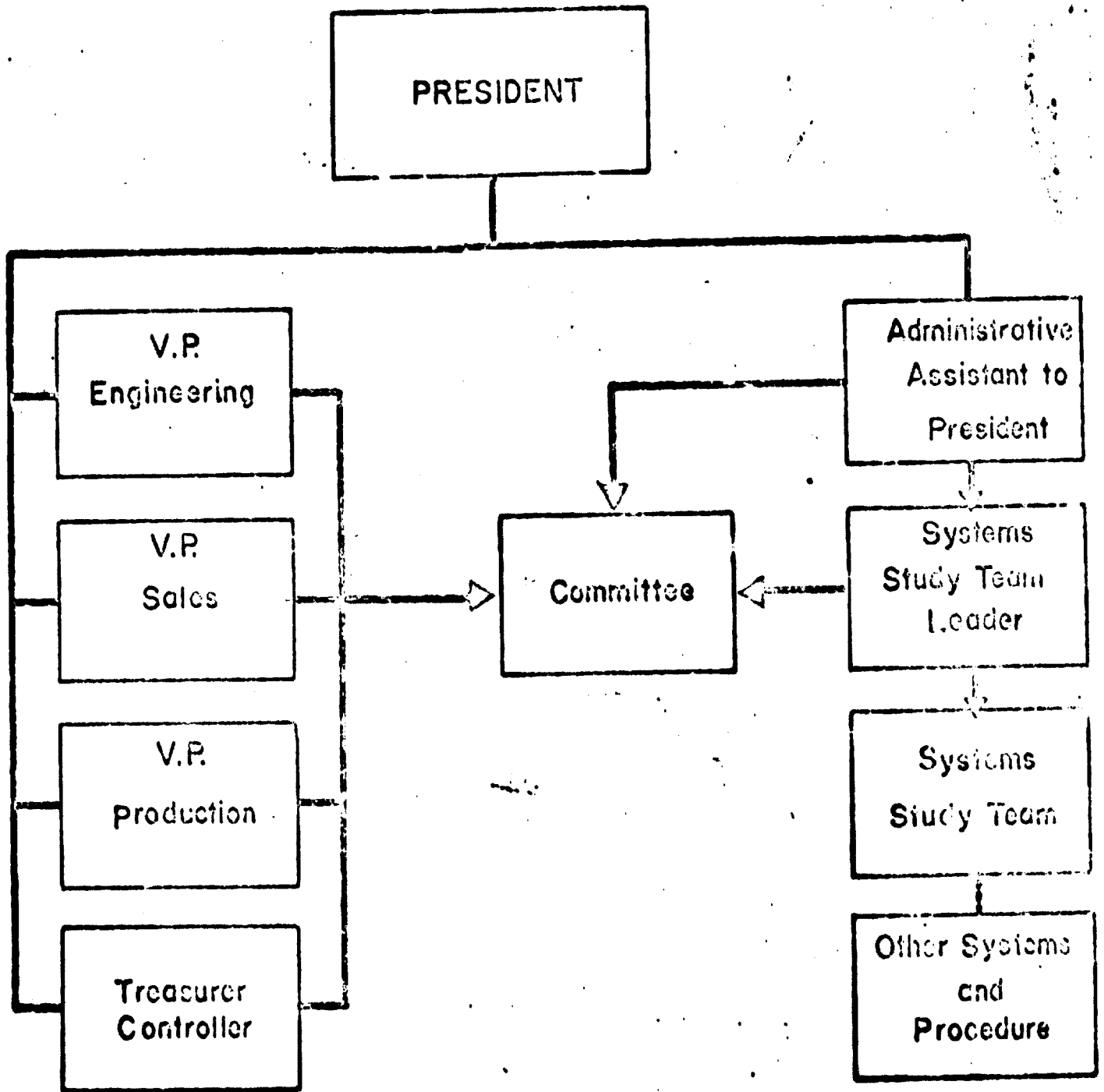
*Describing the system under study*



Uit: S.L. O.  
Systems ana.  
management,

# ORGANIZATION FOR WITHIN COMPANY STUDY

2.3



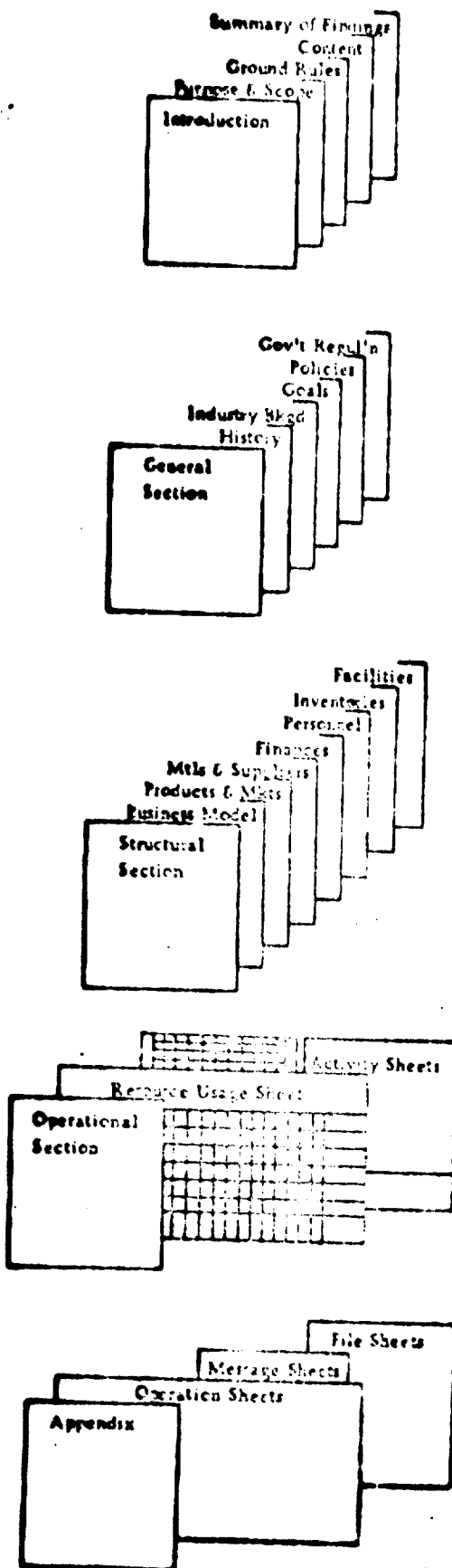
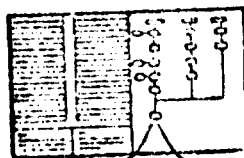


Figure 1.

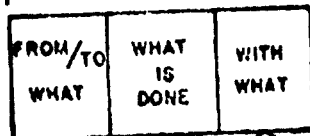
RESOURCE  
USAGE  
SHEET



ACTIVITY  
SHEET



OPERATION  
SHEET



MESSAGE  
SHEET



FILE  
SHEET



E8/9

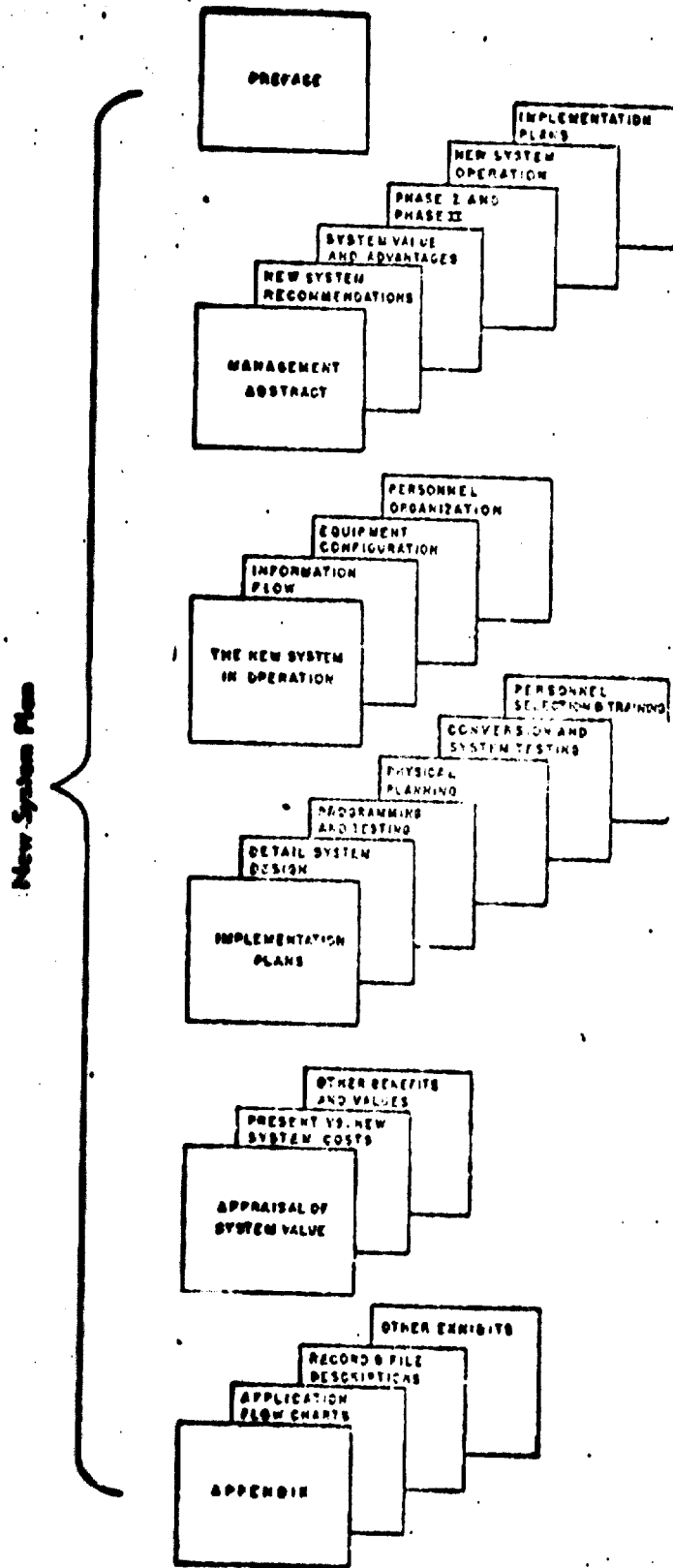


Figure 1. New System Plan

ANALYTICAL METHODOLOGY IN  
ADMINISTRATIVE AUTOMATION

Designing a Business Information System

## DESIGNING A BUSINESS INFORMATION SYSTEM

### Survey of material for courses

0. Business information system
  - Summary "Designing a business information system"
  - Diagram "Model of a business information system"
  - Explanation of symbols "Model of a business information system"
1. Analysis business information
  - 1.1.1 Heading main procedures in chronological order
  - 1.1.2 Analyse main tasks and heading according to information objects (5 x)
2. Designing an information system of temporary information
  - 1.2.1 Heading temporary information objects according to place in organization
    - Enumeration "Questions to put to determine the validity of a report"
    - Enumeration "Reports, forms and records"
  - 1.2.2 Elaboration of main tasks per temporary information object
    - Data recording sheet
    - Input analysis chart
    - Output redundancy chart
    - File consolidation chart
    - Output analysis chart
3. Choice of form and presentation of temporary information
  - 1.3.2 Determination of demands for desired temporary information
  - 1.3.3 Determination of characteristics of possible temporary information
  - 1.3.4 Choice of form and presentation of desired temporary information
4. Designing an information system of permanent information
  - 1.2.6 Heading permanent information objects according to place in organization (2 x)
  - 1.2.7 Elaboration of main tasks per permanent information object
5. Choice of form and presentation of permanent information

### Literature

Questions to put to the recipient of a report to determine its validity are as follows:

1. How many other persons use it?
2. How essential is it to the work of your unit?
3. How often do you use your copy of this report?
4. How much of this information on this report do you not use?
5. Is the data on this report necessary for:
  - (a) making decisions to take action?
  - (b) keeping you informed on current conditions?
  - (c) checking accuracy of other matters?
  - (d) establishing control over operations?
6. What would be the effect on your work if you:
  - (a) did not receive the report at all?
  - (b) received it less frequently?
  - (c) received less information than at present?
  - (d) received more information than at present?
7. The cost of preparing this report has been estimated at x dollars. Do you consider that your use of the data justifies this expense?
8. What other reports, records, or forms are prepared from data on this report?
9. Can the data on this report be had from any other source?
10. Is this report easy to read and use?
11. How long do you keep your copy of this report?
12. How and where do you file it?
13. How often do you refer to it after its original use?

1. Reports

- (a) Information reported. (If this is not clearly indicated by the captions on the report form, enter in the appropriate columns or sections a full description of the information required.)
- (b) Period covered by the report.
- (c) Frequency of preparation.
- (d) Age of information reported.
- (e) Source of each part of the information.
- (f) Method of compiling data.
- (g) Method of preparing or reproducing report.
- (h) Verification or checking procedures.
- (i) Responsibility for preparation (organization unit and position title.)
- (j) Man-hours required.
- (k) Number of copies.
- (l) Complete routing of each copy.
- (m) Purpose of report.
- (n) Use actually made of each copy by recipients.
- (o) Effectiveness of report. Does it meet the requirements?

2. Forms

Most of the points of information appearing in the report check list are equally applicable to business forms. In addition, however, the following supplementary facts should be gathered whenever forms are studied:

- (a) Volume of use.
- (b) Form cost.
- (c) Information entered at time of origination.
- (d) Volume and significance of errors.
- (e) Information added subsequent to origination.
- (f) Approving signatures required.
- (g) Use made of each piece of information on the form.
- (h) Information transcribed to other forms, records or reports.
- (i) Ultimate disposition of each copy.





3. Records

- (a) Information recorded in each column or space.
- (b) Source of each entry.
- (c) Volume of postings.
- (d) Frequency of posting.
- (e) Method of posting.
- (f) Responsibility for maintenance.
- (g) Man-hours required.
- (h) Method of verifying posted data.
- (i) Method and frequency of summarizing posted data.
- (j) Equipment in which record is filed.
- (k) Arrangement or sequence of filing, type and frequency of visual indexing, etc.
- (l) Purpose of record; nature and frequency of references to it or inquiries for the information it contains; types of reports, if any, prepared from it.







Number of Digits per Field	DATA FIELDS																					
	3	5	7	6	1	4	3	5	6	6	5	1	5	4	2	5	2	7	8	6	4	5
MAND COPY OUTPUT:																						
Employee Termination	2	1	M	N	M	M	N															
Pay Check	2	M	N	N	M	M	T	T	C	C	C											
Bank Listing	2	M	N	M																		
Payroll Register	7	M	N	M	M	M	T	T	C	C	C											
Check Register	7	M	N	M	M																	
FICA	3	M	M	M																		
Attendance Report	3	M	N	M																		
Payroll Report	2	M	N	M																		
W-2	2	M	N	M																		

SOURCE:  
 Master Record M  
 Transaction T  
 Computed C

Output Analysis Chart

- 2 -

**ANALYTICAL METHODOLOGY IN  
ADMINISTRATIVE AUTOMATION**

Designing the information  
processing organisation

DESIGNING THE INFORMATION PROCESSING ORGANIZATION

Survey of material for courses

0. Organization system
1. Analysis of controlling organization
  - 2.1.1 Heading procedures in chronological order
  - 2.1.2 Analysis of tasks and heading according to task joinings
    - Decision-making techniques
2. Designing the equipment organization
  - Comprehensive input-output system
  - 1410 Configurator
  - 2.2.1 Heading machine-task joinings according to place in organization
  - 2.2.2 Elaboration of tasks per machine-task joining
3. Choice of equipment
  - 2.3.2 Determination of demands for necessary equipment
    - Check list daily computer scheduling
    - Occupation of the machine during a year
    - Computer characteristics (IBM/360-20)
  - 2.3.3 Determination of characteristics of equipment available
  - 2.3.4 Choice of equipment to be used
4. Designing the personnel organization
  - 2.2.6 Heading personnel-task joinings according to place in organization (3 x)
    - Concentric organizational diagram
  - 2.2.7 Elaboration of tasks per personnel-task joining
5. Choice of personnel
  - Review of the most important functional categories
  - 2.3.7 Determination of demands of necessary personnel
  - 2.3.8 Determination of characteristics of personnel available
  - 2.3.9 Choice of personnel to be appointed

Literature

"Computer Characteristics"; loose-leaf; concise descriptions of computer available on the European market; 110 pp., 1965 plus regular supplements.  
Netherlands ADP Research Centre, Amsterdam.

"New Functions in Information Processing",  
Netherlands ADP Research Centre, Amsterdam, 1963. 68 pp.

E.S.

DECISION-MAKING TECHNIQUES	
Types of Decisions	Techniques
	Traditional      Modern
<p><b>Programmed:</b></p> <p>Routine, repetitive decisions Organization develops specific processes for handling them</p>	<p>1. Habit</p> <p>2. Clerical routine: Standard operating procedures</p> <p>3. Organization structure: Common expectations A system of subgoals Well-defined informational channels</p> <p>1. Operations Research: Mathematical analysis Models Computer simulation</p> <p>2. Electronic data processing</p>
<p><b>Nonprogrammed:</b></p> <p>One-shot, ill-structured novel, policy decisions Handled by general problem-solving processes</p>	<p>1. Judgment, intuition, and creativity</p> <p>2. Rules of thumb</p> <p>3. Selection and training of executives</p> <p>Heuristic problem-solving techniques applied to: (a) training human decision makers (b) constructing heuristic computer programs</p>

E 5/2

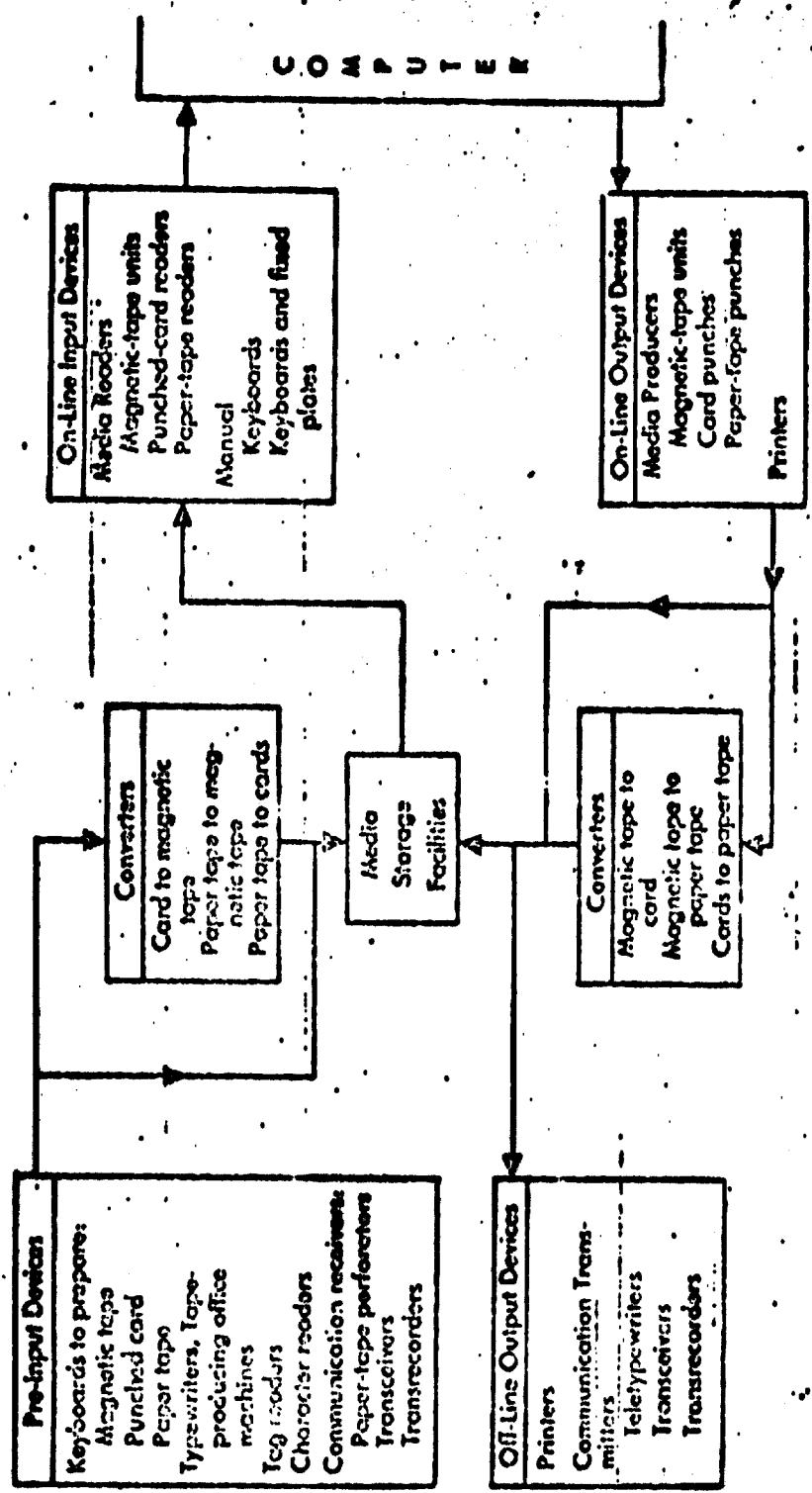
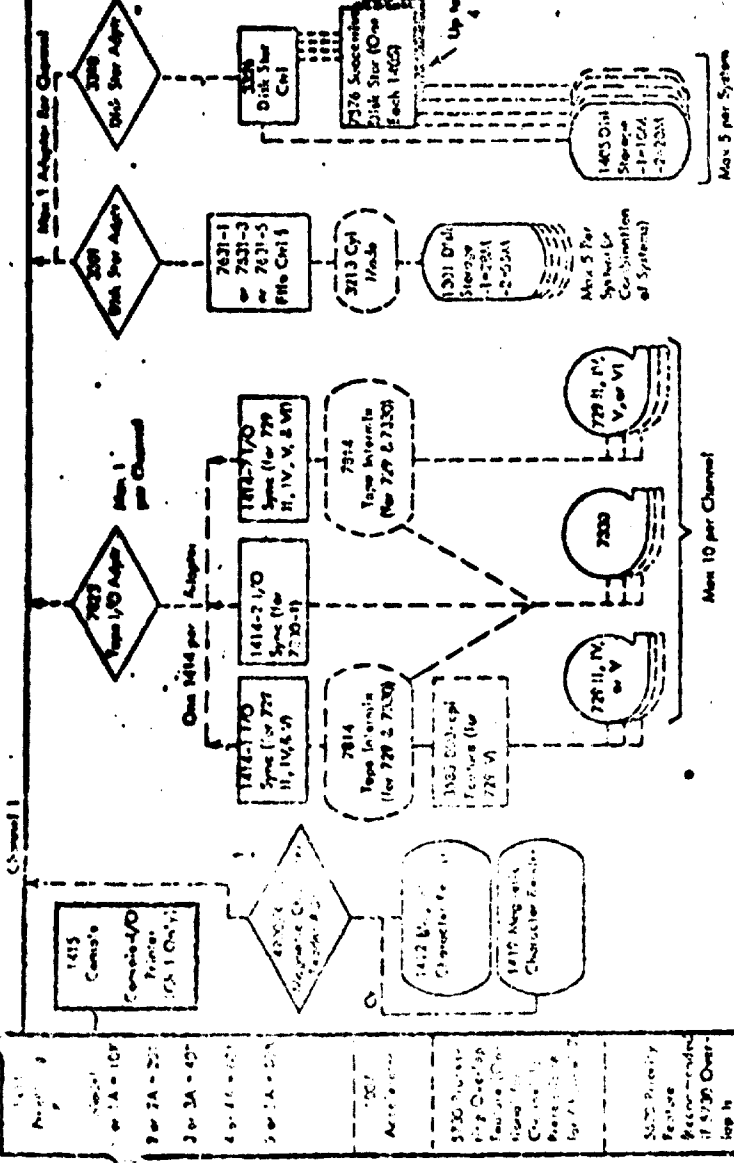


Figure 4-20. Comprehensive input-output system

1030003

Channel 1 Configuration



**TO USE THIS 1410 CONFIGURATION:**

- Select devices needed.
- From selected devices, READ UP to 4th column and 1411.

Solid lines (---) show requirements. Dotted lines (---) show options.

Address comments regarding contents of this publication to IBM Corporation, Central Manual, Dept. 208, PO Box 200, Poughkeepsie, New York.

**Optional and Recommendations:**  
 5420 Priority on 1403, under Prerequisite of 5420 Priority on 1411.  
 Cannot mix 1403 with 1401 on System.

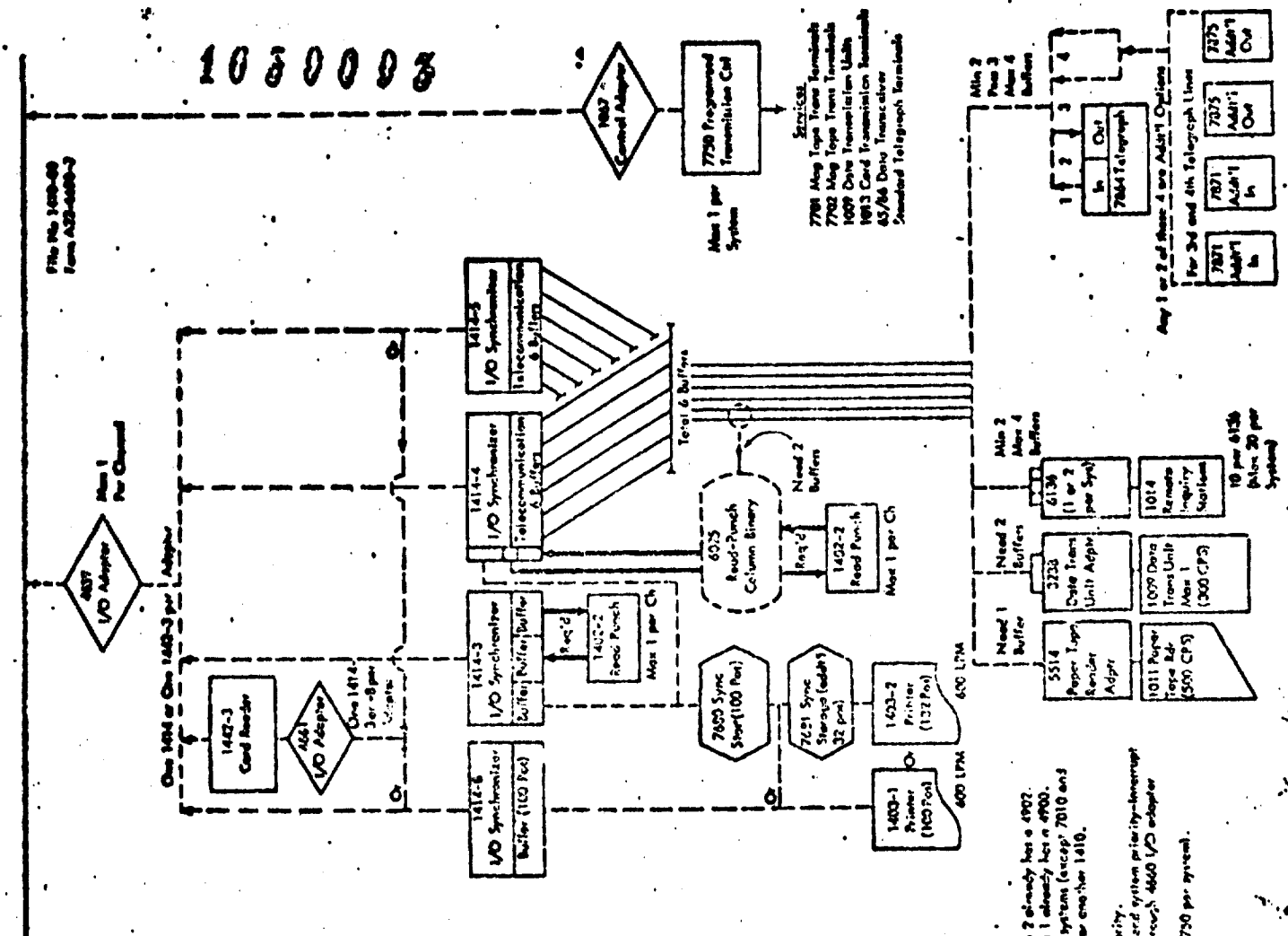
NOTES

- \* Prerequisite: 1411 Model AI-AS.
- \* 4700 used if Ch 2 has no 4702; 4703 used if Ch 2 already has a 4702.
- \* 4902 used if Ch 1 has no 4903; 4903 used if Ch 1 already has a 4900.
- \* 7031-3 permits sharing 1401's with 7000 series systems (except 7010 and 7037). 7031-5 permits shared use by a 7010 or another 1410.
- \* Prerequisite: 5515 Priority 2, 5700 Priority 3.
- \* Prerequisite: 4560 I/O Adapter and 5420 Priority.
- \* 5021 Priority Reserve Extension required to extend system priority-coverage capabilities to I/O operations transmitted through 4660 I/O adapter (Ch 2).
- \* Not installed if 1037 is on Ch 1 (over of one 7750 per system).

CHANNEL 2 ADAPTERS, OPTIONAL FEATURES, AND DEVICES ARE SAME AS CHANNEL 1 EXCEPT AS FOLLOWS:

- Adapter or Feature
  - 4700/4900 - Magnetic Char Reader Adapter
  - 3025 500-sp. Inserter (for 729 V on 1414-B)
  - 7073 Type I/O Adapter
  - 3301 Disk Storage Adapter (for 1301-V)
  - 3310 Disk Storage Adapter (for 1405-V)
  - 4559 I/O Adapter
  - 1407 Control Adapter
- Number for Channel 2
- 4902/4903 (see notes \* and †)
  - 3926
  - 7074
  - 3302
  - 3311
  - 4660 \* †
  - 1003 \* †

Channel 2 Configuration



**Optional and Recommendations:**  
 5420 Priority on 1403, under Prerequisite of 5420 Priority on 1411.  
 Cannot mix 1403 with 1401 on System.

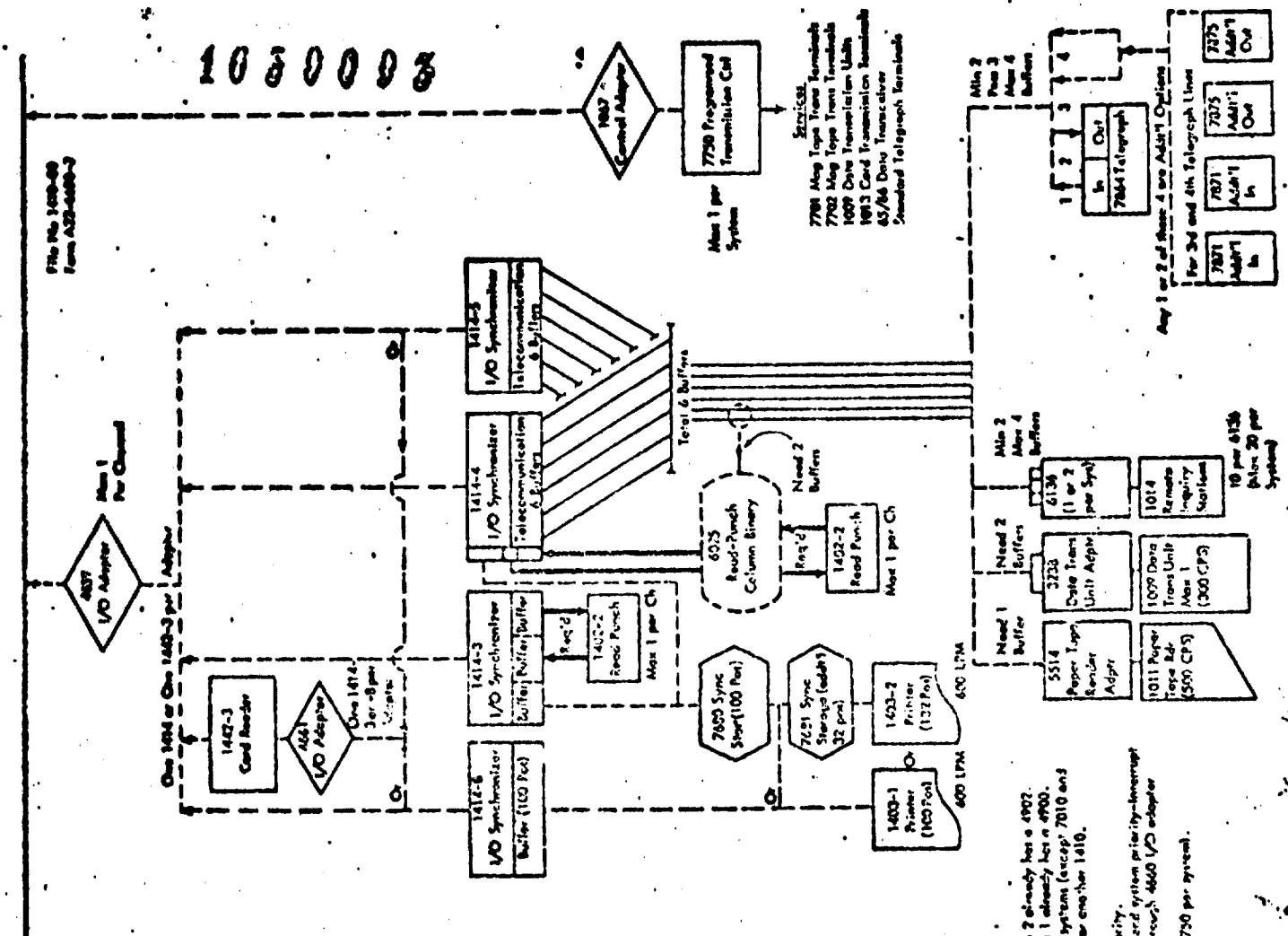
NOTES

- \* Prerequisite: 1411 Model AI-AS.
- \* 4700 used if Ch 2 has no 4702; 4703 used if Ch 2 already has a 4702.
- \* 4902 used if Ch 1 has no 4903; 4903 used if Ch 1 already has a 4900.
- \* 7031-3 permits sharing 1401's with 7000 series systems (except 7010 and 7037). 7031-5 permits shared use by a 7010 or another 1410.
- \* Prerequisite: 5515 Priority 2, 5700 Priority 3.
- \* Prerequisite: 4560 I/O Adapter and 5420 Priority.
- \* 5021 Priority Reserve Extension required to extend system priority-coverage capabilities to I/O operations transmitted through 4660 I/O adapter (Ch 2).
- \* Not installed if 1037 is on Ch 1 (over of one 7750 per system).

CHANNEL 2 ADAPTERS, OPTIONAL FEATURES, AND DEVICES ARE SAME AS CHANNEL 1 EXCEPT AS FOLLOWS:

- Adapter or Feature
  - 4700/4900 - Magnetic Char Reader Adapter
  - 3025 500-sp. Inserter (for 729 V on 1414-B)
  - 7073 Type I/O Adapter
  - 3301 Disk Storage Adapter (for 1301-V)
  - 3310 Disk Storage Adapter (for 1405-V)
  - 4559 I/O Adapter
  - 1407 Control Adapter
- Number for Channel 2
- 4902/4903 (see notes \* and †)
  - 3926
  - 7074
  - 3302
  - 3311
  - 4660 \* †
  - 1003 \* †

Channel 3 Configuration



**Optional and Recommendations:**  
 5420 Priority on 1403, under Prerequisite of 5420 Priority on 1411.  
 Cannot mix 1403 with 1401 on System.

NOTES

- \* Prerequisite: 1411 Model AI-AS.
- \* 4700 used if Ch 2 has no 4702; 4703 used if Ch 2 already has a 4702.
- \* 4902 used if Ch 1 has no 4903; 4903 used if Ch 1 already has a 4900.
- \* 7031-3 permits sharing 1401's with 7000 series systems (except 7010 and 7037). 7031-5 permits shared use by a 7010 or another 1410.
- \* Prerequisite: 5515 Priority 2, 5700 Priority 3.
- \* Prerequisite: 4560 I/O Adapter and 5420 Priority.
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  - 3926
  - 7074
  - 3302
  - 3311
  - 4660 \* †
  - 1003 \* †



CHECK LIST - DAILY COMPUTER SCHEDULING  
(other than production runs)

1. Conversion runs - new applications
2. De-bugging - revisions and new programs
3. Set-up time - each run
  - a. changing tapes
  - b. entering program
4. Preventive maintenance time
  - a. daily cleaning
  - b. complete maintenance - weekly
  - c. reduced voltage tests
5. Down time - due to system errors
  - a. input errors
  - b. console errors
  - c. operator errors - wrong tape etc.
  - d. input data not on time
6. Down time due to machine - emergency
  - a. air conditioning breakdown
  - b. power breakdown
  - c. equipment trouble (may cause re-runs also)

# OCCUPATION OF THE MACHINE IN THE COURSE OF THE YEAR

E.5

5 weeks work    
  13 weeks work    
  26 weeks work

A = theoretical available machine hours

B = A minus 8,3 % maintenance

C = B minus 9,4 % technical disturbance

D = C minus 5,0 % = max. available time  
of exchange

E = D minus 5,0 % loss in consequence  
of waiting

hours  
a  
week

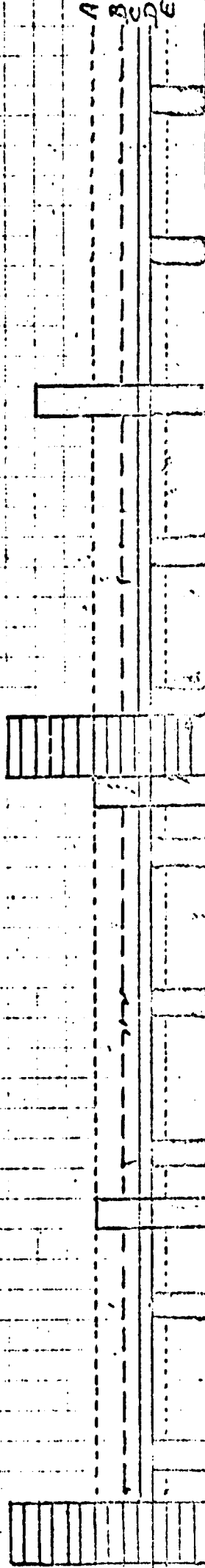
80

60

40

20

10

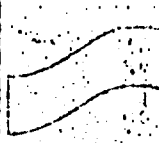
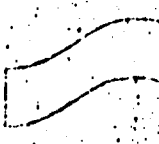



smoothable weekwork

daywork

5    10    15    20    25    30    35    40    45    50    62

NETHERLANDS AUTOMATIC INFORMATION PROCESSING RESEARCH CENTRE

Serial Par. L 10		in production 1964		IBM	
addressing mode 2		selling price Hfl. 256K-356K		360-20	
fixed point		monthly rental Hfl. 5.8K-20K		sold or ordered in the Netherlands YES	
bits 174 546.6 us 5 x 5 d 3870 us 5 x 5 d 5525 10 : 5 d		Size in words of 10 bits/ 2 dec/ 1 alph		(avg.) density	
floating point		Total i/o channels 4+2		core 8) 5.0	
us us us		max. units type		buffer speed	
legend b = binary/bit d = decimal/digit a = alphanumeric ser = serial par = parallel k = 1,000 M = 1,000,000 R = read W = write C = compute R/W/C = R, W and C concurrently us = microsecond ms = millisecond c = card ch = character l = line * = planned		input 1)  E13B 1419 3)		yes 600 1000 c/min 500 500 1600 dec/min	
		output 1)  2203 A1 1403/2 1407/7 1403/N1		yes 500 500 c/min 300 160 ccl/sec 160 300/350/425/450 600 600 l/min 1100 120/132/144 ch/line 13/39/52/C4 ch/line	
notes 1. see remarks (pto) 2. console typewriter 3. on line or off line 4. optional 5. not yet known 6. not solid state 7. 4+4+2x1 parity bits 8. cycle time/1/2 byte 9. 800 BPI 10. 1600 BPI 11. 12. 13. 14.		file 1)  2415-1 9) 2415-2 9) 2415-3 9) 2415-4 10) 2415-5 10) 2415-6 10)		15 15 15 30 30 30 kch/sec	
date Feb. 1967 Rev. 1		PRELIMINARY DEFINITE, verified by manufacturer		return access file kind type DISK 2311-11 DISK 2311-22	
access time 0 ms- 135 ms av. ac. time 75 ms		unit size 5.4Mbytes max. units 2		0 ms- 100 ms 100 ms	

number of instructions	yes	instructions per word	1/2, 1, 1/6
number of multi-programs		number of instructions	30
scanning by control control unit	yes	indirect addressing	no
break in from peripheral units	yes	ASSEMBLER LANGUAGE, IOCS, R.P.C.	
priority control by software	yes	autocodes: DISK and TAPE MONITOR	
hardware	no	PUNCHED-CARD UTILITY PROGRAMS	
number of accumulators	8/2 bytes	ALGOL	no
add-to-storage logic	yes	COBOL	no
number of index registers	2/2 bytes	FORTAN	no

Remarks

The Multifunction Card machine (type 2560) can perform several functions: cardreading, cardpunching, collating, cardprinting (interpreting). For communication between other computers (of the 360-series) or between the model 20 Central Processor and remote peripherals, a communication adapter can be supplied.

Minimum configuration for using:

- R. P. G. : 4K storage, 1 printer, 1 cardreader
- BAL with IOCS : 4K storage, 1 cardreader, 1 cardpunch (or combined)
- PCUP : 4K storage, 1 MFCM (2560) collating program
- : 4K storage, 1 cardreader, 1 cardpunch gangpunch + reproduce program
- : 4K storage, 1 printer, 1 cardreader, 1 list + summary punch cardpunch program
- : 4K storage, 1 MFCM (2560) merge/sort program
- Magnetic Tape : 8K storage System Control and Service Program (Tape Monitor)
- DISK System : 12K storage System Control and Service Program (DISK Monitor)

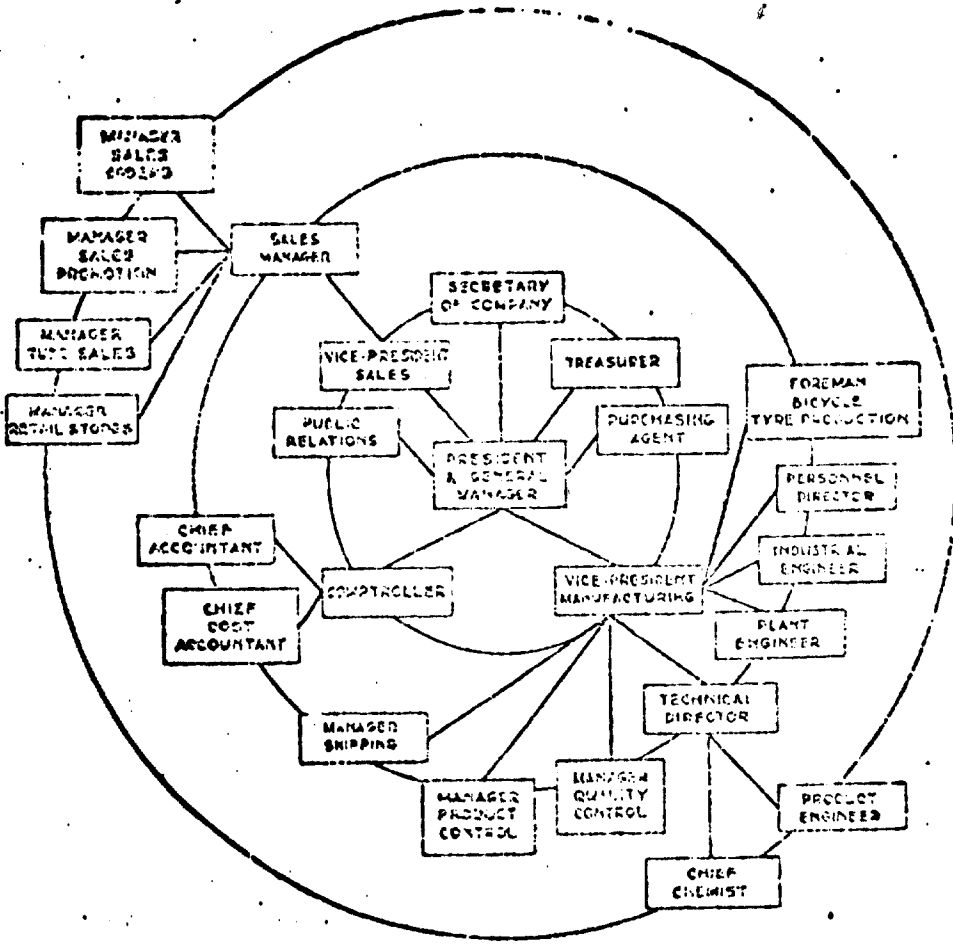
Magnetic Tapes.

- One Model 2415 can be attached per system
- 2415 model 1 and 3 : 2 drives
- 2415 model 2 and 5 : 4 drives
- 2415 model 3 and 6 : 6 drives

DISK

On one system 20 can be used either 2311 model 11 or 2311 model 12.

E 5/4



REVIEW OF THE MOST IMPORTANT FUNCTIONAL CATEGORIES

Chart 1

Functionary	Task	Knowledge	Contact	Transfer of work
I Systems analyst or admin. organizer	Analysis of the problem in its entirety. Draft the fundamental approach to problems. Supervise the elaboration Record in Chart A.	Extensive knowledge of administrative and organizational problems. Broad knowledge of the machine.	With the firm's management and departmental chiefs II	A
II Junior systems analyst or junior admin. organizer or chief programmer	Detailed analysis of the problem stated in Chart A. Elaborate the solution in such a way that it can be understood by the department concerned. Organize efficient checks Record in Chart B.	Sound knowledge of administrative and organizational problems. Sound knowledge of the machine.	With heads and staff or departments I and II	B
III Systems programmer or programmer analyst or programmer	Elaborate Chart B in such a way that the problem can be written in machine language without further questions. Organize the machine checks. Record in Chart C.	Some knowledge of administrative and organizational problems. Thorough knowledge of the machine	With staff of departments II and IV	C
IV Coder or assistant programmer	Write the programme using Chart C.	Detailed knowledge of the machine code	II and III	

- A. Flowchart in which the whole problem can be seen at a glance.
- B. Detailed flowchart in which all details of the problem are clearly visible,
- C. Very detailed flowchart and wholly oriented on machine on which the work will be done. An average of 3 to 5 machine instructions will be necessary for each symbol. The details prevent the problem (see A and B, from being clearly recognizable.

**ANALYTICAL METHODOLOGY IN  
ADMINISTRATIVE AUTOMATION**

Preparation of the detailed  
systems design

## PREPARATION OF THE DETAILED SYSTEMS DESIGN

### Survey of material for courses

1. Information, education and training of automation staff
2. Planning and arrangement of the detailed systems design
  - Network planning for systems study
3. Documentation of the detailed system design
  - Chart selector

### Literature

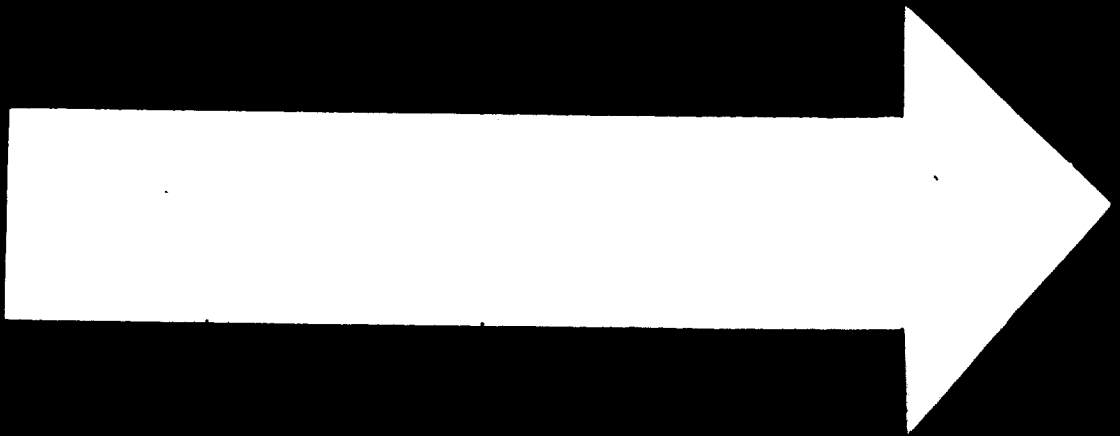
"Planning by Network Analysis",  
Netherlands ADP Research Centre, Amsterdam, 1967. 50 pp.



E6/3

CHART SELECTOR

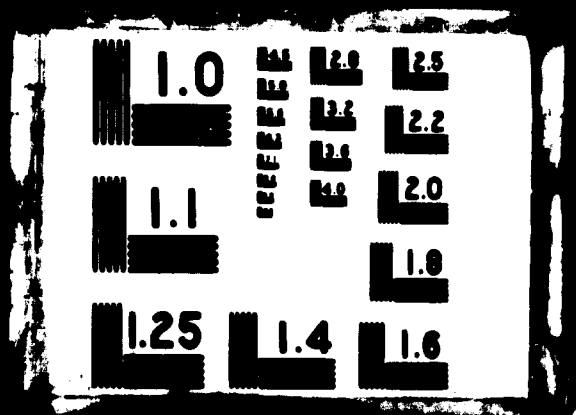
OBJECTIVE	CHART TO USE	ILLUSTRATION OF CHART						
<p>To study the sequence of major operating steps in an activity and the organization units performing them.</p>	<p><b>WORK FLOW CHARTS</b> give a general description of the steps in one column; other columns represent organization units. The connecting lines show the flow of work.</p>	A	B	C	D	<p>DESCRIPTION</p> <p>Application prepared for examination</p> <p>Examined, certified and approved</p> <p>License prepared, validated and issued</p> <p>Distributed and recorded</p>		
<p>To analyze the detailed steps in a flow of work that is quite complex or involves several organization units.</p>	<p><b>MULTI-COLUMN PROCESS CHARTS</b> show steps in greater detail than on a work flow chart -- symbols are used to describe steps.</p>	<p>MAIL CLERK</p> <p>CLERK</p> <p>TYPIST</p> <p>ANALYST</p> <p>CHIEF</p>						
<p>To study the detailed steps in a relatively simple procedure such as one within a single organization unit.</p>	<p><b>SINGLE-COLUMN PROCESS CHARTS</b> are often drawn on printed forms; work flow is shown by connecting the appropriate symbols.</p>							
<p>To study the flow of copies of a multi-copy form.</p>	<p><b>FORM DISTRIBUTION CHARTS</b> show the number of copies in the first column. The flow of each copy of the form is traced from unit to unit.</p>	<p>Application Form 1035</p>	A	B	C	D	E	
<p>To improve the layout of the office so that unnecessary steps can be avoided.</p>	<p><b>LAYOUT FLOW CHARTS</b> involve a diagram of the office made to scale -- the flow from desk to desk is shown by arrows.</p>							
<p>To simplify the steps in an operation performed by one employee.</p>	<p><b>OPERATION CHARTS</b> are of several types; the one shown in the next column is commonly used to study the motions of one hand.</p>	<p>LEFT HAND</p> <ol style="list-style-type: none"> <li>1. Move to drawer</li> <li>2. Pick up clip</li> <li>3. Move clip to paper</li> <li>4. Attach clip to paper</li> </ol>	<p>RIGHT HAND</p> <ol style="list-style-type: none"> <li>1. Move to paper</li> <li>2. Pick up paper</li> <li>3. Idle</li> <li>4. Idle</li> </ol>					



**74 . 10 . 16**

2 OF 2

01115



**ANALYTICAL METHODOLOGY IN  
ADMINISTRATIVE AUTOMATION**

**Designing the information  
processing procedures**

## DESIGNING THE INFORMATION PROCESSING PROCEDURES

### Survey of material for courses

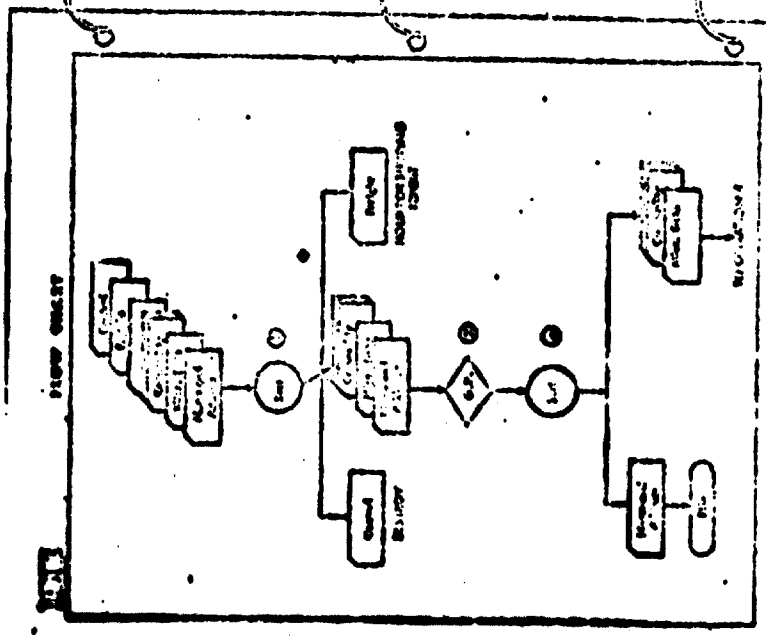
0. Processing system
1. Analysis of controlling procedures
  - .. 3.1.1. Heading sub-procedures in chronological order
  - 3.1.2. Analysis of operations and heading according to operation joinings
2. Designing processing system for equipment
  - 3.2.1. Heading machine-operation joinings according to place in organization
  - 3.2.2. Elaboration of operations per machine-operation joining
  - Pages from procedure manual showing flow charts on one side, and narrative job instructions on facing page
  - Method of presenting procedure instructions in graphic form
3. Choice and design of machine-bound information carriers
  - 3.3.2. Determination of demands re machine-bound information carriers (2 x)
  - 3.3.3. Determination of characteristics of machine-bound information carriers
  - 3.3.4. Choice of characteristics of machine-bound information carriers
4. Designing a processing system for personnel
  - 3.2.6. Heading personnel-operation joinings according to place in organization
  - 3.2.7. Elaboration of operations per personnel-operation joining
5. Choice and design of personnel-bound information carriers
  - 3.3.7. Determination of demands personnel-bound information carriers (2 x)
  - 3.3.8. Determination of characteristics of personnel-bound information carriers
  - 3.3.9. Choice of characteristics of personnel-bound information carriers
  - A specification sheet used for speciality forms

### Literature

E 7/2

**JOB INSTRUCTIONS**

Job No.	Job Title	Job Description
1	SALES ACCOUNTING	<p>1. All sales invoices are to be prepared and entered on the sales invoice form. The invoice form is to be prepared on the basis of the sales order and the shipping order. The invoice form is to be prepared on the basis of the sales order and the shipping order. The invoice form is to be prepared on the basis of the sales order and the shipping order.</p>
2		<p>2. All sales invoices are to be prepared and entered on the sales invoice form. The invoice form is to be prepared on the basis of the sales order and the shipping order. The invoice form is to be prepared on the basis of the sales order and the shipping order. The invoice form is to be prepared on the basis of the sales order and the shipping order.</p>
3		<p>3. All sales invoices are to be prepared and entered on the sales invoice form. The invoice form is to be prepared on the basis of the sales order and the shipping order. The invoice form is to be prepared on the basis of the sales order and the shipping order. The invoice form is to be prepared on the basis of the sales order and the shipping order.</p>





**ANALYTICAL METHODOLOGY IN  
ADMINISTRATIVE AUTOMATION**

**Designing the instructions  
for information processing**



## DESIGNING THE INSTRUCTIONS FOR INFORMATION PROCESSING

### Survey of material for courses

0. Instruction system
1. Analysis of controlling methods
  - 4.1.1. Heading sub-sub-procedures in chronological order
  - 4.1.2. Analysis of actions and heading according to working places
  - Flow chart for sale pricing decision
  - 4.1.7. Analysis of actions and heading according to working places
  - Procedure study sheet depicting requisition of material
2. Designing instruction system for equipment
  - 4.2.1. Heading of machine-working-places according to place in organization
  - 4.2.2. Elaboration of actions per machine-working-place.
3. Choice of machine-bound tools
4. Designing instruction system for personnel
  - 4.2.6. Heading of personnel-working-places according to place in organization (4x)
  - 4.2.7. Elaboration of actions per personnel-working-place
5. Choice of personnel-bound tools
  - 4.3.7. Determination of demands personnel-bound tools
  - 4.3.8. Determination of characteristics of personnel-bound tools
  - 4.3.9. Choice of personnel-bound tools to be used.

System **Depreciation Material** Procedure Study Sheet Date **6/27/55**

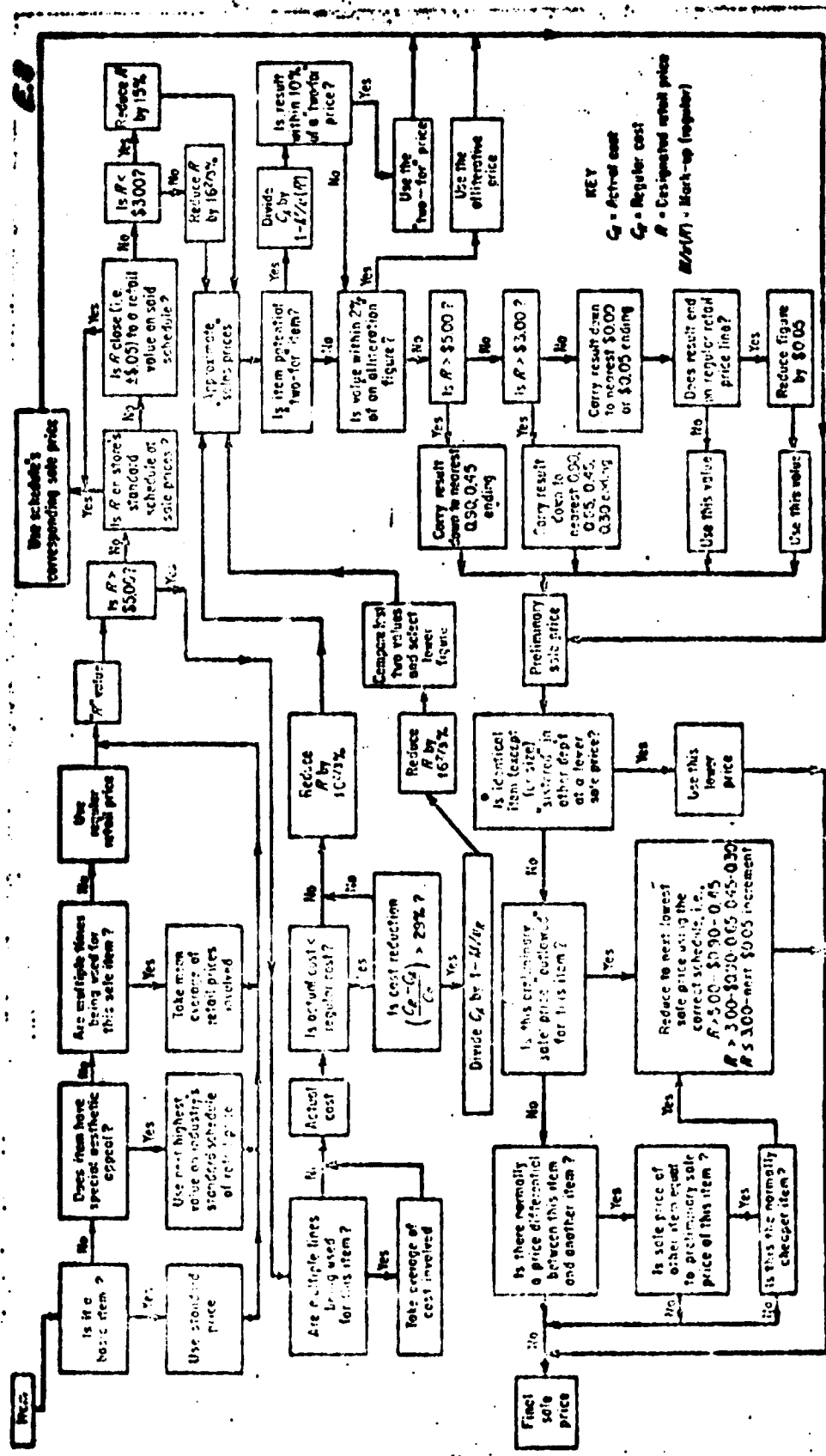
Prepared for (Company, Location, Sponsor)				Job Assignment No.		
Form Search Position		Form No. 8104	Title and Color of Copy WHITE - 60x7 OFFICE		Copy No. 1 of 3	
<input checked="" type="radio"/> Origin of Record <input checked="" type="radio"/> Adding to Record <input type="radio"/> Mending Operation	<input type="radio"/> None <input type="checkbox"/> Inspection <input type="checkbox"/> Mkt. Dist. File, or Storage	Question Each Step What is done? Where is it done? When is it done? Who does it? How is it done?	WHY? WHY? WHY? WHY?	Indicate Type of Improvement For Each Can it be eliminated? If so, indicate by <u>    </u> E Can it be combined or changed in sequence for better operation? If change in sequence, mark <u>    </u> C Can it be amplified? If so, mark <u>    </u> S		
Step	Symbol	Description	No. of Oper.	Wage Bkt.	Output or Dist. Moved	Notes - Questions - Improvement
1	<input checked="" type="radio"/>	4-part form written by clerk	1			Max. 4 items/req Lengthened -- 10-15/yr
2	<input type="checkbox"/>	Checked and approved by foreman				
3	<input type="radio"/>	Separate copy No. 4 from group				Copy No. 4 filed See PIS No. 2
4	<input type="checkbox"/>	In outgoing mail				4 pick-ups/day
5	<input checked="" type="radio"/>	Mail girl takes to stores			800'	Does not return to mailroom
6	<input type="checkbox"/>	In incoming mail-stores				Clerk checks basket every 25-30 min.
7	<input type="checkbox"/>	Checks for completeness and accuracy-clerk				Account, stock number proper unit designation
8	<input checked="" type="radio"/>	Initial, date, stock unit code				
9	<input type="radio"/>	Stores copy No. 8				Copy No. 8 to storeroom See PIS No. 3
10	<input type="checkbox"/>	Mail by clerk				Clerk delivers to Record Office every hour
11	<input checked="" type="radio"/>	Clerk delivers to Record Office				
12	<input type="checkbox"/>	Delayed in Record Office				Max. delay 1 hr
13	<input checked="" type="radio"/>					Record Clerk records Material Control Record and posts
14	<input type="radio"/>	Separate copy No. 2				Copy No. 2 filed See PIS No. 4
15	<input type="checkbox"/>	In outgoing mail				4 pick-ups daily
16	<input checked="" type="radio"/>	To accounting			1000'	
17	<input checked="" type="radio"/>					Cost ledger posted
18	<input type="checkbox"/>	In outgoing mail				
19	<input checked="" type="radio"/>	To stores				
20	<input type="checkbox"/>	In incoming mail				

One of the Procedures Book Charts sold by The Standard Register Company, Inc., Chicago

Compiled by **F. B. P.**

Chart 6.10. Procedure Study Sheet depicting requisition of material.

Process Charts and Diagrams



Flow chart for sale pricing decision.

**ANALYTICAL METHODOLOGY IN  
ADMINISTRATIVE AUTOMATION**

**Introduction of the  
designed system**

## INTRODUCTION OF THE DESIGNED SYSTEM

### Survey of material for courses

1. Information, education and instruction of non-automation staff
2. Organisation and furnishing of the computer room  
- Variables to consider in EDP-installation
3. Conversion of old system into new system.

**Literature**

Variables to Consider in EDP Installation

5.9

	Higher-Level Management	Systems Analysts	Electronics Engineer	Air Conditioning Engineer	Architect	Electrical Engineer	Building Maintenance	Power Company Engineer	Computer Manufacturer Representative	Punched Card Supervisor
Location of computer, general	X	X			X		X			
Allocation of space, changeover problem	X	X					X			
Floor loading		X			X		X			
Getting equipment into building		X			X		X		X	
Floor area		X			X		X		X	
Volume of room		X			X		X		X	
Air conditioning				X	X		X			
Location of temperature and humidity controls			X	X			X		X	
Air inputs and outlets			X	X	X		X		X	
Which areas to air condition	X	X	X	X	X		X		X	
Fire protection	X	X	X	X	X	X	X	X	X	X
Equipment layout		X	X	X	X		X		X	
Layout of cable trenches		X	X	X	X		X		X	
Determining cable lengths		X	X	X	X	X	X		X	
Voltage variations			X			X	X	X	X	
Vibration, location to reduce	X	X	X		X		X		X	
Dust in computer room			X	X			X		X	
Floor material			X	X	X		X		X	
Future expansion of equipment	X	X	X	X	X	X	X	X	X	
Possible shifting of equipment		X	X	X	X		X		X	
Location of personnel, general	X	X			X		X		X	
Programmers and systems analysts		X			X		X		X	
Operators		X			X		X		X	
Supervisor of installation		X			X		X		X	
Secretary-receptionist		X			X		X		X	
Maintenance		X			X		X	X	X	
Location of tape storage vault	X	X		X	X		X		X	
Location of temporary tape storage	X	X	X	X	X		X		X	
Location of maintenance area	X	X		X	X		X		X	
Location of punched card equipment	X	X			X		X		X	
Location of punched card storage	X	X			X		X		X	
Location of paper storage, for printer	X	X		X	X		X		X	
Location of transaction recorders	X	X		X	X		X		X	
Location of typewriters	X	X			X		X		X	

**ANALYTICAL METHODOLOGY IN  
ADMINISTRATIVE AUTOMATION**

Supervision of the  
introduced system

**SUPERVISION OF THE INTRODUCED SYSTEM**

1. Testing of practical efficiency of the introduced system
2. Maintenance of the introduced system
3. Trimming the introduced system



(A. Schinkel, Amsterdam)

Preparatory  
Work with  
Small Groups  
Self-Instruction  
Laboratory

Scientific Professional  
Laboratory and Training

Scientific Professional  
Laboratory and Training



**Preparatory level:**

- Introduction to the field
- Basic concepts and methods
- Laboratory exercises

**Intermediate level:**

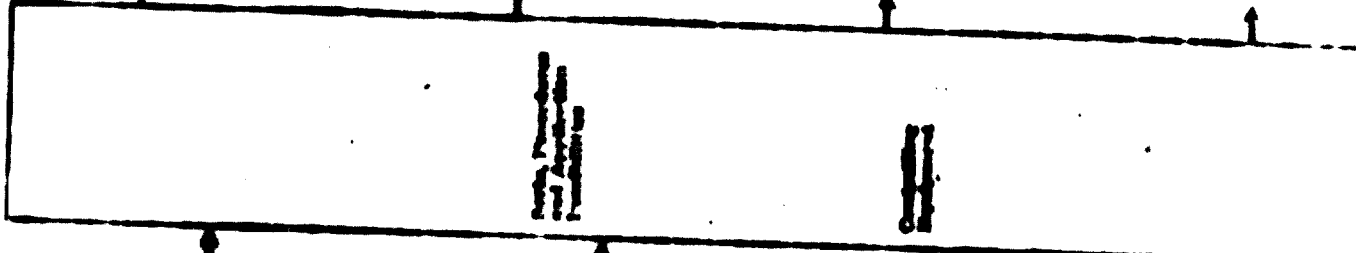
- Introduction to the field
- Basic concepts and methods
- Laboratory exercises

**General knowledge level:**

- Introduction to the field
- Basic concepts and methods
- Laboratory exercises

**Scientific Professional level:**

- Introduction to the field
- Basic concepts and methods
- Laboratory exercises



**Preparatory level:**

- Introduction to the field
- Basic concepts and methods
- Laboratory exercises

**Intermediate level:**

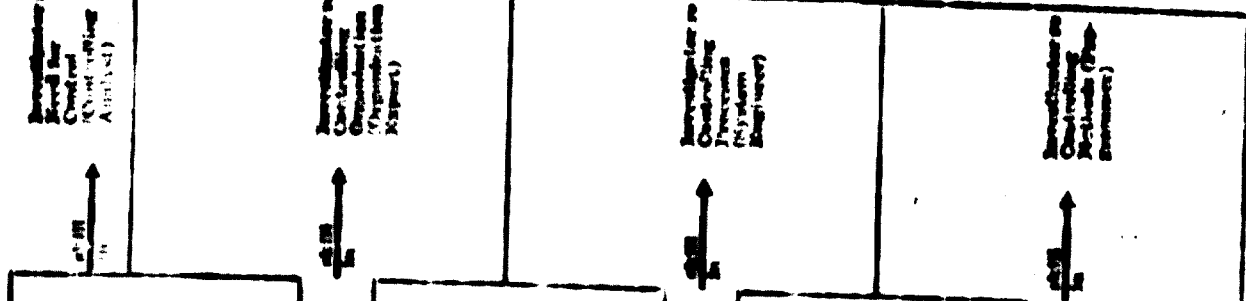
- Introduction to the field
- Basic concepts and methods
- Laboratory exercises

**General knowledge level:**

- Introduction to the field
- Basic concepts and methods
- Laboratory exercises

**Scientific Professional level:**

- Introduction to the field
- Basic concepts and methods
- Laboratory exercises



**Preparatory level:**

- Introduction to the field
- Basic concepts and methods
- Laboratory exercises

**Intermediate level:**

- Introduction to the field
- Basic concepts and methods
- Laboratory exercises

**General knowledge level:**

- Introduction to the field
- Basic concepts and methods
- Laboratory exercises

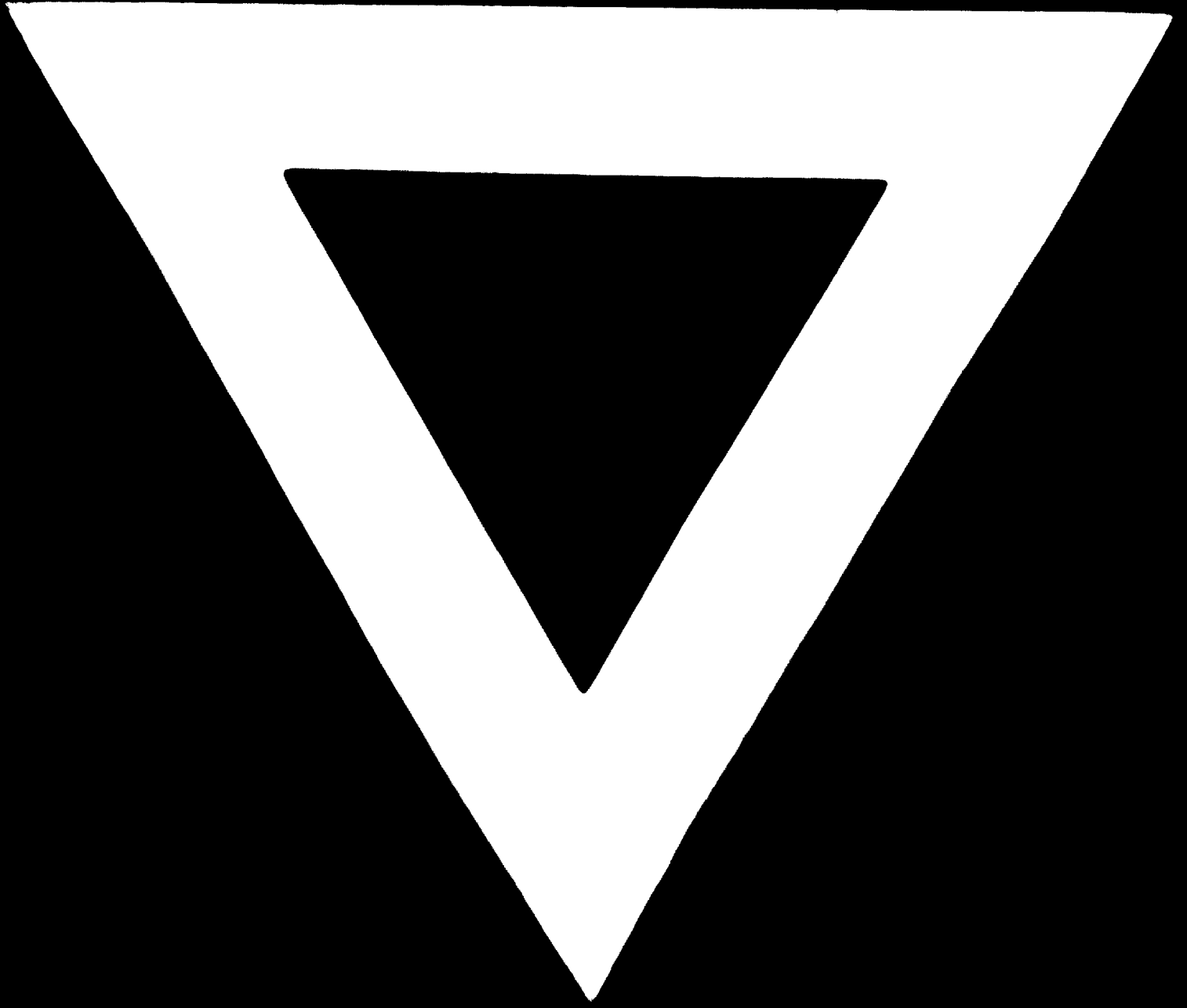
**Scientific Professional level:**

- Introduction to the field
- Basic concepts and methods
- Laboratory exercises

Scientific Professional  
Laboratory and Training

Scientific Professional  
Laboratory and Training

Scientific Professional  
Laboratory and Training



**74 . 10 . 16**