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CENTRAL INTELLIGENCE AGENCY

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THE SOURCE EVALUATIONS IN THIS REPORT ARE DEFINITIVE.
THE APPRAISAL OF CONTENT IS TENTATIVE.
(FOR KEY SEE REVERSE)

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The following changes should be made:

a. Lisskhimstroi, paragraph 3, should read Liskhimstroy.
b. Reinfahrt should read Reynfart throughout.
c. Tittkov should read Titkov throughout.
d. Fodimann, paragraph 5, should read Fodiman.
e. Voroshzov, paragraph 5, should read Vorozov.
f. Ministry of Chemistry, page 2, should read Ministry of Chemical Industry.

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C O N F I D E N T I A L

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THIS IS UNEVALUATED INFORMATION

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INTRODUCTION

1. 50X1-HUM

At no time, however, was there a definite statement or explanation to the German specialists of the exact organization or relationship of the Khimkombinat to the rest of Soviet industry.

C O N F I D E N T I A L

ORGANIZATION OF THE CHEMICAL COMBINE

2. The production between 1946 and 1951 consisted of:

   a. Preparation of intermediates for azo dyes and naphthol AS products, perhaps also the preparation of individual azo dyes.

   b. Preparation of vat dyes, their starting materials and intermediates.

The Combine was under the Ministry of Chemistry in Moscow. 50X1-HUM group, up to about June 1947, was directly under the chemical combine. Later became a branch of NIOPiK (State Scientific Laboratory for Aniline dyes and their intermediates). The German 50X1-HUM name for the branch was Wissenschaftliches staatliches Laboratorium fuer Anilinfarbstoffe und deren Zwischenprodukte 50X1-HUM After that date, there was only a decoy works association This 50X1-HUM relationship can also be represented by means of the following scheme:

Ministry of Chemistry Moscow ⟷ Chemical Combine Rubezhnoye ⟷ NIOPiK Branch Rubezhnoye (Including the group of Wolfen specialists)

3. The director was TRACH, to about 1948, when he relinquished this position to take over the direction of a caustic plant in the 50X1-HUM vicinity of Lisskhimstroi. In his place came another director. The chief engineer was ARNOLDOV. The production manager for new installations was RASHEVSKAYA. He also (and at times ARNOLDOV, MASHINSKAYA and others), provided the principal liaison between the NIOPiK Branch and the Combine. This liaison was also effected by common conferences of representatives of the NIOPiK Branch on one side, and representatives of the Combine on the other side under the chairmanship of ARNOLDOV as well as RASCHEVSKAYA, in the presence of TRACH, MISUCH and others.

ORGANIZATION OF THE WORK GROUP OF WOLFEN SPECIALISTS

4. During the period from fall 1946 to early summer 1947, the Wolfen group worked in the central laboratory of the Chemical Combine and was placed directly under the plant directorship of the Combine.

Work Group of Wolfen Specialists	⟷	Works Direction of the Chemical Combine
Scientific leader: BULKIN German group leader: Prof. Dr. RIECHE		Director: TRACH Chief Engineer: ARNOLDOV Liaison with the Wolfen specialists: RASHEVSKAYA, ARNOLDOV, MASHINSKAYA

Difficulties in the work arose very soon under this relationship and, had to be adjusted by Moscow. As a result, the organizational plan was changed from the ground up in 1947. 50X1-HUM

5. From June 1947 to May 1951, the group worked as a branch of the NIOPiK in Moscow, and no longer was placed under the plant leadership of the Central Combine.

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Ministry of Chemistry Moscow NIOPiK Central ⟷ NIOPiK Branch (Working group of Wolfen specialists) ⟷ Plant Directorship, Chemical Combine, Rubezhnoye

Representing the NIOPiK Branch, the director was REINFAHRT, until the fall of 1950. Replacing him, until our return to East Germany in May 1951, was TITTKOV. The scientific leader was TROYANOV (previously in Wolfen, 1945/46). Representing the Wolfen specialists, was Prof. Dr. RIECHE, who remained the German group leader. Liaison between NIOPiK Central in Moscow and the Branch in Rubezhnoye was handled by (a) MISUCH (in Wolfen 1945/47) initially for the whole field, but later especially for textile auxiliary products; (b) DOKUNICHIN especially for vat dyes and indigosols; and (c) FODIMANN, leader of the dyeworks in Moscow, at the beginning. The Commissar from the Ministry for Chemistry was VOROSHZOV, at the beginning.

6. The final settlement before the return journey to the East Zone of Germany was led in particular, by MISUCH, DOKUNICHIN, BARANIK ("Arbiter" of the group for personal affairs, so-called "Kommandant"), and TROYANOV. The director, TITTKOV, was indisposed at the time because of illness. 50X1

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SALARIES OF THE GERMAN SPECIALISTS

7. The German specialists from Wolfen and the salaries they received from the Soviets during their assignment to Rubezhnoye are given below. no changes were made in the approximate five-year period 50X1-HUM

Name	Salary in rubles per month
RIECHE, Prof. Dr. Alfred	10,000
LEHMANN, Dr.	7,000
MAIER-BODE, Dr.	7,000
SCHULZE, Dr. Max	7,000
WUTKE, Dr.	7,000
BRODERSEN, Dr.	6,000
/REG-185/	6,000
KELLER, Dr.	6,000
KRATZ, Dr.	6,000
THURM, Dr.	6,000
BRINKMANN, Dipl. Ing.	5,000
ENGELMANN, Dr.	5,000
FUCHS, Dr.	5,000
HAIL, Dr. Gerhard	5,000
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RICHTER, Dr. Adolf	5,000
SCHUSTER, Dr.	5,000
WOLF, Dr.	5,000
CARO, Dr.	4,500
GNUECHTEL, Dr.	4,000--4,500
HOFFMANN, Dr.	4,500
RICHTER, Dr. Wolfgang	4,000
RANK, Ing.	3,500--4,000

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RESEARCH ACTIVITIES AT THE KHIMKOMBINAT

8. Since the production of the Kimkombinat was centered about vat dyes and their starting and intermediate compounds, as well as azo dyes and their intermediates such as p-nitraniline and nitroanisidines, our assignment, broadly, was to provide the Soviets with the necessary procedures and techniques to produce these dyes in quantity and in acceptable quality. The program to be followed was one of development from the laboratory stage through the pilot scale to the works scale of production. This program was considered important by the Soviets because of military use in uniforms and for colored trim for uniforms. In addition to these particular dyes, we worked on Indigosols--a solubilized form of vat dyes--and miscellaneous items such as p-aminosalicylic acid, organic sulphur compounds and indicator dyes for acid-base systems. In view of the fact that organic nitro compounds were made in the plant, it would be reasonable to assume that the processes could be readily converted to explosive production should the need arise. This sort of change was made at Wolfen during World War II. The dye production techniques we advocated followed the usual German industrial practices with practically no alterations. 50X1-HUM

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9. arrived in Rubezhnoye in November 1946 did not start any actual work until May 1947 when the new laboratories were made available During the intervening period, engaged only in writing reports on various phases of dye and intermediate preparation and plant operations 50X1-HUM 50X1-HUM 50X1-HUM

10. When work in the laboratory and pilot plant began had Soviet co-workers who were to learn the details of laboratory work and the necessary theory with the objective of applying this knowledge to practice in the plant. Initially, members of the specialists group were allowed in the plant area proper, but after a short period this was stopped and could only observe progress through the pilot scale (Technikum). No reason was given for this change in working arrangements. Each was assigned a few colors to develop in their entirety in the laboratory and subsequently in the pilot plant. The usual works technical reports accustomed to writing did not serve the Soviets at all. had to include every minute detail in reports--even such common items as which anhydrous aluminum chloride was used instead of the crystalline hydrated form, or detailed descriptions of laboratory equipment and plant apparatus. once having to describe a simple porcelain casserole used in the laboratory. continually pressed for improvements in the dyes and simplification of the procedures so that the crude and even primitive equipment in the plant could be utilized. The need to adapt a reaction to the existing or available equipment instead of obtaining the equipment necessary for the reaction was major difficulty and even a source of irritation. In addition, the Soviets had no concept of proper storage conditions for chemicals. This was borne out by the repeated waste and spoilage of items such as chlorosulphonic acid, oleum and anhydrous aluminum chloride caused by weather and improper handling and closure

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of containers. Other poor practices in the plant can be exemplified, again in the use of aluminum chloride, by an explosion resulting from an unclean and wet reactor used in the preparation of hydroxythionaphthene (2-hydroxy-3, 4-benzothiophene) from S-phenyl-thioglycollic acid through cyclization. When Germans explained why the explosion had occurred and explained the need for dry equipment, the plant officials said "Why didn't you tell us that before?" feared, at times, being charged with sabotage for omitting what had considered common details of chemical plant practices.

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11. floor plan of the laboratory /see page 11 /. By referring to it more readily describe some of the work assigned and some of the conditions encountered in pursuing individual and group tasks.

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Room 1 was occupied by Drs. HOFFMANN and WUTKE. HOFFMANN worked on vat dyes and Indigosols while WUTKE worked on sulphur dyes and did plant development work.

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WUTKE worked on "Indocarbon CL,"

Room 2 housed Dr. THURM. He worked on additional vat dyes such as "Indanthrene Brilliant Rose B" and similar items.

Room 3 was shared by Drs. ENGELMANN and GNUECHTEL. Dr. ENGELMANN worked on halogenation products such as 1, 2, 3-trichlorobenzene, as well as other intermediates to vat dyes leading to "Indanthrene Printing Violet BBF" and Indanthrene Brilliant Orange." Although certain vat dyes were studied by Dr. GNUECHTEL, he also prepared some of the common acid-base indicator dyes.

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Room 4 Dr. HAIL. His work dealt with vat dyes and Indigosols related to "Indanthrene Printing Blacks" and Indanthrene Red Violet RH." This last, for some reason, was not carried to the pilot plant stage.

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vat dyes "Indanthrene Brilliant Green B" and Indanthrene Brown RRD" plus Indigosols and materials such as 1, 5-dimercaptonaphthalenes used for reclaiming old rubber in processing with new rubber.

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the Soviet chemist REINFAHRT followed, as a sort of hobby, the work on the conversion of naphthalene sulphonyl chloride to the mercaptan by reduction. It was desirable to utilize iron scrap in the reduction, but better results were obtained using tin bearing turnings with zinc as base metal.

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The technical development of this item was more or less problematical and nothing further was heard of it. No catalytic reduction was attempted. This work was carried on simultaneously in Moscow at NIOPiK but was not as successful as indicated by the fact that the work was later referred back

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the chemist charged with this problem in NIOPiK was not capable in his field. The sodium salt of the β-naphtho-mercaptan was next treated with monochloracetic acid which was produced somewhere in the USSR and, incidentally, was of good quality. The resulting β-naphthioglycol was cyclized with anhydrous aluminum chloride in dry chloro-benzene to give the hydroxythionaphthene. Oxidation of this yielded the "Indanthrene Brown RRD." After each step was set down in complete detail, it then advanced to pilot scale development. When making the sulphonyl chloride for the above dye from the corresponding sulphonic acid, 50X1-HUM
had to prepare phosphorous pentachloride from the trichloride and chlorine. 50X1-HUM

Room 5 contained an analytical balance from the East Zone of Germany and one rough balance for the ground floor group. This necessitated queuing up each morning for weighings. Although a state organization occasionally checked the tolerances on the analytical weights, 50X1-HUM
seldom had enough weights for rough work.

Room 6 was used alone by Dr. CARO for his work on nitration products and miscellaneous dyes including indicator types. CARO worked on a continuous process for p-nitroaniline and investigated diazo salts for Napthol AS compounds 50X1-HUM

Room 7 was a small technical room in which the Soviets worked on a semi-pilot scale, but not very frequently.

Room 8 was the main entrance and had a stairwell connecting with the upper floor. 50X1-HUM

Room 9 was a mechanics shop.

Room 10 was used part time by Dr. Wolfgang RICHTER in 50X1-HUM
connection with his work on indicator dyes, photographic developers such as "Atomal" and other items

Room 11 was used by the Soviet directors REINFAHRT, TITTKOV and sometimes BARANIK; 50X1-HUM

Room 12 was the analytical laboratory presided over by Dr. Adolf RICHTER who performed both organic and inorganic analytical service for the German group. He employed the usual I. G. Farben analytical methods for intermediates. There was a muffle furnace that could reach about 800° C, but no other combustion equipment was available, not even Kjehldahl apparatus for digestions. Ground glass volumetric apparatus of USSR manufacture was, however, available and of good quality and well calibrated. 50X1-HUM

Room 13 was occupied mainly by Dr. Max SCHULZE and by Dr. Wolfgang RICHTER at times. Dr. SCHULZE did work on "Vat Yellow 5G (3 or 4G?)" as well as sulphonation products for azo dyes.

Room 14 was shared by Drs. BRODERSEN and [redacted] Textile dyeing aids such as fixatives, detergents and wetting agents were BRODERSEN's interests and were of considerable importance to the Soviet MISUCH who followed the work closely. These materials were similar to "Wofafix" and "Nekal BX," used to enhance fastness and washability. [redacted] did work on various vat dyes and Indigosols, analytical methods for intermediates and worked out an apparatus for the distillation of pyridine chlorc acid.

Room 15 was the laboratory of Prof. Alfred RIECHE, [redacted] designated leader and representative with the adjoining Room 16 as his office. His own work had to do with s brown vat dyes as well as one of the vat orange dyes, [redacted]

Room 17 was used for insecticides preparation by Dr. MAIER-BODE [redacted] The testing [redacted] was not done there [redacted]

Room 18 was for Dr. LEHMANN and his work on fur dyes, [redacted] involving a p-phenylenediamine basis. After oxidation in the fur fiber, the dye was grey.

Room 19--stairwell

Room 20 was the office of the Soviet director.

Room 21 housed the physical apparatus used by Dr. FUCHS in his work on indicators and the compilation of pH-indicator tables.

Room 22 housed Dipl. Ing. BRINKMANN and Dr. KRATZ who worked on plant and equipment design and development. Early completion of their work led to idleness and then some troubles later.

Room 23 was used as the scientific archives.

Rooms 24 and 25 served as library and archives for records and notes brought from East Germany.

Room 26 was the catalyst and pressure hydrogenation laboratory under the guidance of Dr. SCHUSTER and engineer RANK. The catalyst work dealt with fat hydrogenation and oxidation of anthracene to anthraquinone, with some apparatus being available that was capable of withstanding pressures of the order of 400-500 atmospheres. No protective measures were taken with this high pressure equipment. [redacted]

Room 27 served as the laboratory for Dr. KELLER who worked on various dyes including Naphthol AS dyes and, [redacted] p-aminosalicylic acid which was of interest to the Soviets because of its value in the treatment of tuberculosis.

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Room 28 was used by Dr. WOLF for his work in inorganic product preparations such as phosphorous pentachloride, sulphur monochloride and others. All inorganic problems were handled by WOLF except analytical questions which remained with RICHTER. 50X1-HUM

GENERAL CONDITION OF THE LABORATORIES 50X1-HUM

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12. The laboratories in general gave an impression of simple primitiveness and were far from the type known in Germany. The room with HAIL had two wooden work benches along one wall and running down the center. The opposite wall served for taller set-ups starting at the floor. Agitation was provided by a common pulley shaft running the length of the bench and was powered by a motor outside the room itself. Power failures caused loss of runs and many irritations. Heating of apparatus was by means of crude firebrick - resistance wire electric heaters that could not be adjusted except by the distance from the object, or by means of burners using the gas-benzene vapor piped to the building from the surrounding plant. This gas-benzene mixture gave rise to physical disorders because of leaks, flame failure and poor ventilation. Water was available at the end of the benches, but check valves had to be devised to prevent backing up in vacuum lines caused by pressure drops at the water aspirators.

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13. A small amount of ground glass joint and stopcock equipment was available from Jena in East Germany but was decidedly inadequate. For example had to prepare 50X1-HUM "glacial" acetic acid from a weaker acid by the use of handmade, Raschig-packed columns with rubber fittings. This yielded only a 98 per cent acid, but it was all that 50X1-HUM available. The same was true with solid potassium hydroxide required for "Indanthrene Brilliant Green B" where had 50X1-HUM prepare it from the dilute aqueous solution furnished Special equipment was unavailable unless made it 50X1-HUM Even under these circumstances, the necessary materials were very hard to find. Raw materials for plant production were not available in quantity andwere of inferior quality. The plant apparatus was all of USSR manufacture, but since special apparatus for production purposes was not included in the plan, it could not be obtained. Even orders placed for simple equipment took extremely long periods for fulfillment, if done at all. In the plant, bromindigo was being produced in primitive equipment upon our arrival. The pilot plant's only crude two-arm balance required improvised weights made of brick and lead. Perhaps in another five years in NIOPiK at Moscow, vat dyes of acceptable quality could have been produced with attendant difficulties by even simpler procedures, but the whole program was speeded up by our presence. The key to Soviet production, at least in the dyes field, seems to be simplicity.

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MISCELLANEOUS INFORMATION

14. In the fall of 1950, director TROYANOV received a Stalin prize for his contributions to the fulfillment of the 5-year plan. He himself vacillated between praise and criticism and censured particularly when a method could not be made conform to the apparatus available. 50X1-HUM 50X1-HUM

15. Of the previous list [see paragraph 7] of German specialists, all were returned with their families in May of 1951 with the exception of LEHMANN, SCHUSTER and BRINKMANN they were detained because of their rebellious attitudes and insulting remarks against the Soviets since the work they had been required to perform had been finished sometime earlier. 50X1-HUM 50X1-HUM 50X1-HUM

16. a Dr. von BOCK arrived at Rubezhnoye. This is the Dr. Bernhard von BOCK hold a patent for the preparation of a tetrahydrohydroxy-naphthoquinoline dye for acetate rayon. work on this development was done within Farben laboratories. 50X1-HUM 50X1-HUM

EVALUATION OF SOVIET TECHNOLOGICAL ADVANCEMENT

17. The Soviet chemist MISUCH pictured the wonderful technological facilities in the USSR with great enthusiasm, but this proved to be over-emphasized. Perhaps outside of Rubezhnoye the technical achievements were better, but from the evidence at hand it difficult to believe. Comments: In this connection account for the technological achievement in the USSR as evidenced by their production of an atomic bomb. if sufficient priority and support were given a project, they could accomplish a specific objective. 50X1-HUM 50X1-HUM 50X1-HUM 50X1-HUM 50X1-HUM

18. working relationships with the Soviets experienced a persistent skepticism regarding results. There were always doubts surrounding the reasoning employed in attaining end results. This is perhaps related to the difficulty the Soviets had in grasping the core or nucleus of a problem when transferring it from a theoretical concept to a working practicality. This is true even in the face concerning the training of technologists where two to three years of theoretical training was followed by about a half year 50X1-HUM 50X1-HUM 50X1-HUM

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in a plant, then examinations. This was apparently done more in the USSR than in Germany or the rest of Europe. Another facet revealed was that women, though they learned and worked as well in the laboratory and plant as the men, usually held inferior positions and received smaller wages. All of this experience has led to conclusion that the patterns of life and work under Communist domination are highly undesirable.

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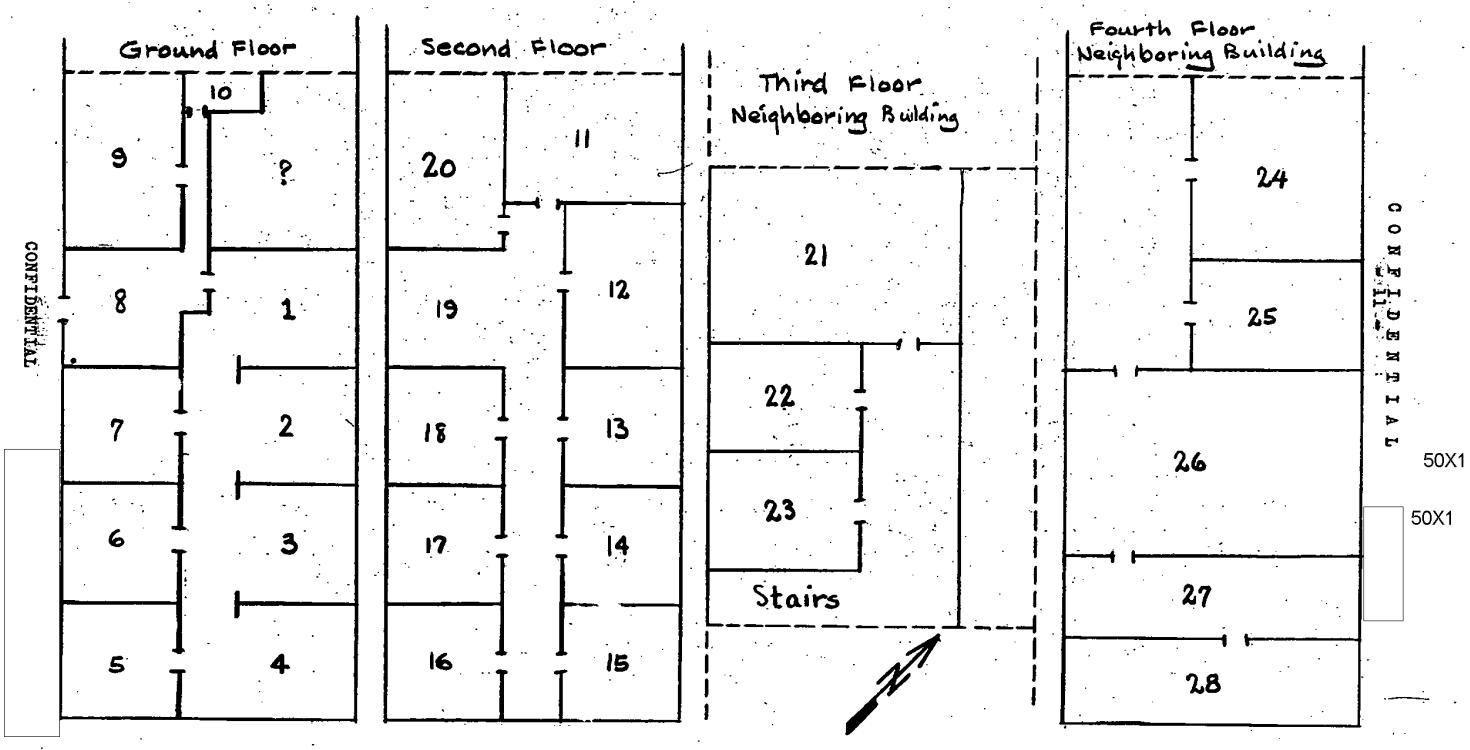
Comments: The complex structural formulas of the dyes cited above have been intentionally omitted. They are readily available from standard reference texts on organic chemistry and dyestuffs and tables of dyestuffs such as the British Colour Index and Schultz's Farbstofftabellen.

General Layout of Laboratories - KHIMKOMBINAT - RUBEZHNOYE - USSR



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