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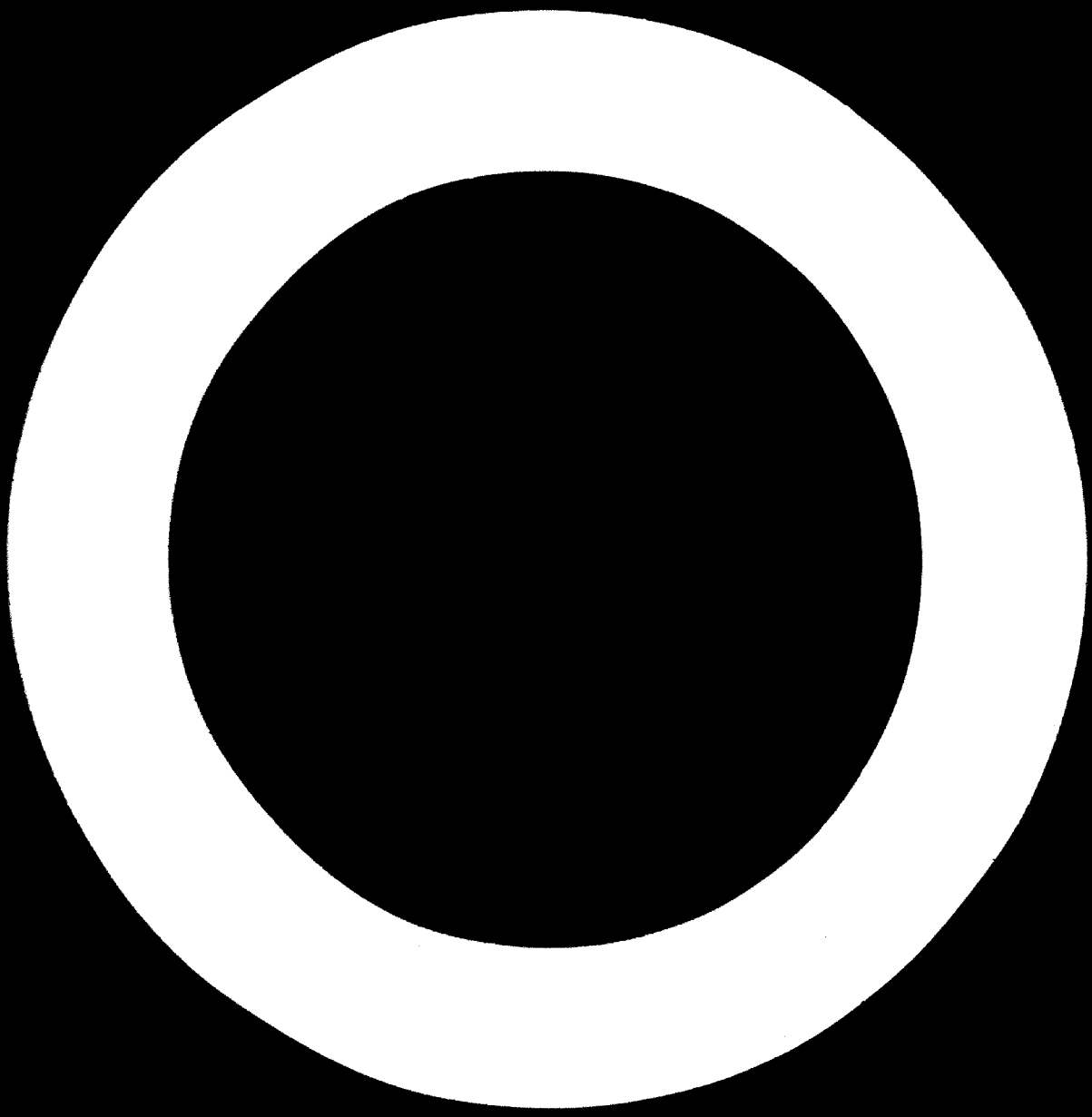
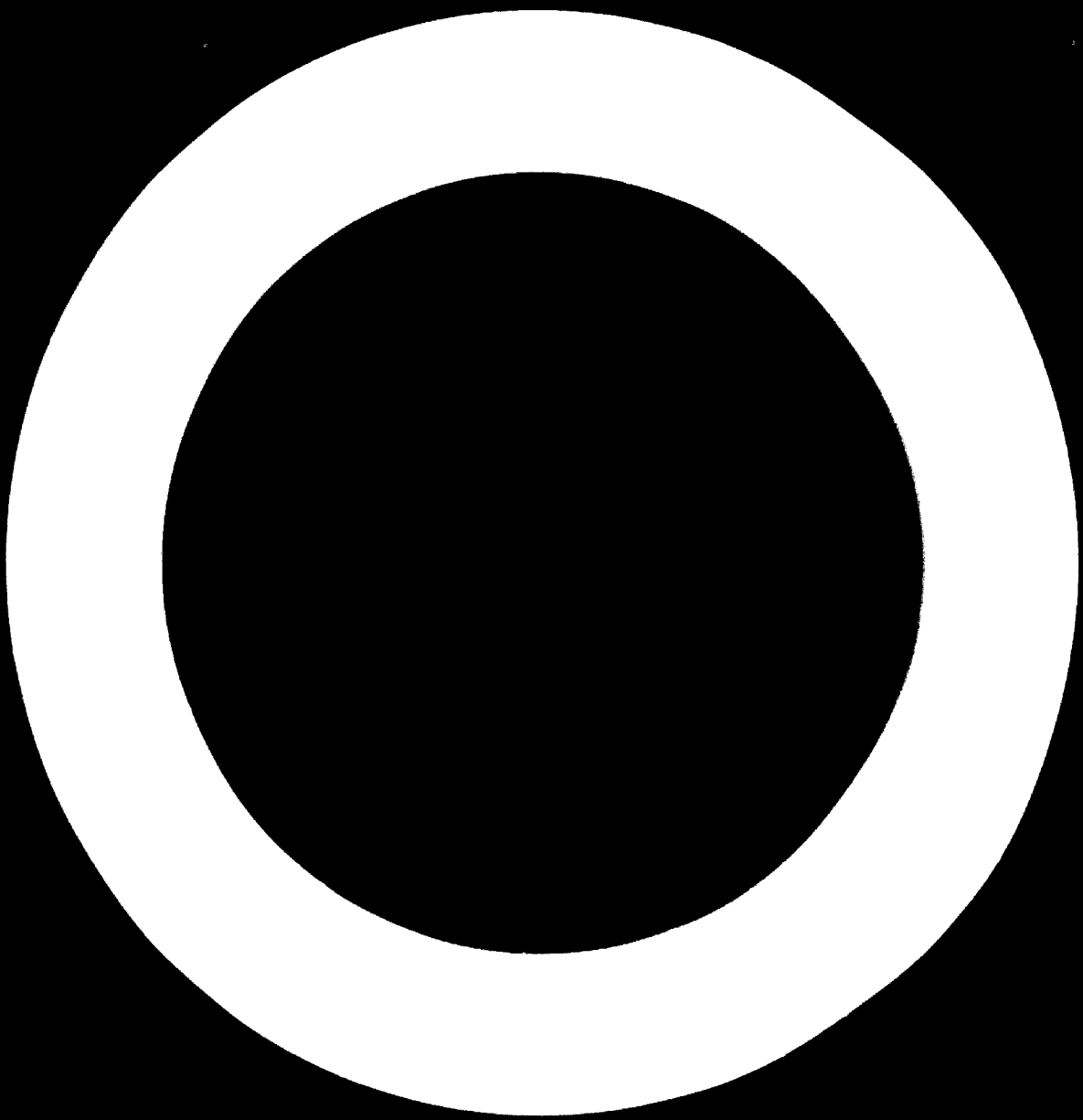
UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

EXCHANGE OF EXPERIENCE IN THE FOUNDRY INDUSTRY BETWEEN SELECTED DEVELOPING COUNTRIES IN SOUTH-EAST ASIA.

Report of a Workshop

Calcutta, Jamshedpur, Ranchi, India
8 – 15 December 1974





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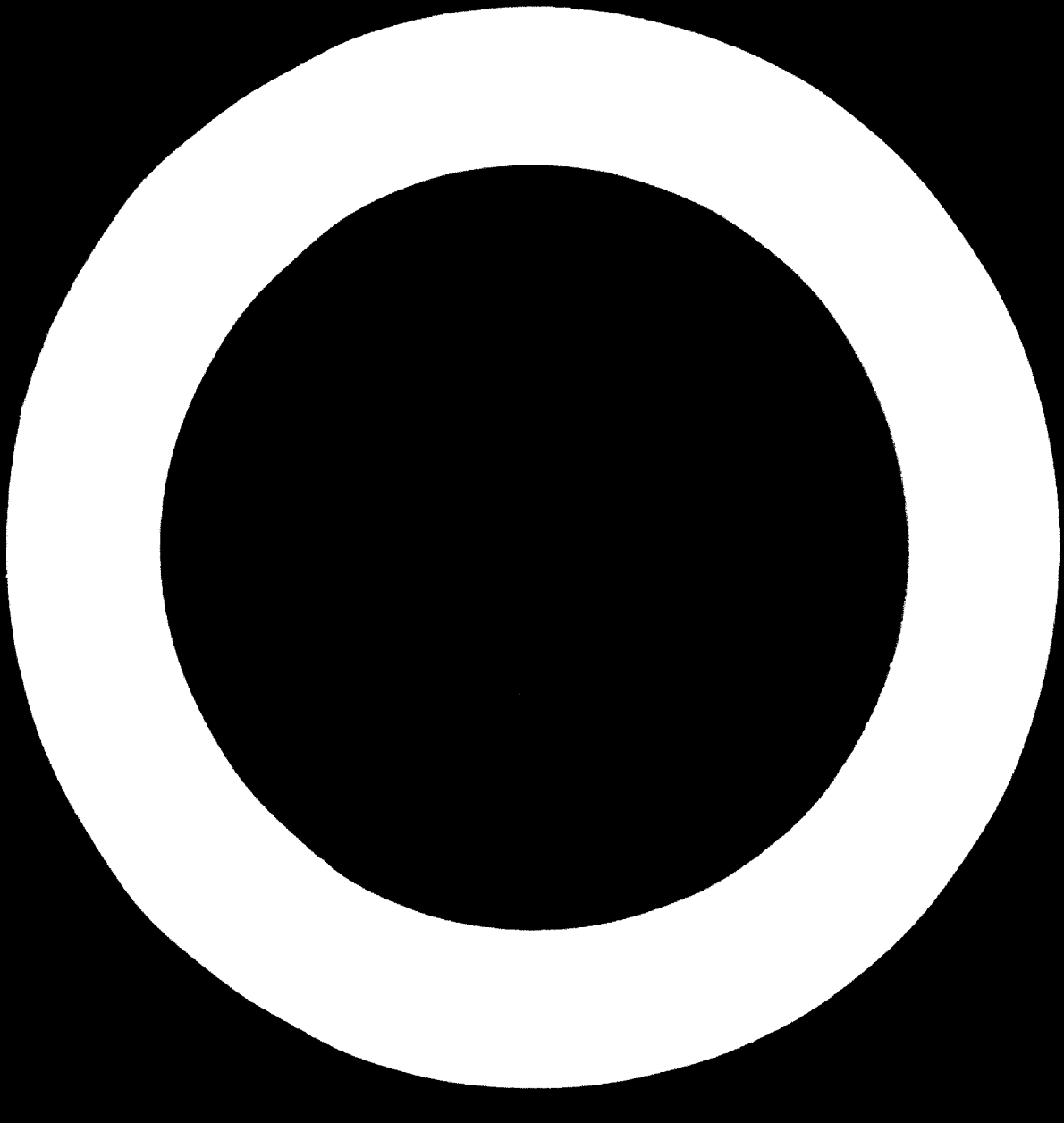

INTRODUCTION

The Workshop on Exchange of Experience in the Foundry Industry between Selected Developing Countries in Asia and the Far East was held at Calcutta, Jamshedpur and Ranchi, India, from 2 to 15 December 1974. The Workshop was organized by the United Nations Industrial Development Organization in co-operation with the Institute of Indian Foundrymen.

The production of castings is important to the industrial development of a country. The manufacture of every machine and each piece of equipment used in transportation, farming, construction, mining and in water-supply and sanitation facilities depends on castings. Most of this equipment cannot continue in operation for long unless the important parts that wear out are replaced. Thus, an effective local means of supplying spare parts is essential. In fact, the organization of a foundry to meet the need for spare parts of simple, basic tools and utensils is the first stage in the growth of a casting industry. The first steps towards the development of a metallurgical industry also usually involve the installation of small foundries that later may grow into larger units with diversified production. One reason for this gradual development is that foundries can be created with a relatively small initial investment. In several developing countries such as India, small foundries have played and continue to play an important role in over-all industrial development.

There are some 6,000 foundries in India. Of these, about 5,000 are registered units in the small-scale sector. Most of the registered small foundries produce predominantly grey-iron castings. Small quantities of malleable iron, steel, copper, and aluminium-based castings are also produced. These small foundries produce approximately one fourth of the total iron castings of the country and thus make a sizable contribution to the local market. Usually local raw materials of average quality are used, and only the minimum basic equipment is installed in these small foundries. Nevertheless, they produce castings of acceptable quality and at a reasonable, competitive cost.

The main purpose of the Workshop was to strengthen the foundry industry in the developing countries of South-East Asia through mutual co-operation and exchange of experience and knowledge.

The participants included foundry operators, designers of equipment and technologists from selected Asian countries. The Workshop was intended to provide them with an opportunity to examine jointly the technical, economic, managerial and institutional aspects of the small-foundry industry in India with a view to identifying favourable technical and economic conditions under which small foundries in their countries should be established or further developed.

A further purpose of the Workshop was to identify projects in developing countries of the region that would benefit from UNIDO technical assistance.

In preparation for the Workshop, a UNIDO consultant from India visited selected representative small foundries in the Calcutta area to collect information and data. On the basis of this information and his own experience, the consultant prepared a case study on the establishment, development and operation of small cast-iron foundries in India. The study concentrated on possible foundry layouts for small units of varying capacities, technological alternatives, furnace design, selection and testing of raw materials, problems of quality control, management and manpower. Typical local conditions affecting foundry operations were given due attention.

The consultant also selected, in close co-operation with the Institute of Indian Foundrymen, a total of 17 foundries, institutions and organizations for the participants to visit in the Calcutta area, Jamshedpur and Ranchi. (Annex I gives the programme of visits.)

As a result of this project, co-operation in the foundry industry between the countries of the region is expected to increase in the form of the establishment of joint ventures with equity participation or other conditions; provision of equipment, designs, technical assistance and expertise; and arrangements for fellowship training.

I. ORGANIZATION OF THE WORKSHOP

On Monday, 9 December 1974, the Workshop was opened at the Park Hotel, Calcutta.

The participants were addressed by A. L. Dias, the Governor of West Bengal, officials of the Institute of Indian Foundrymen and the representative from UNIDO. The participants came from the following countries: Indonesia, 2; Malaysia, 1; Nepal, 2; Philippines, 1; Singapore, 1; Sri Lanka, 2; Thailand, 2 and India, 26. UNIDO and the Economic and Social Commission for Asia and the Pacific (ESCAP) each sent one representative.

Most of the week was spent visiting plants. During these visits the participants exchanged views on technical and economic questions with the management of the plants.

The Workshop ended with discussion sessions held at the National Institute of Foundry and Forge Technology at Ranchi. Opinions, knowledge and experience were exchanged between the foreign participants and the Indian foundrymen. In addition, informal question-and-answer periods dealing with specific technological problems were held.

II. CONCLUSIONS

1. The participants regarded the visits to foundries, plants and institutions in the Calcutta area, Jamshedpur and Ranchi as useful. They observed a variety of operations and levels of technologies co-existing in the foundries visited. The foundries were supplying the local market and in some cases foreign markets with castings. However, it was felt that longer visits with more time for exchanging views would have been desirable.

2. It was noted that in many of the developing countries of Asia, the technological level of the foundry industry, particularly in small foundries, was inadequate. That resulted in poor quality, a high rejection rate, low productivity and a high rate of consumption of raw materials. It was also noted, however, that side by side with such foundries, in most countries some very

modern units using advanced technology existed. There was thus an urgent need to promote the transfer of such technologies from the advanced to the other units, both within a country and among developing countries.

3. Foundrymen in the region felt an urgent need for technical information on new processes and products. Such information was inadequate in most countries. It was noted that a system of technical information had already been initiated at the National Institute of Foundry and Forge Technology (NIFFT) at Ranchi. NIFFT could make arrangements to disseminate pertinent technical information to information centres and foundries in other countries on request.

4. The participants noted during their visits that India had devoted considerable efforts to set up comprehensive training programmes for foundry personnel at NIFFT at Ranchi and at the Central Staff Training and Research Institute at Howrah.

5. It was found that small foundries would need more extensive assistance from all sources of know-how and experience. To set up such foundries required substantial technical skill.

6. Strengthening of the co-operation between foundrymen of developing countries of Asia at all levels was considered to be of great importance.

7. The participants felt that it would be useful to organize similar workshops in the region in the future.

III. RECOMMENDATIONS

1. The operations in small foundries can be successful, provided that laboratory quality control facilities are properly organized and effective. In some cases it would be preferable to establish centralized control and testing laboratories serving several small foundries. Entrepreneurial initiative is essential in this respect.

2. The exchange of information on manufacturers of foundry equipment, on suppliers of foundry raw materials, and on training and research facilities in the region, should be intensified. For this purpose, directories should be issued.

3. UNIDO should consider the compilation of a portfolio of foundry technologies already available in developing countries of the region. Such technologies may be more appropriate to local factor endowment, skills, markets, capital and labour availabilities than those from outside the region. The active promotion of such a portfolio could strengthen co-operation among developing countries.

4. The establishment of national or regional (within a country) institutions designed to provide technical assistance and extension services to local foundries should be stimulated.

5. A co-operative foundry association should be set up in each country to procure foundry materials, process foundry sands and perform various commercial functions. Such self-help efforts may be more effective and prompt than total reliance on government agencies.

6. Greater use should be made of regional training centres for foundry technology; their programmes should be more closely linked with the real needs of the industry.

7. Exchange of information and experience between existing and planned institutes of foundry technology or development centres for the metal industries should be encouraged.

8. Periodic briefing of foundrymen on modern technologies and foundry operations should be intensified. The possibility of developing NIFFT into a regional training institute should be studied further.

9. A special programme to send foundry personnel abroad more frequently to enable them to obtain information on new developments at first hand should be organized. Such travel could accelerate the transfer of technology.

10. For upgrading the technologies of the foundry industry in general and for undertaking specific technical problems, experts are needed. Great care should be taken in selecting experts to ensure that they shall have technical competence as well as experience of work in developing countries. In this connexion, greater use should be made of Asian experts. UNIDO should consider the possibility of using local experts for foundry projects in a particular country.

11. The Government should offer incentives to establish small foundries. These may range from provision of common utilities to financial subsidies and technological services.

12. The establishment of small foundries in industrial estates or regions should be based on scientific regional planning, with appropriate provision of utilities and possibilities for rational expansion in the future.

13. The design of the layout as well as the selection of locations of new foundries should at least provide for inclusion of antipollution devices at a later stage when financial means become available.

14. Working conditions in small foundries should be improved progressively through the introduction of safety measures and mechanization of some of the operations.

15. Centralized processing and supply of raw materials for the needs of the small foundries should be organized where appropriate.

16. Developing countries of the region, should take greater advantage of UNIDO technical assistance to the foundry industry in the stages of planning and operations, which includes assistance in establishing central or regional (within a country) testing and quality control laboratories, foundry development centres; and provision of expert and consulting services for the preparation of feasibility studies, technical project reports, equipment tender specifications, independent evaluation of studies and reports prepared by third parties and for supervision of foundry projects established on a bilateral basis.

17. UNIDO, assisted by its adviser in the transfer of technology at the Economic and Social Commission for Asia and the Pacific (ESCAP), should promote a comprehensive programme in the foundry industry of the region with the purpose of utilizing intercountry funds, which may be made available.

Annex

PROGRAMME OF VISITS

Monday, 9 December 1974	
12.00 noon to 12.45 p.m.	Machinery Manufacturers Corporation Ltd, Calcutta
12.50 p.m. to 1.15 p.m.	Steel Rolling Mills of Hindustan Ltd, Calcutta
3.00 p.m. to 3.40 p.m.	Jay Engineering Works Ltd, Calcutta
Tuesday, 10 December 1974	
8.45 a.m. to 9.15 a.m.	Indo-Japanese Prototype Development and Training Centre, Howrah
9.45 a.m. to 10.15 a.m.	N.G. Chakrabarti Alloy Steels P. Ltd, Howrah
10.15 a.m. to 10.30 a.m.	N.M.L. Field Station, Howrah
10.50 a.m. to 11.15 a.m.	Central Staff Training and Research Institute, Howrah
12.10 p.m. to 12.40 p.m.	Star Iron Works, Liluah, Howrah
12.50 p.m. to 1.20 p.m.	Liluah Iron Works, Liluah, Howrah
3.00 p.m. to 3.45 p.m.	Agarwal Hardware Works P. Ltd, Howrah
Wednesday, 11 December 1974	
9.00 a.m. to 11.30 a.m.	Hindustan Motors Ltd, Uttarpara, West Bengal
12.30 p.m. to 1.30 p.m.	Kusum Engg. Company Ltd, 24-Parganas, West Bengal
3.00 p.m. to 3.30 p.m.	Small Industries Service Institute, Calcutta
Thursday, 12 December 1974	
8.30 a.m. to 12.05 p.m.	Foundry Division of Tata Engg. and Locomotive Co. Ltd, Jamshedpur
2.45 p.m. to 3.45 p.m.	National Metallurgical Laboratory, Jamshedpur
Friday, 13 December 1974	
9.00 a.m. to 12.00 noon	Heavy Engineering Corporation, Ranchi
2.00 p.m. to 3.00 p.m.	National Institute of Foundry and Forge Technology, Ranchi

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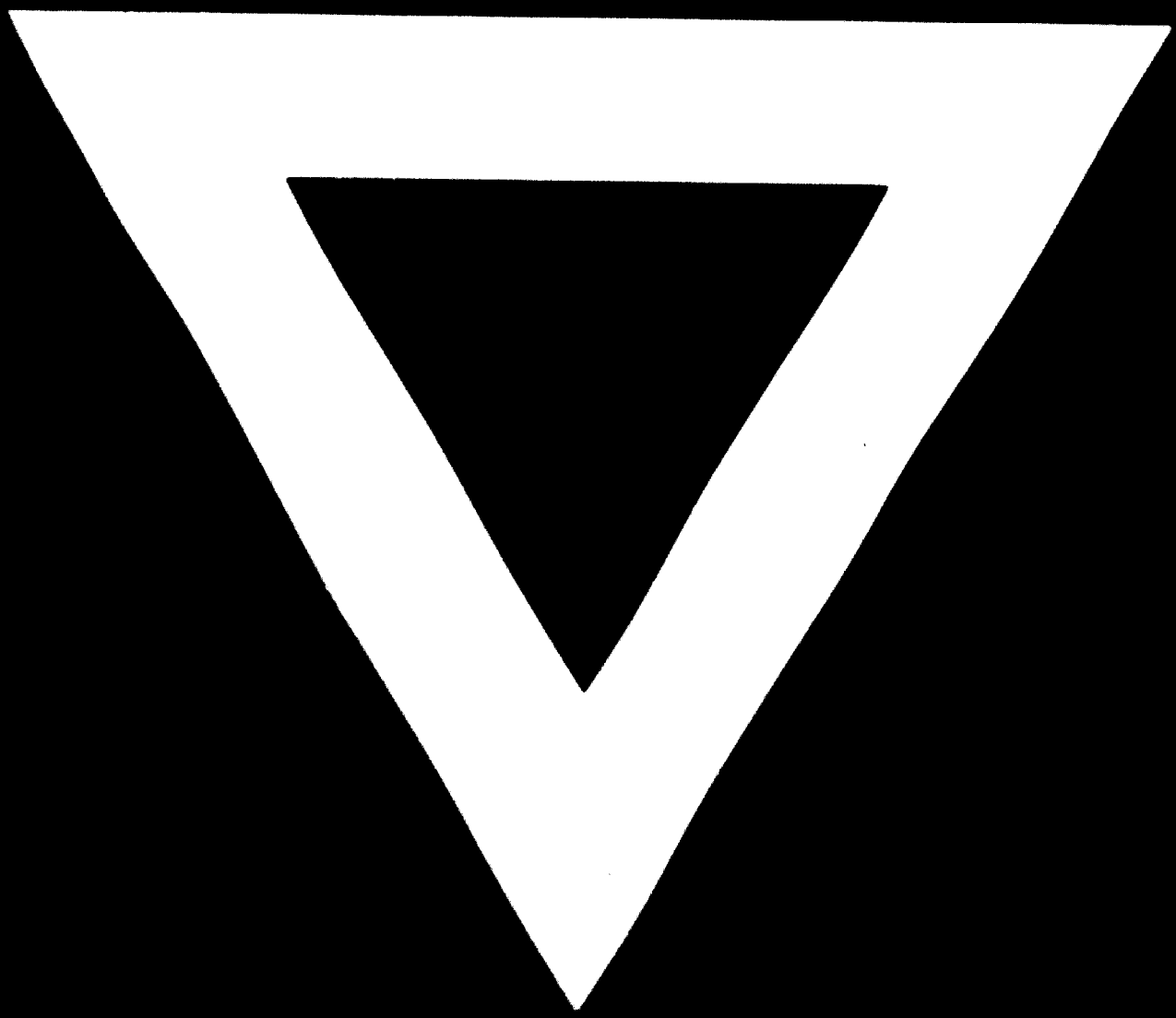

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