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COMPARISON OF JAPANESE POLYMERIZATION AND VIBRONS

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Chemical Society of Japan
Chemical Fibre Association
Tokyo Japan

presented by

T. Botzung

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United Nations Industrial Development Organization

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23 July 1969
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Interregional Petrochemical Symposium on the
Development of the Petrochemical Industries
in Developing Countries
Leningrad, USSR, 20 - 31 October 1969

PET. SYM. D/4

SUMMARY

COMPETITION BETWEEN POLYESTERS AND NYLONS
AND THEIR FUTURE PROSPECTS 1/

presented
by

T. Nishino

Technical Committee of Japan Chemical Fibres Association

The production of nylon and polyester in Japan in 1968 was about 210,000 tons and 180,000 tons, respectively. Both fibers showed about 20 percent increase annually. Nylon filament, with a remarkable increase, accounted for about 94% of overall nylon production. With polyester, staple fibers in production, in recent years filament has been increasing production and accounts for about 24% of total polyester production.

The production of raw materials for nylon and polyester are based on the petrochemical industry. Their production cost could be expected to be reduced by collaboration with the petrochemical industry. Meanwhile the Japanese producers have been exerting efforts to improve production processes and to utilize new processes. These factors will

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and to possible cost reduction in the production of both fibers. At present, both fibers are produced by melt spinning, but new processes are being developed such as continuous polymerization, direct spinning or high-speed continuous spinning without drawing process.

Nylon has many good properties: excellent dyeability, strength, superiority in elastic recovery and small young's modulus. Polyester has other valuable properties: better blending with other fibers, perfect moisture resistance, excellent wrinkle resistance, high resistance to heat and particular conditions necessary for dyeing.

Nylon is used for industrial materials with a share of about 30% because of its excellent strength. Especially, in the sector of the tire- and nylon is predominant with a share of about 9%. Nylon is also used mainly for apparel and interior materials, as woven or knitted fabrics, especially soft fabrics made with textured yarn.

Polyester is also used widely for apparel and interior materials. Polyester staple is mainly used for various kinds of apparel by blending with other fibers. In recent years, however, polyester filament is used for outerwear because of the unique qualities of its fabrics made with textured yarn. Polyester has presently a small share of industrial materials, but with its excellent properties it is expected to be used much more in this field in the future.

Nylon and polyester are the leaders in the synthetic fields. However, these fibers are being used in different fields because of their unique characteristics. While they are competitive in some fields, as a whole they are expected to develop in the course being complementary to each other because of their properties.

Table 1 Output of Synthetic Fibers in Japan

Unit 1000 tons

Year	Total Synthetic Fiber			Nylon			Polyester		
	F	S	Total	F	S	Total	F	S	Total
1955	7.2	8.5	15.7	5.7	2.4	8.1			
56	12.9	15.9	28.8	10.3	5.0	15.3			
57	20.5	21.3	42.4	16.3	5.8	22.1			
58	23.1	23.0	46.4	19.1	4.0	23.1	0.5	2.5	3.0
59	34.5	48.3	80.8	26.4	4.6	31.0	2.6	11.3	13.9
60	46.7	71.6	118.3	33.7	6.6	40.3	4.5	17.9	22.4
61	62.9	90.2	153.1	42.0	7.5	49.5	9.5	27.3	37.3
62	77.7	105.0	182.7	51.4	6.3	57.7	13.5	33.3	46.3
63	103.6	130.6	239.2	72.0	8.0	80.0	18.3	43.5	62.3
64	160.4	181.9	342.3	109.6	9.5	119.1	27.0	58.6	85.6
65	195.6	214.0	379.6	107.1	10.9	118.0	31.5	64.9	97.4
66	200.1	260.4	460.5	134.2	11.8	146.0	32.0	83.7	120.7
67	256.0	322.0	578.0	174.9	12.7	187.7	48.2	103.7	151.9
68	297.4	383.0	685.4	201.0	13.6	214.6	61.4	120.0	181.4

F: Filament

S: Staple

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry should be supported by a valid receipt or invoice. This ensures transparency and allows for easy verification of the data.

In the second section, the author outlines the various methods used to collect and analyze the data. This includes both manual and automated processes. The goal is to ensure that the data is as accurate and reliable as possible.

The third part of the document provides a detailed breakdown of the results. It shows that there has been a significant increase in sales over the period covered. This is attributed to several factors, including improved marketing strategies and better customer service.

Finally, the document concludes with a series of recommendations for future actions. These include continuing to invest in marketing, improving operational efficiency, and maintaining the high standards of data accuracy that have been established.

Chemical Processes for the Production of Hexahydrobenzoic Acid

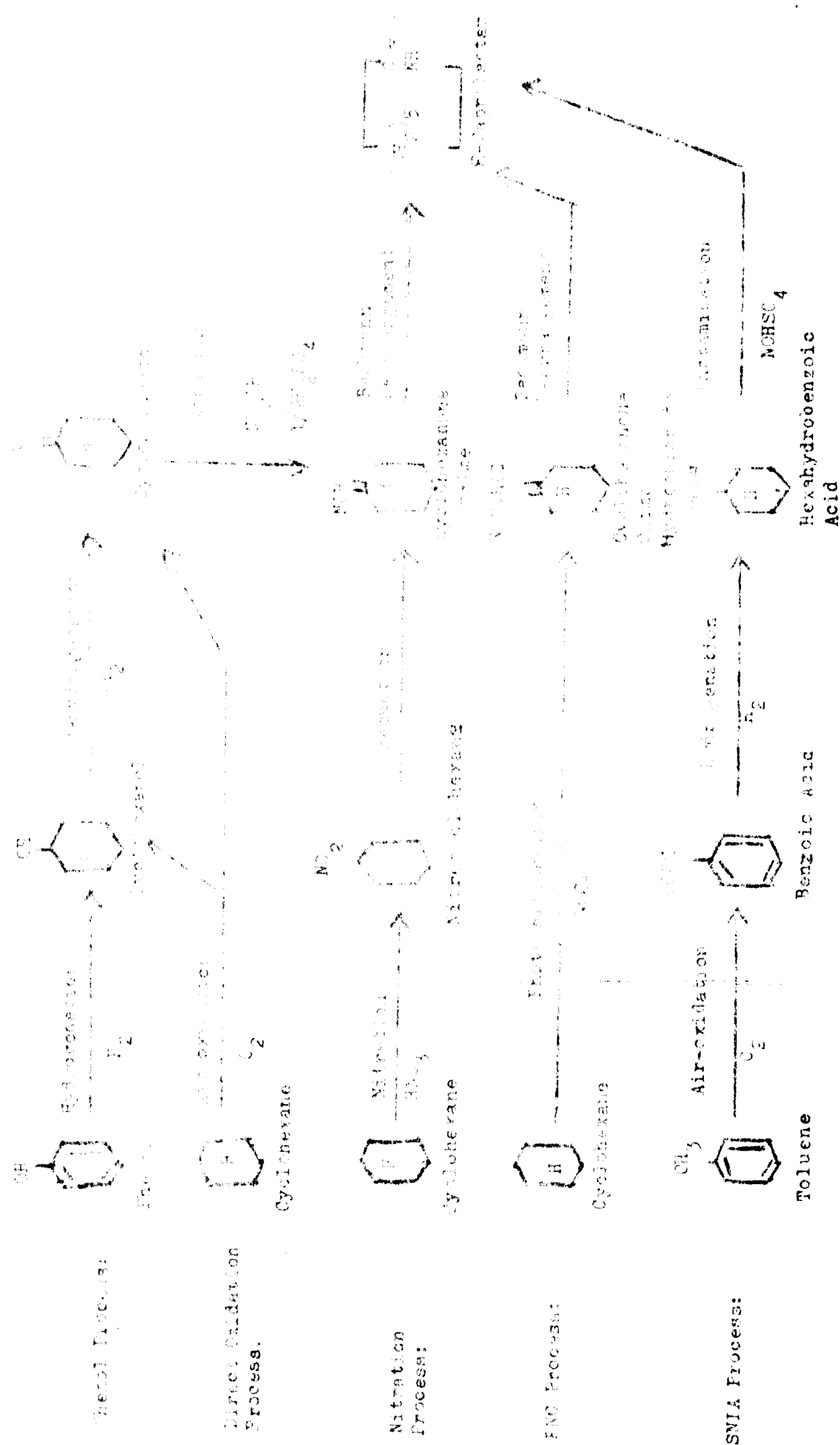
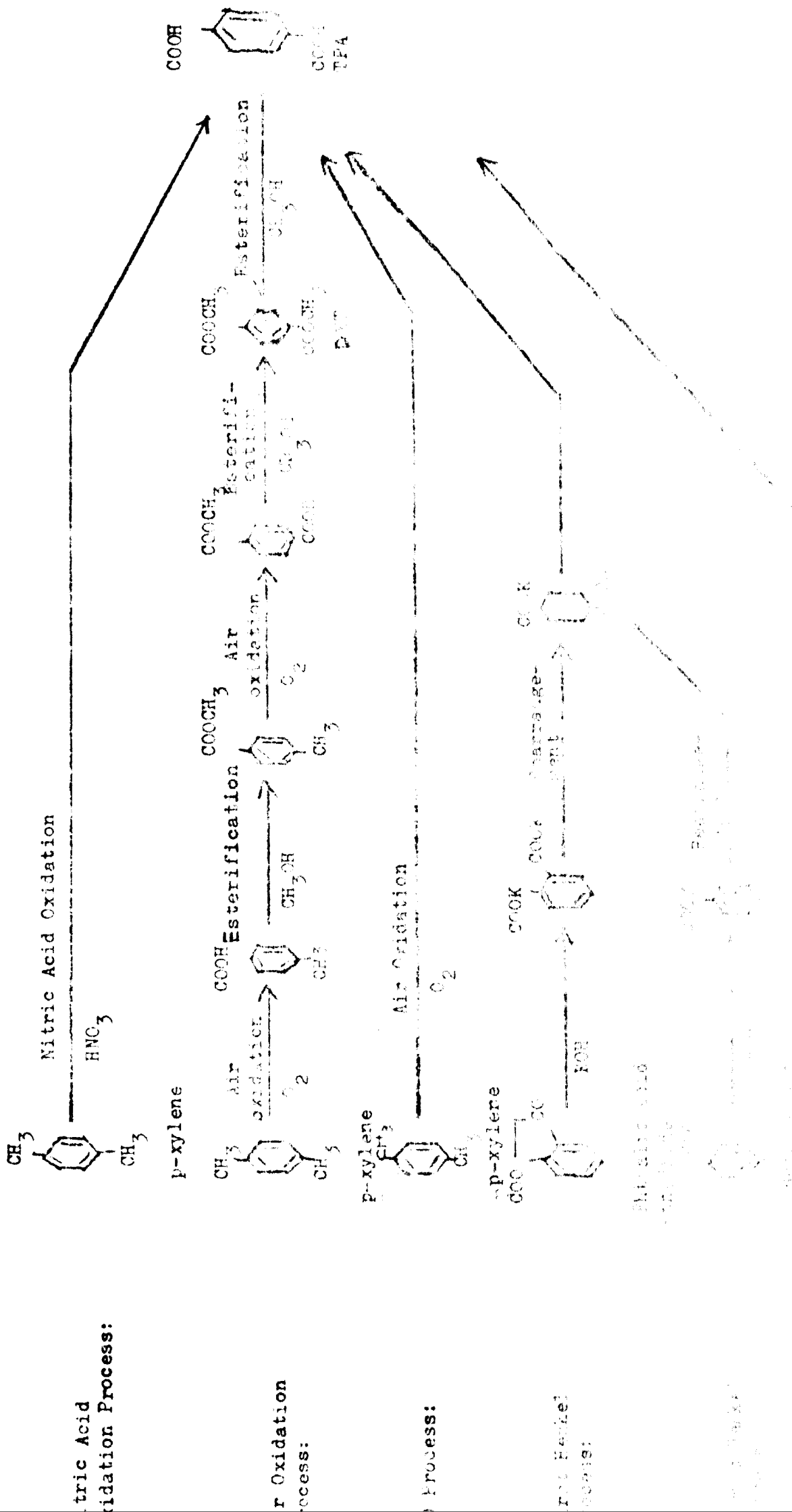


Figure 2 Various Routes to TPA and DMT Synthesis



Nitric Acid Oxidation Process:

Air Oxidation Process:

Air Oxidation Process:

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Air Oxidation Process:

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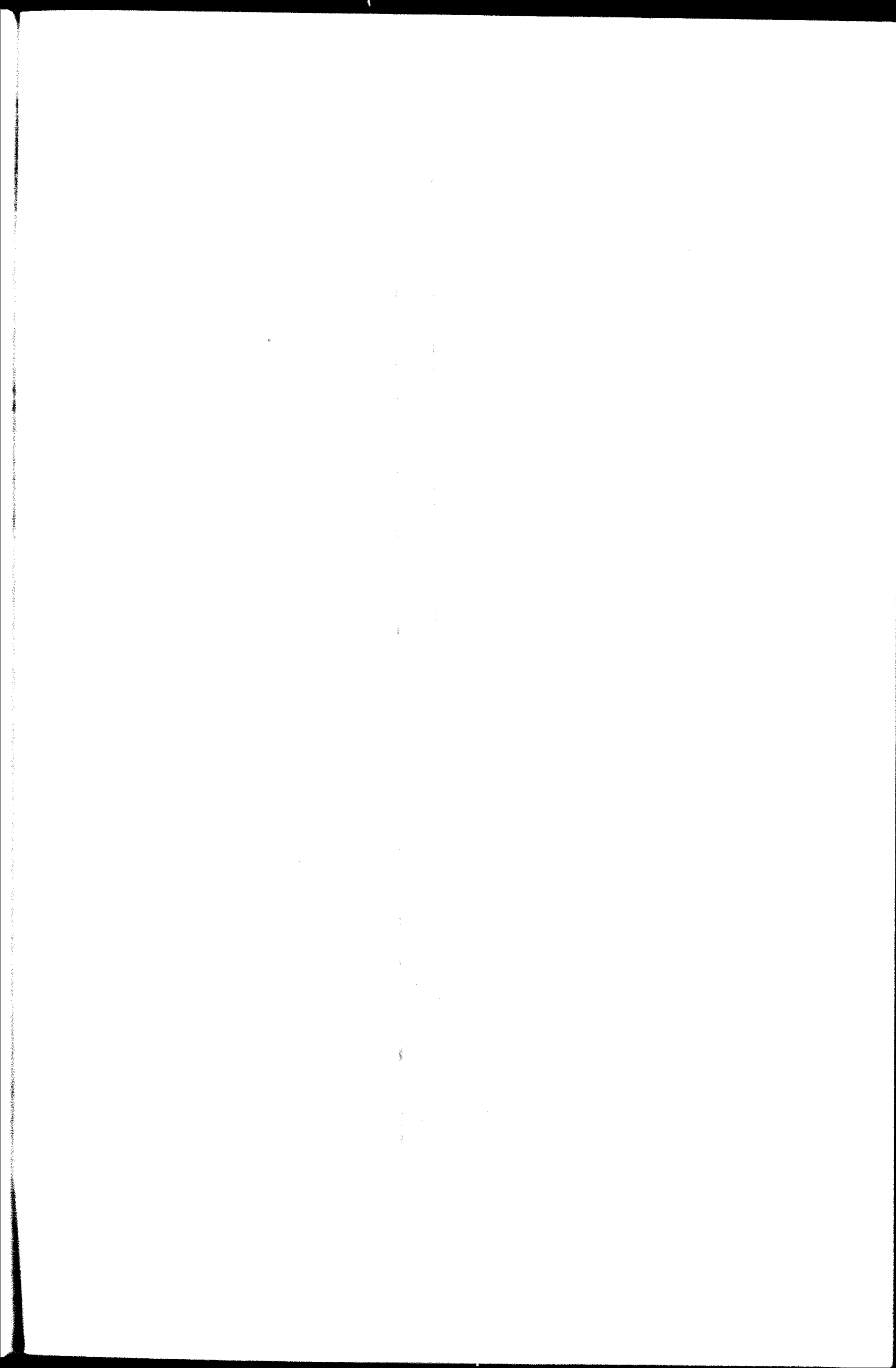
Furthermore, it is noted that the records should be kept in a secure and accessible format. Regular backups are recommended to prevent data loss in the event of a system failure or disaster.

In addition, the document outlines the process for reconciling accounts. This involves comparing the internal records with the bank statements to identify any discrepancies. Any differences should be investigated immediately to determine the cause and corrected accordingly.

The final section of the document provides a summary of the key points discussed. It reiterates the importance of accuracy, security, and regular reconciliation in maintaining reliable financial records.

The document concludes with a statement of intent to implement these practices moving forward. It expresses a commitment to high standards of financial management and transparency.

Finally, the document is signed and dated, indicating the date of completion and the responsible party.



1. Introduction - The first part of the report

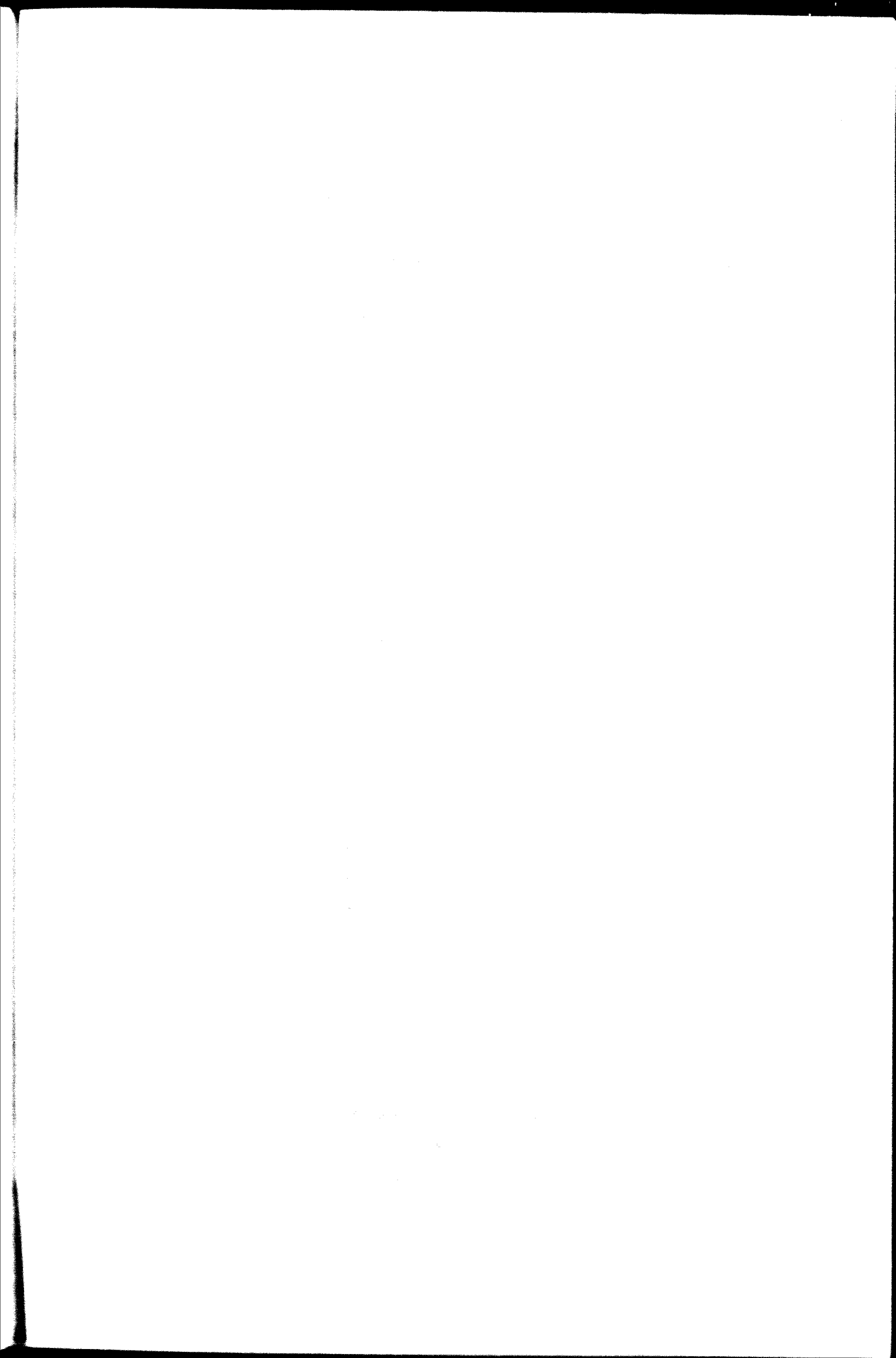
The first part of the report should be a short history of the project. It should include the following information: **purpose of the project**, **scope of the project**, **example**, **methodology**, **theoretical background**, **conclusions**, **recommendations**. The second part of the report should be a detailed description of the project. It should include the following information: **objectives**, **methodology**, **results**, **conclusions**, **recommendations**. The third part of the report should be a summary of the project. It should include the following information: **objectives**, **methodology**, **results**, **conclusions**, **recommendations**.

The fourth part of the report should be a list of references. It should include the following information: **author**, **year**, **title**, **journal**, **volume**, **pages**. The fifth part of the report should be a list of appendices. It should include the following information: **number**, **title**, **description**.

The sixth part of the report should be a list of figures and tables. It should include the following information: **number**, **caption**, **description**. The seventh part of the report should be a list of abbreviations. It should include the following information: **abbreviation**, **full name**.

The eighth part of the report should be a list of symbols. It should include the following information: **symbol**, **description**. The ninth part of the report should be a list of acronyms. It should include the following information: **acronym**, **full name**.

The tenth part of the report should be a list of glossary terms. It should include the following information: **term**, **definition**. The eleventh part of the report should be a list of abbreviations and acronyms. It should include the following information: **abbreviation**, **full name**.



1. The first section of the report

describes the general situation

and the objectives of the study. It also mentions the scope of the section.

The second section deals with the methodology used in the study.

This section includes a description of the data sources and the methods of data collection.

The third section presents the results of the study.

This section contains a detailed analysis of the data and the findings of the study.

The fourth section discusses the implications of the study.

This section provides a critical evaluation of the study and its findings.

The fifth section concludes the report and provides a summary of the main findings.

The following table shows the results of the study.

The data indicates that there is a significant difference between the two groups.

The results are as follows:

The first group showed a higher level of performance than the second group.

This difference was statistically significant at the 5% level.

The reasons for this difference are discussed in the following section.

The study has several limitations, which are discussed below.

Firstly, the sample size was relatively small, which may affect the generalizability of the results.

Secondly, the study was conducted over a short period of time, which may not capture long-term effects.

Despite these limitations, the study provides valuable insights into the topic.

The findings suggest that there are several factors that influence performance.

These factors include motivation, resources, and training.

Further research is needed to explore these factors in more detail.

The following table shows the results of the study.

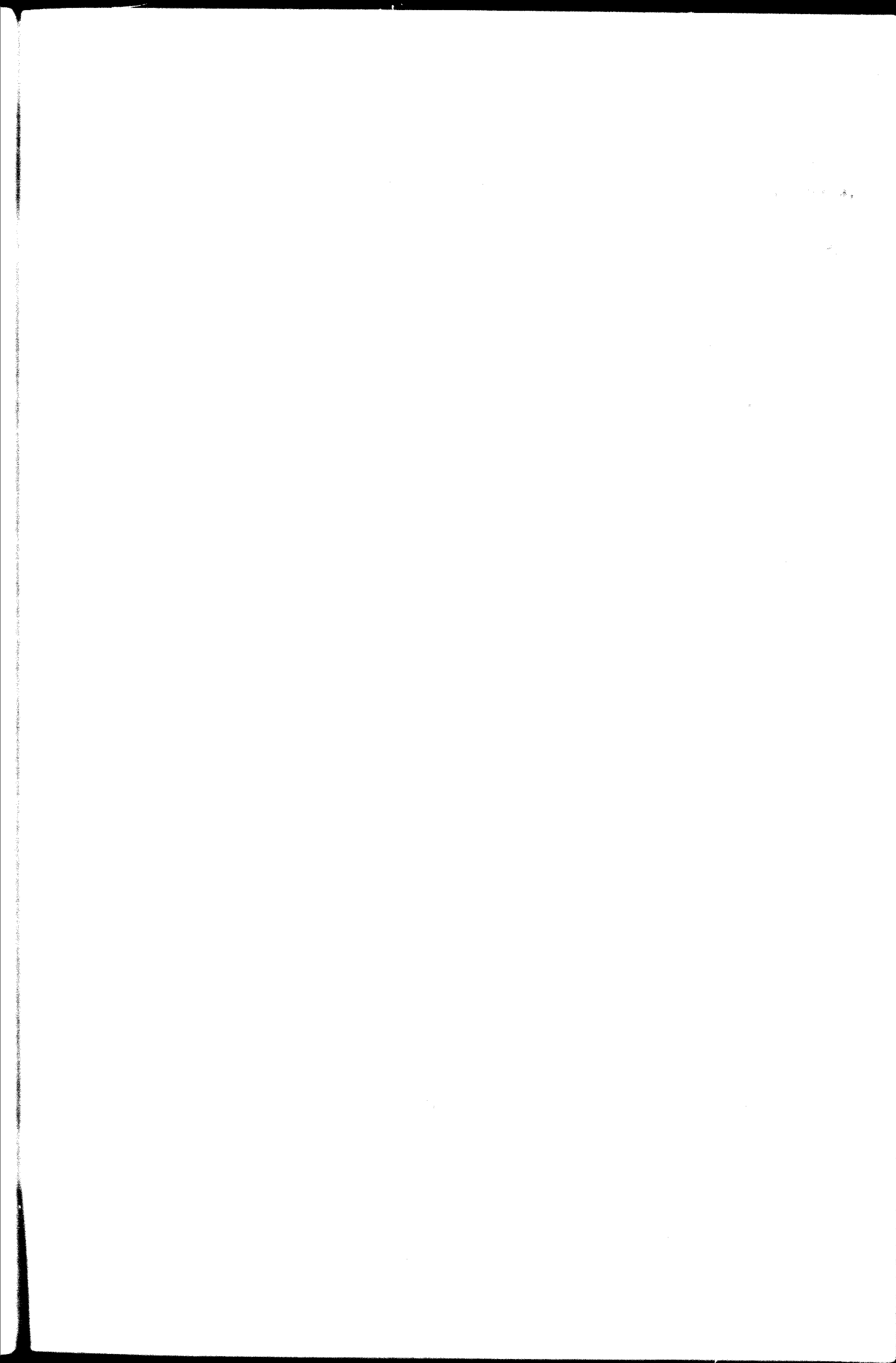
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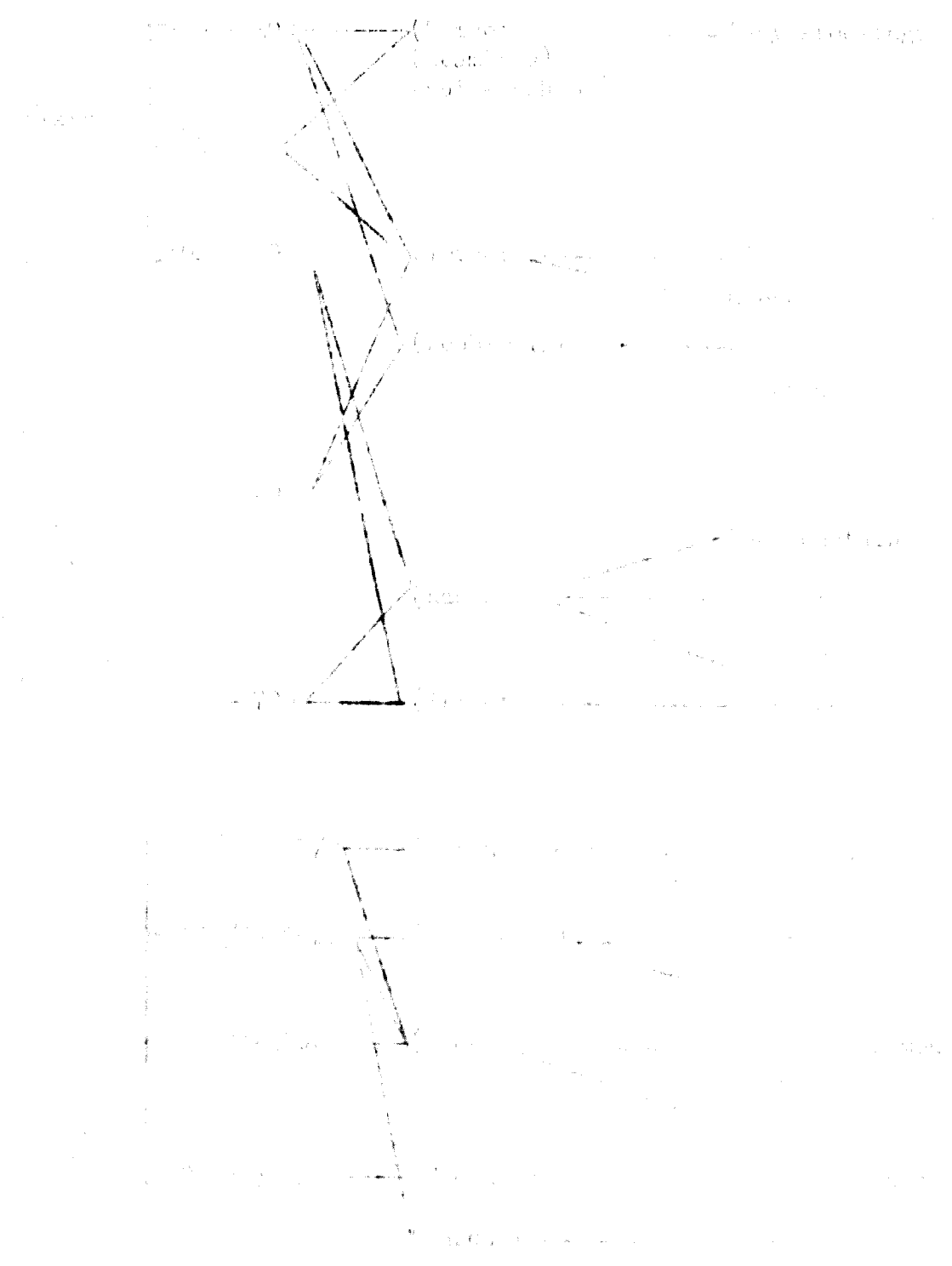
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Fig. 3. Nylon knotting diagram



Non-woven textiles

Blankets, towels and blankets are examples of use.

Examples of use include: upholstery, curtains, carpets, table cloths, bedspreads, floor coverings, and cushions.

Non-woven materials are being used in a wide variety of applications as well. For example, carpets are being made from a wide variety of fibers and are being used in a wide variety of applications. The introduction of new fibers and the further advancement of fibers in these applications.

Industrial applications

Nylon is used in a wide variety of industrial applications for its biggest strength and abrasion resistance. In combination with other properties such as high strength and chemical resistance, it is used in a wide variety of applications including: parachutes, aircraft, and other applications.

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Other applications

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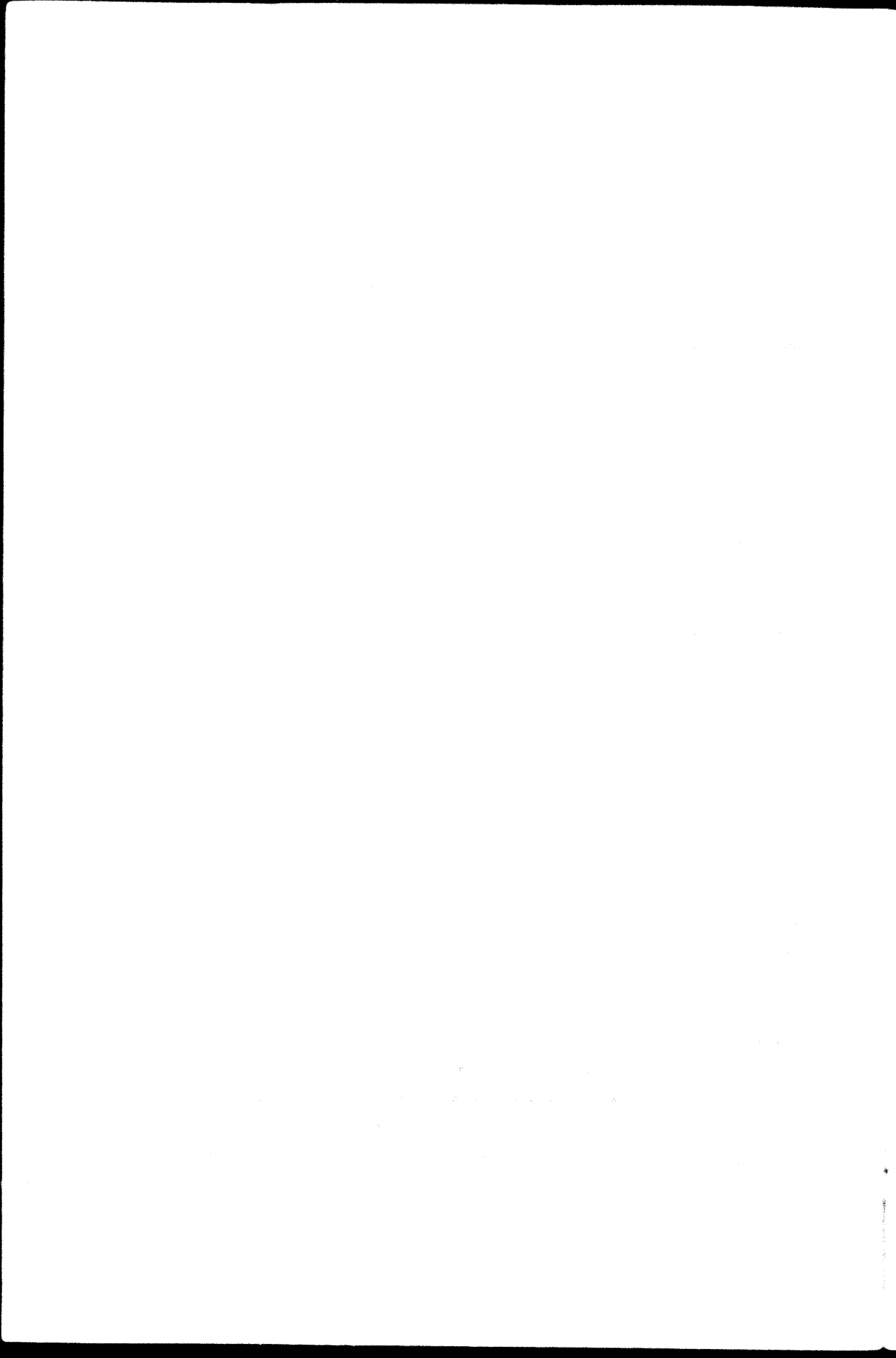
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