INDEX - MICROFILM REEL 191
(Original designation Navy 5851-2)

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51A Pocket handbook of processes, equipment layout, flow diagrams, and building layouts of the Böhlen plant. Buildings 18-65, as follows:

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	36	61-64	Storage for foaming agents.
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	37		Flow diagram gasometer.
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51B Pocket handbook of processes, equipment layout, flow diagrams, and building layouts of the Böhlen plant. Buildings 1 - 16, as follows:

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2-4	1	Oxygen production plant - list of equipment.
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6	1	Flow diagram.
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	11	3-4	List of equipment
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	16-17	7	Contact plant. List of equipment.
	18	7	Plan layout.
	19	9	Compressors - list of equipment.
	20	11	Vacuum plant. List of equipment.
	21-23	9	CO_2 purification. List of equipment.
	24-25	9	CO purification. List of equipment.
	26	9	Layout plan.
	27	9	Flow diagram - CO_2 scrubbers.
	28	10	CO_2 gas holder.
	29	11	Pump house. List of equipment.
	30	11	Vacuum pump. List of equipment.
	31-32	11	Contact plant. List of equipment.
	33	11	Layout plan.
	34	11	Flow diagram of liquor & pressure lines.
	35	11	Flow diagram of contact plant.
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	40	12	Alkazid plant. Layout plan.
	41	12	Alkazid plant - flow diagram.
	42	13	Claus plant. List of equipment.
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	45-48	15	Dephenolization plant. List of Equipment.
	49	15	Plan layout.
	50	15	Flow diagram of phenol distillation.
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	52-53	16	Tar separator. List of equipment.
	54	16	Tar separator. Layout plan.
	55	16	Tar separator. Flow diagram.

52A Pocket handbook of processes, equipment layout, flow diagrams, and building layouts of the "Zeitz" plant, as follows:

Page	Bldg.	
1	1	Oxygen plant - flow diagram.
2-7	1	Oxygen plant. List of equipment.
8	3/57	Water gas plant. Layout plan.
9-20		Winkler water gas plant - list of equipment.
21	6	Disulfurization plant. Plan layout.
22	7	Pump house. Layout plan.
23	7	Hydrogenation plant. Layout plan.
24	7	Hydrogenation plant. Section B-B; and C-C.
25-29	7	Hydrogenation plant. List of equipment.
30	9	Gas compressors.

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52A cont'd.	31	9	Gas compresors – basement.
	32	9	Gas compressors – Section A-B.
	33-38	9	List of equipment.
	39	11	Injector pumps, layout plan.
	40-45	11	List of equipment.
	46	11	Injector pumps, layout plan.
	47-49	11	List of equipment.
	50	14	Hydrogen sulfide gas holder.
	51-55	16	Tar separator; treatment of foul oil, etc. List of equipment.
	56	17	Tar storage tank – layout plan.
	57-58	17	List of equipment.
	59	18	T.T.H. chamber – layout plan.
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	61-63	18/19	List of equipment.
	64	19	Gas-phase chamber; layout plan.
	65-66	19	Gas-phase chamber; list of equipment.
	67-69	21	Pump house & misc. List of equipment.
	70	23	Distillation plant. Plan layout.
	71-72	23	Distillation plant. List of equipment.
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52B Pocket handbook of processes, equipment layout; flow diagrams, and building layouts of the "Zeitz" plant. Buildings 31-98, as follows:

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1-3	31/32	Benzin storage tank. List of equipment.
4	33/35	Diesel oil storage tank. List of equipment
5	36	Work room. Plan layout of ground floor.
6	38	Nitrogen gas holder. List of equipment.
7	40	Store room.
8-10	48	CO and CO_2 plant. Plan layout.
11-18	48	CO and CO_2 plant. List of equipment.
19	54	Water filter plant. Layout plan.
20	54	Water plant – pump house. Layout plan.
21	54	Water plant – pure water receiver. Layout plan.
22	55	Settling tank. Layout plan.
23-30	54/55	List of equipment.
31	57	Bunkers, screening, and pulverizing plant.
32-35	57	List of equipment.
36-38	58	Water purification plant.
39-43	65	Waste water treatment. List of equipment.
44	67	Water purification plant.
45	70	Water works. Layout plan.
46	90	Power station.
47-71	89/90	Power station. List of equipment and products used, analyses of fuel.

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53 Plant rules and regulations for personnel of the Ammoniakwerk Merseburg, Leuna Works. 50 page booklet.

54 Cloth back photostat of piping diagram of gas products obtained from hydrogenation process. Status of Dec. 15, 1940. No. 1782(22) Ammoniakwerke Merseburg.

55 Not reproduced.

56 A 6 page letter in English dated April 23, 1945, from Dr. Wulff, Buna-Werke, to Captain Pullen of the U. S. Army enclosing four statements as follows:

(1) Capacity of production of Buna Werk Schkopau plant:
   (a) Before the first air raid;
   (b) Estimated capacity of plant in its present condition;
   (c) Estimated capacity of plant without supply of electric current from outside.
(2) Products and quantities which are required per month in case (c) and naming also the factories and places where they were manufactured so far.
(3) List of stacks of raw materials on hand with details on how long they will last in case (c).
(4) Stacks of finished products on hand.

57 Processes used at Buna-Werk Schkopau. About 100 pages. Dates range from 1937 to 1939.

A rough draft probably used by some of the superintendents of the German plant at Schkopau as a ready reference in connection with plant operation. It is separated into seven portions, as follows:

(1) Acetylene manufacture.

A description is given of the various constituent phases of the manufacture of acetylene such as storage for raw materials, preparation of acetylene, purification and compression of acetylene, etc. The procedure for making acetylene seems to be the conventional process. The annual capacity of acetylene is 60 million cubic meters per year. The carbon monoxide produced as a by-product is purified and stored in a gas holder. Acetaldehyde is formed by contact with mercury salt solution of sulphuric acid and iron sulphate. The acetaldehyde is purified by distillation to remove water, crotonaldehyde and acetylene. Considerable care has been taken to protect against fire and explosion hazard and all places where explosion might occur are blanketed with nitrogen gas. In addition, special care is taken to insure protection against lightening.

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(2) Calcium carbide manufacture.

The raw materials used in the production of calcium carbide are limestone, coke, and anthracite. The process described is conventional insofar as can be determined. Some conception of the size of the unit may be obtained by the statement made that each electrode weighs 80 tons. In this section there are appended three plans, B2285, showing schematically the layout of the plant.

(3) Chlorine and sodium hydroxide.

This process is the conventional electrolytic decomposition of salt solution. The crude salt is first purified by the addition of barium salts to remove calcium sulphate, calcium chloride, magnesium sulphate, and magnesium chloride. Approximately 36,000 tons of rock salt are used per year. The electrolysis takes place in 160 mercury cells, each having a capacity of 1200 amperes. The chlorine is water washed and passed through a packed tower using sulphuric acid. The dried chlorine is compressed. The sodium hydroxide solution is not purified but is sent to other plants. The hydrogen gas, obtained as a by-product, is stored in a gas holder.

(4) Ethylene oxide and related side reaction materials.

Ethylene of 95% purity is used. Ethylene is reacted with chlorine and water to form a 5% solution of ethylene chlorohydrin. At the same time, small quantities of ethylene chloride and dichlordiethylether are formed. The ethylene chlorohydrin is saponified with lime and is converted to ethylene oxide which is distilled off, together with the ethylene chloride and dichlordiethylether. Conversion of ethylene oxide to diethylene glycol and side reaction products such as tri and tetraethylene glycol is effected by pressure synthesis and subsequent purification by distillation. Ethylene oxide under a blanket of nitrogen is dissolved in water and compressed in a reaction chamber to 20 atmospheres pressure. The ethylene oxide reacts with the water to form glycol and one molecule of glycol reacts with other glycol molecules to form diethylene glycol. The product is vacuum distilled and fractionated. There are appended a number of flow charts, one of them showing the formation of ethylene chlorohydrine and the various steps in the purification thereof. Another portion of this same sketch, L1oo67-2, shows the flow chart of the ethylene oxide apparatus. Another chart, L1767-16, shows schematically the raw materials required, and the products and by-products made in preparation of ethylene oxide.

(5) Preparation of phthalic anhydride.

Phthalic anhydride is prepared by oxidating naphthalene vapor with air, care being taken to insure that the mixture is below the explosion range. The phthalic anhydride is sublimed and melted. Impurities in the formation of phthalic anhydride are inert dust, malleic acid, benzoic acid, and phthalic acid.

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(6) Preparation of styrene.

Benzene and ethylene are condensed to a raw ethyl benzene. This raw ethyl benzene is purified to remove unreacted benzene and diethyl benzene. The diethyl benzene reacts with additional quantities of benzene under the influence of catalysts to form additional quantities of ethyl benzene. The purified ethyl benzene is vaporized and is converted at a temperature of 500°C. into styrene. The styrene is distilled to remove unreacted ethyl benzene. The process is divided into the alkylization, ethyl benzol distillation, the conversion by catalysts) of ethyl benzene is styrene, and the purification of styrene. The catalyst used in the synthesis of ethyl benzene is not mentioned except that it is stated to be sensitive to moisture. The reaction is carried out in enameled jacketed towers. The ethyl benzene is dried with solid caustic soda. In the pre-preparation of the styrene, a by-product is formed which is merely called "furnace oil," probably resembling a heavy diesel oil. The description of the distillation and contact equipment reveals nothing unusual or novel.

Preparation of aldol.

Acetaldehyde is compressed and contacted with a liquid catalyst, the nature of which is not revealed. The reaction is interrupted by neutralization with small quantities of mineral acid. The inorganic salt thus formed is removed in a centrifuge. It is to be noted that the reaction chamber is stated to be made of aluminum. The butylene glycol is prepared by hydrogenation of aldol and subsequent hydrogenation of raw butylene glycol and acetaldehyde. The aldol is hydrogenated in a mixture of hydrogen and nitrogen at 300 atmospheres pressure. As stated before, the nature of the solid catalyst is not revealed. The temperature ranges between 80 and 200 degrees Centigrade. The high pressure reaction chambers are clad with copper and one of them is clad with special steel designated as V4H. The reaction chambers are 500 mm. wide and 18 meters long. The raw butylene glycol resulting from the aldol hydrogenation is put in a stirring apparatus and is neutralized with sodium hydroxide and the resulting mass is distilled. Considerable detail is given of the re-cycling procedure and separation of the by-products.

(7) Preparation of vinyl chloride.

Acetylene dried with solid caustic soda is brought in contact with dry gaseous hydrochloric acid. The resulting vinylchloride distills at 13.5°C. The liquid vinylchloride is transferred from storage tanks protected with nitrogen to tank cars for shipment elsewhere.

The apparent reason for the lack of details as to catalysts is probably due to the fact that these documents were ostensibly prepared for personnel who are primarily interested in safety from the standpoint of explosion, fire hazard, and other non-chemical interests