



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as "developed", "industrialized" and "developing" are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

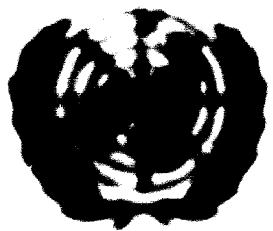
FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

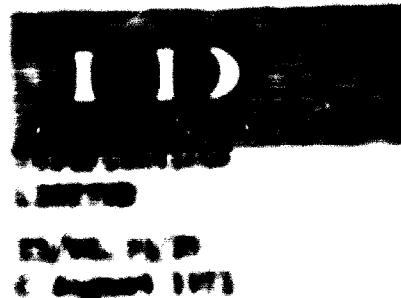
CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org



DO275



[REDACTED] [REDACTED]

[REDACTED]

RECEIVED IN THE
FEDERAL BUREAU OF INVESTIGATION
U.S. DEPARTMENT OF JUSTICE
NEW YORK, NEW YORK, ON AUGUST 11, 1971
BY AGENT, [REDACTED]

SEARCHED INDEXED SERIALIZED FILED
[REDACTED]

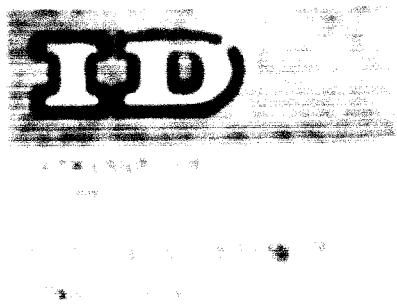
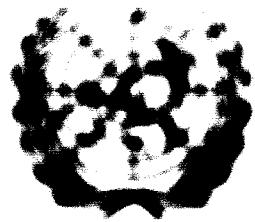
ALL INFORMATION CONTAINED
HEREIN IS UNCLASSIFIED

1. [REDACTED]
2. [REDACTED]
3. [REDACTED]
4. [REDACTED]

ALL INFORMATION CONTAINED
HEREIN IS UNCLASSIFIED
DATE 11/12/01 BY [REDACTED]

67-234-28

We suggest that some of the projects be the size of hole
punches of state report maps and be set in the project
background as demanded, even though the larger panoramic
maps can used for prospecting the smaller holes.

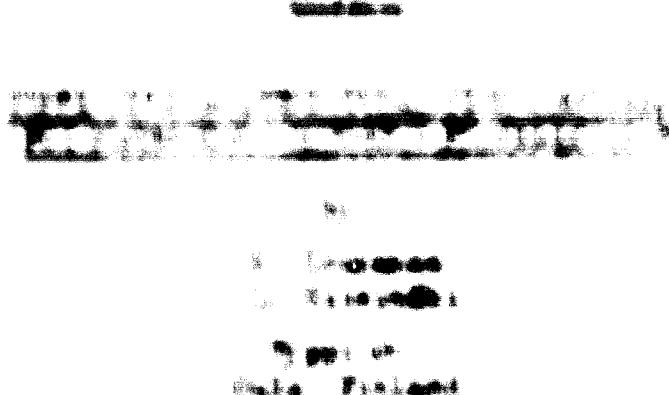


WATER INSOLUBLE INORGANIC OXIDES

Water insoluble inorganic oxides are:

1. Those which are soluble in water.

2. Those which are insoluble in water.



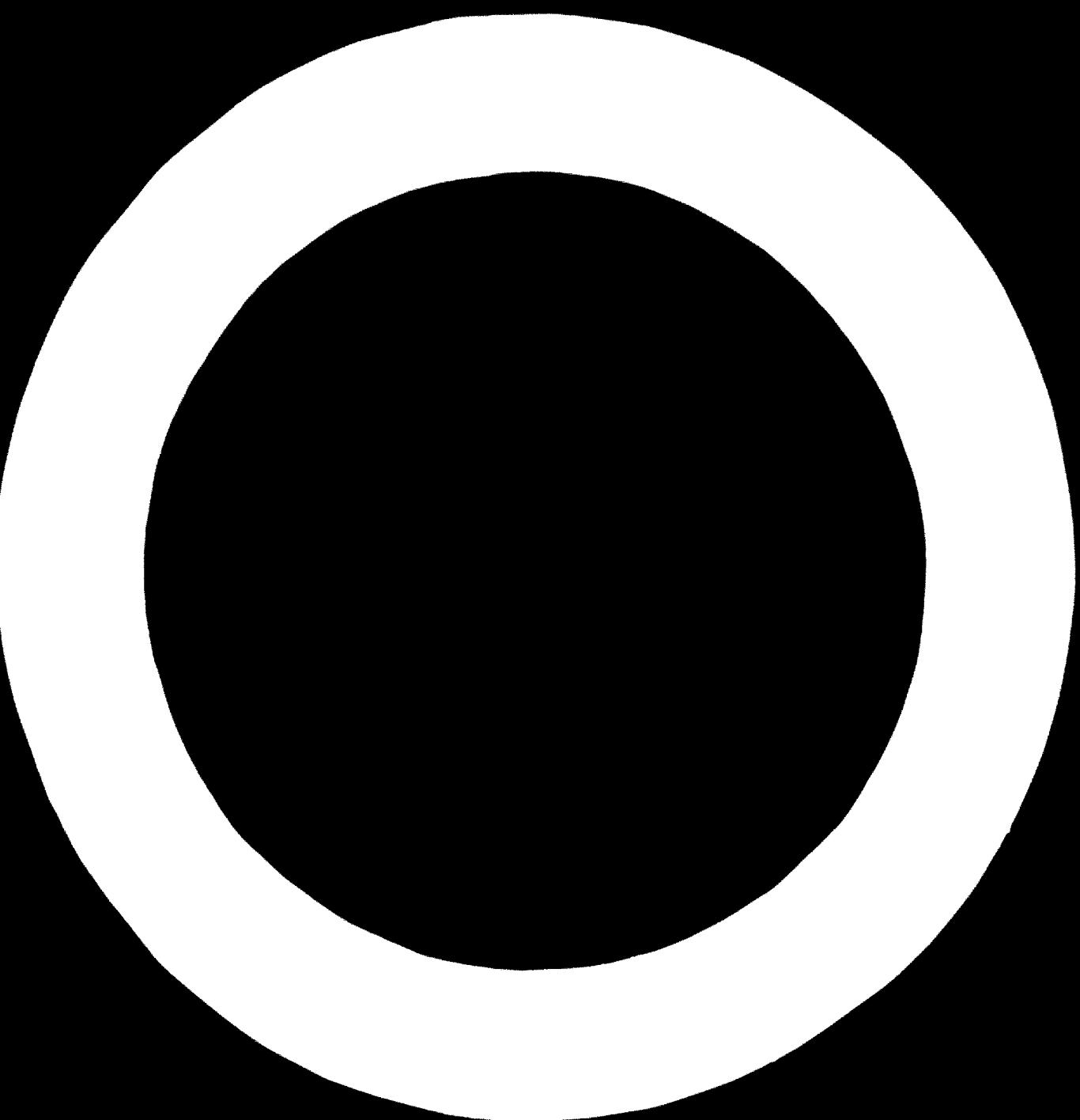
To make the analysis of phosphate rock suitable in view of the fact of the water-insoluble phosphate fraction, this is conveniently done by breaking the mineral structure and transforming tricalcium phosphate into a soluble form by one of the following methods:

- (i) Phosphate rock is added:
- (ii) Water is converted to another compound
- (iii) Water is partially removed as sulphate, sulfate or chloride.

In the solvent extraction process, in contrast, the phosphate itself is extracted as an aqueous salt and remains together with other mineral components which are separated. Thus we principle obtain the production of a fertilizer with high extract content and high water solubility.

Pyrite, the sulphur-containing mineral, can be removed by the use of sodium pyrosulfite by decomposing the pyrosulfite into sulphur and hydrogen sulfide. After removal of the sulphuric acid, the remaining solution is washed with water, and the remaining water will contain a proportion of the calcium, iron and phosphate. The extraction is carried out in a new type

of apparatus which is described in the paper on "The use of the water-soluble phosphate rock and its conversion to the production of the fertilizer".



of steam-generating apparatus developed for this process. In addition interest
in steam-generating apparatus has been shown because it is a good com-
ponent for pharmaceutical and other applications, other examples of the industry may also
utilize steam-generating apparatus. Thus, although the original plan is concerned to some
degree with coal combustion products and ammonia extracts and a plant of this
size is already under construction, the potentialities of steam-generating apparatus and a plant of this
size are limited. The cost of coal and the cost of steam-generating equipment is \$100,000.
The cost of steam-generating equipment will be \$100,000. The cost of steam-generating equipment
and ammonia extracts together with construction of the plant will be after removal of
the basic investment approximately 10 ammonia extracts and ammonia extracts both in very
pure form.

The important characteristics of this process are the high utilization factor of the
products, the high water solubility of the products (90 per cent), high conversion
of phosphorus and nitrogen and by-products which are easily separated. Economically it
has been calculated to be competitive with other fertilizer processes giving the same
quality of products.

This process has until now been used in pilot-plant scale with limestone as
a raw material. Other raw materials are under investigation. Economic figures have
been calculated and are given in the paper.

I. [REDACTED] 1.00
II. [REDACTED] 1.00
III. The Type of Person
The quality of function performed by the type of
individual constituting person 11.00
The two extremes and intermediate cases in the type
of individual [REDACTED] 11.00



I. THERAPY

The first approach can consist of making phosphorus-containing fertilizers more available to plants, and the second, of selecting for plants or varieties which can absorb and/or utilize these compounds and in addition, the second should be utilized, as pure ammonium salts, "ammonium" and its derivatives of inorganic character, "mineral salts". In these forms phosphorus is added to soil solution and may also sufficiently so at least only slowly, available for plants. The task of the fertilizer is to take up calcium. This can be done by various methods. These phosphates must be treated as a fertilizer and suitable dissolution programs to reduce and a plant's availability to use, the supplementation, to be obtained. All the calcium available to the plants, partially as orthophosphate. If more calcium is added to soil, and the calcium is converted to sulphate and phosphate to phosphorus used. This is how the greatest part of the world's phosphorus from plants to produce. Calcium carbonate is then removed from the system and to nearby water. Phosphate will after combination with calcium or other like form the high quality fertilizers.

1. Another approach is to extract the phosphate and use as the base, apart from a slight treatment. Plants do have very valuable components, that is calcium and these are phosphate ions. This calcium is to be converted to calcium carbonate and used because calcium is an extremely soluble phosphate. The calcium can be measured by precipitating and the reduced amount of the phosphate. And after separation a further treatment using calcium extracts, these structures and more calcium phosphate is used in all the available calcium components of the original phosphate can be obtained.

2. All these methods have one major aspect: reduction in either form of removing the phosphate content of the plants together with all other components of the whole phosphate form, which can not convert to insoluble calcium or other in this case the calcium carbonate or phosphate or calcium. This is how we separate calcium phosphate, lime, rock salt and other fertilizers.

3. Of course, phosphate rock is a mineral, and cannot be, without difficulty be broken and it is here the fertilizer is isolated from these phosphate. Once is produced a phosphate rock form, very low phosphate used, but the result of the conversion of lime, which contains the phosphate, another phosphate, and the removal of the lime of the phosphate is to generate lime.

CHAPTER IV

During the course of our work we have been interested in the question of separation and therefore we have made a number of experiments. We have found that there are two main types of separation. There is a physical separation, which is due to the presence of organic material, organic acids, etc., which are soluble in water (and some other solvents). There is also a chemical separation.

The physical separation is the easiest to handle, but it is not so good. If we take an organic acid or a hydrocarbon and mix it with water, the water will dissolve the organic acid and the hydrocarbon will remain, but this is not sufficient to separate the hydrocarbon. To do this we must take part of the liquid in the other layer, dilute the organic acid and add it to the other layer. This other layer may now be separated and taken to the outer, thereby the acid is transferred to the water (because of the lower density), and the other can again be used to repeat again. The same with separation of water and hydrocarbons and this operation can be repeated to give us sufficient separation to be useful.

SEPARATION BY DIFFERENT EXTRACTION. This chapter illustrates the different stages of the separation of water and hydrocarbons by means of organic solvents as described.

One promising organic solvent for a general separation is br. oil emulsion, because it is not a solvent which extracts the component to be separated. It is known that the emulsion does this, because it is immiscible in the water phase, and it readily diffuses from that of the water phase, that it does not react with the water or stage one, because of the organic oil. That, if it is to be used as an emulsifying agent, it must be readily emulsifiable and strong.

Different extraction is a separation method in a readily soluble media and it is used for the separation of components, when no bonds were developed for a very strong bond or strong bond. Organic fuel processes still are one of the best ways of organic separation. These operations separated by organic compounds as an industrial scale can be carbon, aliphatic, aromatic, chloro, carboxylic acid, etc. In the industrial separation of organic structures and their separation has a wide field for a important applications.

So far we have shown our concerned about separation as a separation between two small and two large molecules. Only a few large molecules are readily separable. In addition, however, we are continuing to pursue the use of large molecules in the organic industry. There are as yet being the possibilities of using large molecules in the organic industry. The use of large molecules in the organic industry is a great deal more difficult for the industrial use than smaller molecules.

11. The phosphate which is released from the esterified fatty acids and of which a small proportion is lost by volatilization is used to neutralize the acid and dilute the phosphate to a suitable concentration. Figure 1, illustrates the "Type A" process.

12. *Preparation of Phosphate*

13. In the solvent system it is not an advantage by Type A, phosphate must be dissolved in water first and the insoluble material is separated. The organic layer which contains remaining calcium carbonate, phosphoric acid and citrate must be fed to the first stage of the esterification. From the first passes through the extraction section of the separator. Phosphoric acid and a part of citrate will transfer into the solvent. The organic passing from the extraction section of the apparatus of A contains some calcium and other components from the phosphate must also be fed into the washing section. The solvent is washed with water after the water solution obtained from the separator. From the washing section the organic soluble phosphate containing phosphoric acid and citrate will be retained and also an aqueous phase containing some calcium which is retained with the aqueous phase of the extraction section, which has a constant calcium and carbonate activities and the same part of the aqueous of the phosphate must.

14. The aqueous phase obtained from the extraction is now mixed with ammonia water, a mixture of organic solvent, water and crystals of ammonia phosphate and of ammonia citrate is formed. In addition, an upper layer of nearly pure organic solvent and a lower layer of ammonia phosphate and an ammonia citrate slurry (Batholite) are obtained. If the two separation of the phases the solvent is recycled to the extraction section. From the Batholite a small amount of solvent is recovered by the distillation and recycled. The Batholite is transferred to the crystallization unit and from here to the production of fertilizers. The constant content of an PTK-fertilizer produced by the Type A solvent extraction method is 10.0% and for the corresponding PTK-fertilizer the calcium content is 10.0% and the overall efficiency of the phosphate is about 99 %.

15. The aqueous phase obtained from the extraction is neutralized with ammonia and the calcium carbonate in this phase is recovered by filtration. The calcium carbonate which has been recovered is converted to ammonia carbonate by carbon dioxide and ammonia. The ammonia carbonate solution is used for the precipitation of ammonia by lime to form the calcium carbonate.

16. The calcium carbonate is converted to lime and added to the batholite, which is re-

13. The early research work on Typex by and to a U.S. Patent Application Serial No. 2,312,625, entitled "Method of Separating Phenols from Aromatic Hydrocarbons," is a record of the early efforts, with little industrial utilization recommended. As a result of the early work and our later experience, we have found three different extraction processes - one which fits the particularities of each product. In addition, extraction processes are available for the production of each product. In addition, however, no complete separation of solvent from the two acids is to be had by either processes, for there are considerable losses.

14. The choice of solvents to date is a most important factor in determining the new solvent extraction processes. The solvents mostly used for extracting the phenolic acid from either coal tar or coke have been benzene and xylene. These alcohols, however, react rather violently with acetone and if the acetone and acetate acids are present acetone is oxidized to carbon dioxide at high temperatures. Typex by has been isolated from acetone, but has failed to use benzene, xylene, and, acetone, because it decomposes only very slowly under the conditions prevailing in the extraction process.

15. Different factors have a strong influence on the process economy and Typex by has carried out a very thorough investigation as regards the process and amount of solvent losses. In the solvent extraction process of Typex by the solvent losses have been eliminated by optimizing the process conditions. The dominant factor in rendering good process economy has been the fact that about 75% of the cycling solvent is separated by gravitational forces and only a little part is recovered by distillation.

THE ANALYSIS OF TYPTEX BY PREPARED IN THE DUREX & MURRAY LABORATORY

16. The main part of the research and development work has been carried out using halo-alkalis. It has, however, been verified that this process can also be used for long-chain alkylates. Using halo-alkalis as raw material a portion of the analytical data of which are given in Table I.

17. Table I) The analytical composition of the products obtained by the Typex by extraction process.

Extraction method	Extraction solvent	% Acids	% Acetone
1	S	26.9	24.0
2	S	24.1	17.0
3	S	2.9	11.0
4	S	26.7	26.0
5	S	23.1	26.0
6	C	22.0	2.17

The results were obtained consistently from a very high nutrient content and also the water availability of plantations so high, about 10 L/m² per year, the water requirement was probably to unity or larger, which is due to different properties. The productivity on 100% fertilizer application can be added as production estimate and a relationship with the composition on NPK 10-10-10 is obtained.

<http://www.jstor.org>

The essential nature of the extension method has been thoroughly examined and the nature of other autoxidative processes.

11. Final total consumption figure for a probability of 1 in 1000:
 2,400 on 60% completion of first collection, calculated as 100 £.

Indigofera	(20-61,9)	0,440	100
Indigofera	varia 100 g	0,314	"
Amorpha		0,267	"
Pithecellobium	(20-54,2)	0,190	"
Croton elatifer		0,160	"
Trapa	1,1 kg	0,073	"
Trapa	1,1 kg	0,017	"
Blattaria		30	100
Pond		30	100
Small leg. water		20	100
Prunus	water	0,1	"
Agave		0,1	"

13. The investment for a plant will be greater than figures mentioned before by 100 million US dollars.

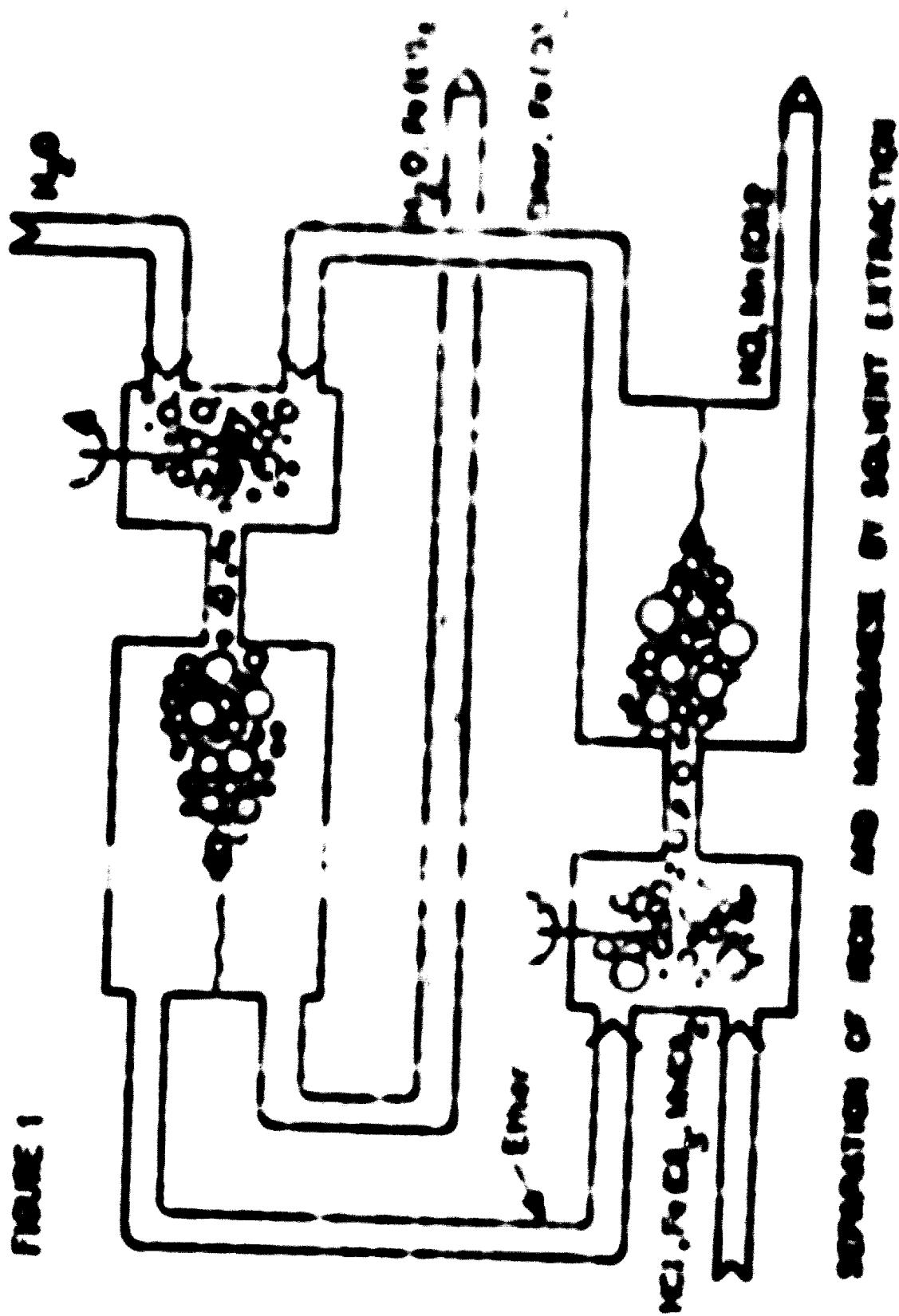
14. The cost of the production equipment is about 1000 tons P₂O₅ in a factory. This, more often 1000-1500 tons P₂O₅ per day, so investment costs about 100 million US dollars. Production costs per ton of compound phosphate are estimated. Daily production of these factories is 10.

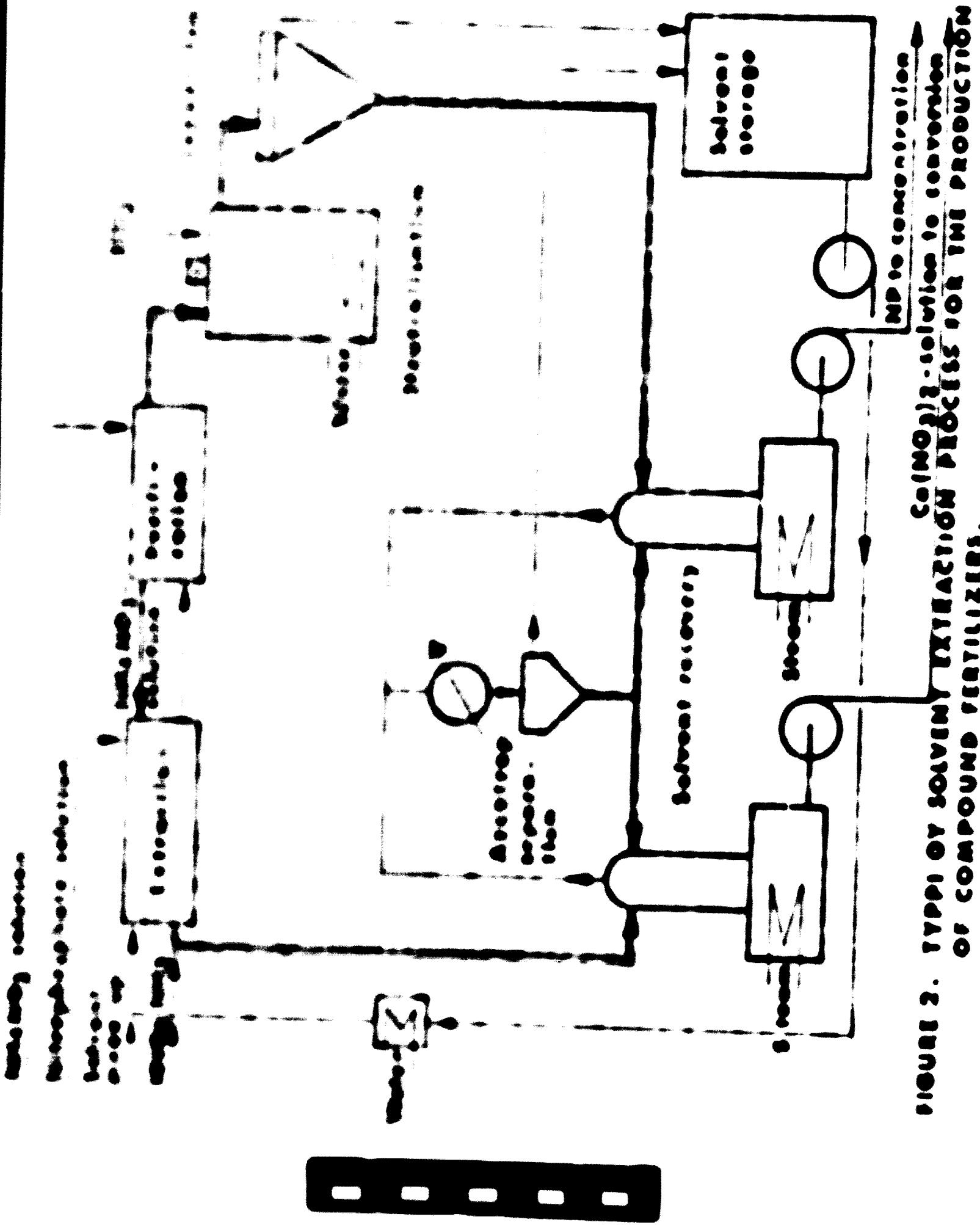
15. Investment costs 100-150 million US dollars.

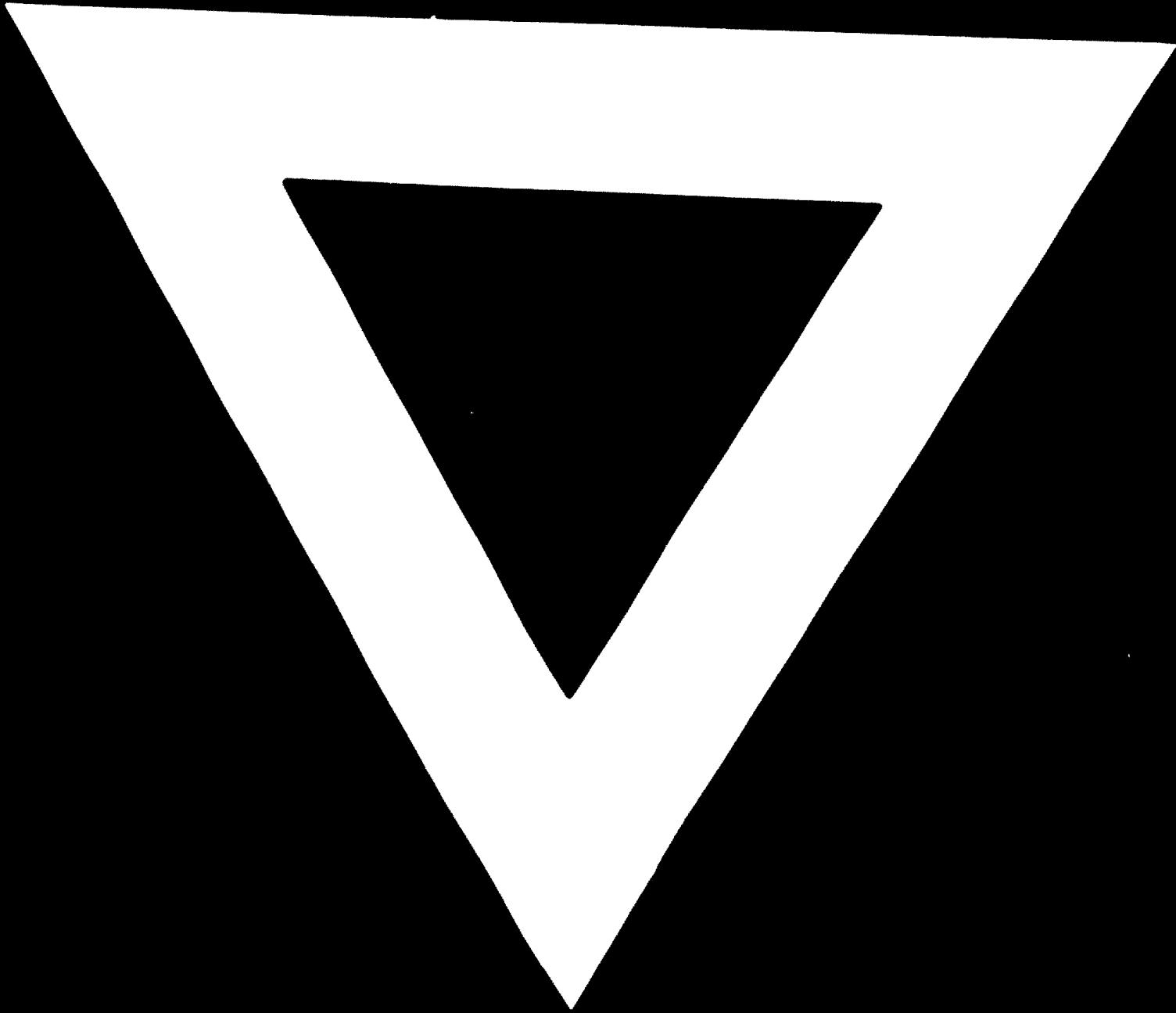
16. Investment costs 100 million US dollars, construction cost 100 million US dollars.

17. This process has as its main advantages the high quality of the products, and recovery of the components phosphorus and nitrogen and also byproducts such as fluorine and the savings of energy. Also these aditives used to save energy available than anhydrous and this process is preferable. The possible use of homograde phosphate rock may also be one of the main advantages of this process. Current estimation taking a new technology for fertilizer production it offers many new promises for the future, which until now have not been fully exploited.

FIGURE 1







10. 2. 72