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# CONSTRUCTION OF A FULLY AUTOMATED SULPHURIC ACID FACTORY

Submitted by the Government of France

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* Since the Government has submitted a very short paper, it is treated for purposes of reproduction and distribution as a summary paper and will be distributed in English, French, Spanish and Russian.

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# CONSTRUCTION OF A FULLY AUTOMATED SULPHURIC ACID FACTORY

It is of course not possible to expect a small country in the course of industrialization to be able to manufacture locally the basic chemicals it may require. However, the possibility of setting up small manufacturing units under viable economic conditions should not be dismissed out of hand. The example described below is a unit making sulphuric acid from sulphur built to meet a need for only four tons per day.

Profitability studies made jointly by French experts and local technicians trained in French schools showed that imported sulphuric acid would be expensive in view of the amortization of the investment in the large stocks which would have to be held locally in order to ensure some flexibility in supply.

It was found that it would be much cheaper to import and stock sulphur. The company technicians therefore decided to manufacture the sulphuric acid they needed, five tons per day, primarily to secure some freedom of action, but also because they realized that such an essential manufacture as sulphuric acid could not but be beneficial to the country's industrial potential. They applied to an engineering company which had already constructed a great many very large sulphuric acid manufacturing units.

This company adapted the system used in the largest factories in the world to construct what was quite certainly one of the smallest (this would not, of course, have been justifiable in a highly industrialized country because of the low capacity required).

Briefly speaking, a sulphuric acid manufacturing unit in which the sulphur is burned to produce sulphur dioxide, converted into sulphur trioxide and finally hydrated to give highly concentrated sulphuric acid looks like a small conventional petrochemical unit, with its stacks, heat exchangers, pipe-racks, control and regulating instruments (for temperature, levels, etc.).

The engineering company considered it particularly appropriate that the plant should be as automated as possible because of its small capacity, and hence its low thermal inertia, as well as the special operating conditions to which it was subject, the only manual work being the introduction of the sulphur into the melter designed to ensure the fusion of the sulphur before combustion. But thereafter there would be nothing more to do - the figures for regulating the operation having been posted up beforehand - except to watch the sulphuric acid flow out, completely pure and limpid.

The unit was therefore designed and constructed in France and sent out in separate parts to be assembled in the manufacturing complex in which it was to be incorporated.

Local staff under minimum supervision assembled the unit there and set it in operation; it was willing staff, who had only to be taught a few notions of modern technology; a valve, a pump, a temperature gauge were complete novelties which they easily assimilated after being given the necessary explanations. And, by and large, it took no longer to build the unit and put it into operation than it does in our parts: six months.

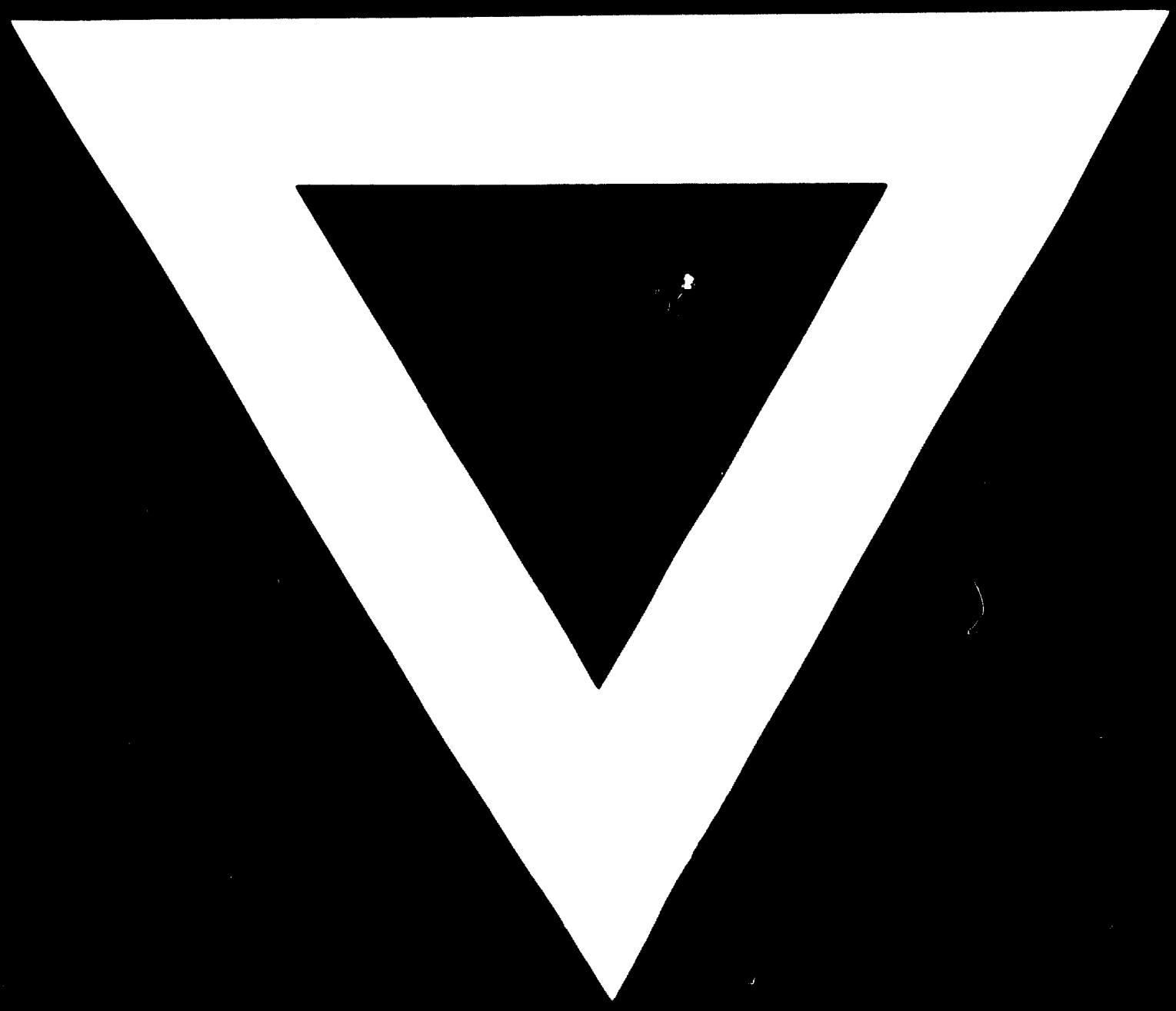
Immediately after the first sulphuric acid was produced, the local technicians took full charge of the plant at the foreman level as well as at the level of the operators responsible for the active supervision of the shop twenty-four hours out of twenty-four (a unit of this type practically never stops). And not only did they rapidly become familiar with the elementary notions of starting, regulation and stopping, but they readily came to have a complete grasp of the broad outlines of the manufacturing process.

Automation undoubtedly simplified the operator's task and its advantage was that it compelled the local technicians specializing in control and regulation to acquire the notions of electricity, electronics and pneumatic regulation essential for the correct regulation and running repairs of the machines.

Most of the European technicians went home, leaving the installations in perfect running order.

Correspondence was frequently exchanged at regular intervals between technicians of the operating company and the engineering company which had installed the plant.

Six years after the unit started operation, the shop is working satisfactorily, initial performance has been improved and expansion is under consideration.



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