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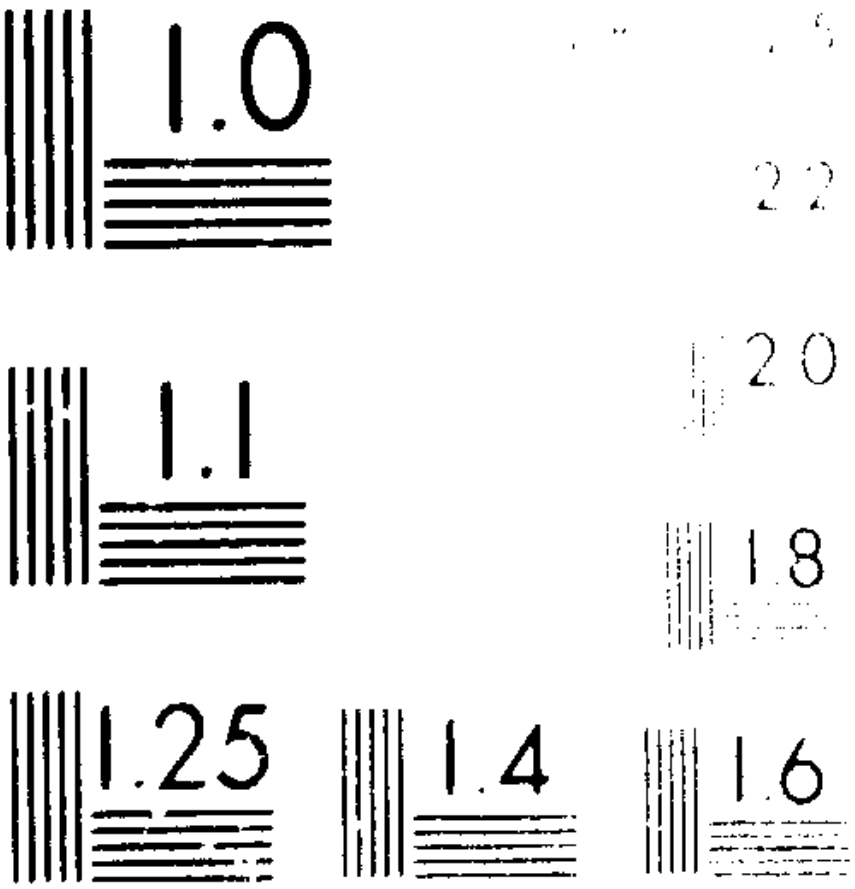
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UNITED NATIONS
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30 August 1983
ENGLISH

China.

ASSISTANCE TO THE IMPROVEMENT OF MODERN TANNING, RETANNING, INTERMEDIATE WORK AND FINISHING KNOW-HOW FOR THE CENTRAL LEATHER LABORATORY IN SHANGHAI AND THE SHANGHAI LEATHER CORPORATION

DP/CPR/80/007

PEOPLE'S REPUBLIC OF CHINA

Technical Report*

Prepared for the Government of the People's Republic of China
by the United Nations Industrial Development Organization
executing agency for the United Nations Development Programme

Based on the work of Max May, Leather Industry Consultant

United Nations Industrial Development Organization
Vienna

* This report has been reproduced without formal editing

C O N T E N T S

Exlanatory Notes — Exchange rates 7.6.1982

Official quatation rate in RMB yuan.

100 US$	=	198.89	Yuan
10,000it.Lira	=	13.25	Yuan
100 F Fr	=	25.86	''
100 DM	=	77.85	''
100 sFr	=	94.44	''

UNDP - United Nations Development Programme
UNIDO - United Nations Industrial Development Organization
SIDFA - Senior Industrial Development Field Adviser
CLRDLS- Central Leather Research and Development Laboratory
Shanghai

Acknowledgement

During the entire mission from 18.5 -17.6, the Leather Expert, experienced exceptional hospitality.

The excellent co-operation of the Shanghai Leather Corporation especially by Mr. Ma Guang-shen, Director, the National Project Director Mr. Shi Xiang-lin, the Vice-Project Director Lan You-min, the able translator Miss Gao Pei-rong, the Assistant Director of the Leather Institute Mr. Wei Qin-Yuan, The Chief of Techn. Depart. of Shanghai Leather Corp. Mr. Ji Ren, the Leather engineer Mr. Jin Zhong-tang and Pan Shang-zhi as interpreter, the Machine Engineer Mr. Fem Yu-lin, joined for smooth team work. Mr. Xie Hai-bao was of great help to implement the tape recording of all lectures and the collecting of formula was written. Mr. Wen Zu-mou and Mr. Yao Pei-de, the former fellowship trainees of DP/CPR/80/007, followed all lectures with intensive interest.

Best thanks go to Mr. Liu Guang-lu of the Second Division of Foreign Affaires Bureau and his assistant Mrs. Chen.

Mrs. Li Qi-ming, Programme Officer & Mr.A.W.Sissingh (SIDFA) have given valuable assistance.

Introduction

The spreading of modern tanning, retanning and finishing technology, of the National Leather Research Institute of Shanghai, is a priority task.

The expert decided to speak all lectures on tape on his personal recorder. The immediate acceptance of this recording by Mr. Shi Xiang-lin and the quick organization of a second recorder by Mr Xie Hai-bao led to 2 tape versions:

1 English - Chinese, ca. 35 casettes

1 English only 22 ''

Since we had no Video camera, formulae, curves, and explanatory drawings, were drawn on cardboard paper, ca. 15m . Those will be reproduced in Chinese to complete and enhance understanding.

In addition to increase understanding and speed of improvement of the main draw backs of the Chinese Leather Industry, that are: Retannage for soft leathers, the adapted intermediate work of sammying, setting out,etc. and written, selected papers, 7 from known authors and 5 by the experts, have been reproduced in 20 copies, to be passed on to the tanneries.

The lectures on tapes are so extensive that they cannot be written down in this report, but a copy can be made, if UNIDO wishes to do so, respecting the copy rights. However, the main contents are given under the Subtitle 3. Seminars.

The profile of the tanneries visited has already been ably described by Mr. Bo Lunden on page 24, report 27 July,81. - with exception of a nummber of new machinery, no significant changes took place.

The productivity is still 2-3 times lower than the modern leather industry. Improvement by better machinery should be incorporated with advanced management and technical know-how to get better results from investments. Hygienic conditions are important to tanneries, in order to get rid of the fungus and the mould growth which cause unpleasant smell to leather, these have a detrimental influence on exports.

The necessity of 'improvised' quick modifications is understood. Systematic work flow would resolve problems of this kind.

Several days had been devoted to the study of the machine lists of the project document. It lead to considerable changes. To remain within the budget, a list of priority has been established. The allotment of credits becomes now urgent, since the building will be ready July-Aug 83.(See photos) The changes made are based on practical experience of the expert who planned eight experimental laboratories for Sandoz and other firms.

Advice was also given to complete machine equipment of the tanning corporation. Emphasis has been given to their proper use e.g. setting out diagrams and their maintenance and routine cleaning e.g. felt sleeves. Since electronics are and will be used more and more, speciallists will be needed as mentioned in lectures.

Detailed lay out of the machines in the Institute is still open. Telex inquiries came in too slow. This important aspect is to be considered quickly at Vienna. The lay out plans 1:100, will be brought by the expert for discussion with Mr. Berg and Mr. Felsner.

Effluent avoidance was stressed in every lecture and a valuable instruction book of the German Leather Industrie 'Lederherstellung und Umwelt', Begriffe und Erläuterungen, Dr. L.Feikes, was passed on for translation into Chinese.

1.1 Time table of activities

16. - 18.5.83	Briefing Vienna Mr.J.Berg, B.Lunden, G.Felsner, M.Nestvold.
18.5.	Arrival at Beijing.
19.5.	Briefing UNDP Beijing
21.5.	Arrival in Shanghai
22.5.	Sunday, preparation of lectures
23.5.	Visit of 2 tanneries and 1 chemical factory.
24.5.	Visit of 1 tannery and Institute
25.5.	Visit of 2 tanneries
26.5.	Seminar 7hrs, Highlights, abroad
27.5.	Seminar 6hrs, Technology of advanced beamhouse work
28.5.	CLRDLS, explanations on new machinery for the tanning Corporation.
29.5.	Sunday, preparation of lectures
30.5.	Seminar 7hr, Basics of modern tannages
31.5.	Seminar 7hrs, Modern tannage of glazed kid
1.6.	CLRDL, Study of machine list for the Leather Lab. Inspection of building, Discussion on lay-out of machines.
2.6.	Visit to handicraft center and lecture preparation
3.6.	Seminar, 7hrs Schema for R+D, softy goat production and finishing.
4.6.	Seminar, 7hrs, Pig tannage, retannage, finishing
5.6.	Sunday. Review of project documents, completion of machine list for CLRDLS, discussion of lay-out of machines.
6.6.	Seminar, 7hrs, Retannage and finishing side leather, summary of Seminar and book on retannage and finishing.
7.6.	Discussion on work co-ordination, writing report
8.6.	Writing report
9.6.	Discussion on report
11.6.	Discussion on report, machine lay-out CLRDLS Finishing typing of report, General review of mission with Mr.Shi Xiang-lin and his team.
12.6.	Sunday. Travel - Shanghai - Beijing

13.6. Debriefing UNDP - Talk with SIDFA, Mr. Sissingh, on machine list changes of project document. General review of mission.

14.6. Departure from Beijing

15-22.6 Personal rest

20.6. Arrival Vienna flight all night - short rest afternoon debriefing

21.6. Debriefing Vienna

22.6. Debriefing Vienna

23.6. Departure Vienna. End of mission.

2. Activities

2.1. Tannery visit

23. 5, Hong Wei (Red Guard) Tannery

Chrome sides 1000 hides/day

400 total staff.

Received by: Mr. Lan You-min, Vice Manager, Vice National Project Director.

Mr. He Jian-guo, Vice Manager

23. 5, Afternoon. Hong Guang (Red Light) Tannery

5000 pig skins/day

70% shoe uppers

7% garment suede and suede shoe upper

23% softy gloves

Received by: Mr. Zhu Min-xian, Vice Manager

Madam. Jun Jun-zhi, Engineer

Visited 3 sections:

Chrome tanned pig: 40% production for shoes

Vegetable tanned: 40% production for full grain leather goods upholstery

Garment : 20% production for suede 70% full grain 10% suede sport shoes

24.5. Yi Min (Benefit of the people) Tannery

700 hides/day a 3.3m ,corrected grain

800 heavy pig - soft leather a 1 0 kg, finished 3.5 kg.

Received by: Mr. Tang Dong-xiang, Director

Mr. Shen Tiang, chief technician

25.5. Xin Yi (New Art) Tannery Kid and goat skins

110,000 skins/month a 3.5 sqf. air dry

Shoe uppers: 3% glazed, 87% plated, 10% suede.

Hankow, Sezuan, Yunnan, Quizhou

Received by: Gen Bin-rong, Director

25.5. Xing Xin (New Development) Tannery, Pig skins

400 skins/day: full grain shoe upper 40%

Chrome and ball leather 20%

Chrome-vegetable tanned leather purses 20%

suede aport shoes 20%

Received by: Mr.Shen Yong-zhi, Director

Mr. Cao De-yan Engineer

2.2 23.5. Shanghai Leather Chemical Plant

Acrylic binders 40%, 3000 tons/year

Chlorination of hydrocarbous 1500 tons/year

sulfatation

Monomers of methyl acrylate 3200tons/year

ca 3000 t. for leather

2500 t. for textile acryl fibers

Syntans: Type - not light fast

Phenolic 200 t/y

Naphthalene based 800 t/y

Amino - urea 50 t/y

Received by: Mr. Wang Kang-ni, Manager

Mr. Chen Hong-bin, Chief chemist engineer

2.3 Visit to shoe factory: In a short lecture break, the new lady shoes factory

Bao Ji - Trade mark Jin He Pai was seen.

The flow of work is well organized, however with little mechanization and much, but excellent handwork. The productivity is 2 pairs/man day. The models look attractive. They are exported to Australia.

Better finished glazed kid is demanded. - A finishing of the shoes seems not to be done.

2.4 Visit to a luggage factory: Pig leather, embossed, but with a cheap looking finish was used. More elegant leathers are wanted, with high scuff resistance. (PU-Finishes)
Again the handwork is very good. Metalparts look poor. Natural pig attaché cases are well made. With soft leather, linings instead of textile and some better styling, it could be a good export article.

2.5 The tape recording of all lectures in English alone, to secure spreading of technical information, ca 22 cassettes (English version), ca 35 casettes with Chinese translations ca. 15 m² of information drawings, curves, detail formulae were prepared by the expert.

2.6 A book on retanning-dyeing-finishing, 12 lectures, 250 pages of papers , 20 photo copy examples were made.

3. 7 days Seminars to 40 - 50 technicians of Shanghai Leather Corp. and 1 engineer of the Beijing Ministry of Light Industry Mr. Yu Zhe-hong.

1. day (26.5,1983) Cassette volume 1-3, Orientation on contents

3.1. On present fashion trends, to very soft natural anilin leathers, in Italy, USA, Japan.

3.2. The special quality characteristics.

3.3. Production flexibility to fashion changes, by computer controlled software. Such as formulae and statistical check-list-control, of quality and analytical tests.

3.4 Efficiency by modern semi-automated Dosemats, prepared to be fully automated. Experiences with the worlds biggest

38 tons Dosemat, with 20,000 kid skins, 5 tons dry wt. 3-4 fold increase of productivity.

3.5 The physical characteristics of the drumming action on Diffussion, of Chemicals in leather manufacture.

3.6 Its influence on the Uniformity of chemical reactions. From soaking and liming, on to dyeing and fatliqouring, to ensure stability of quality and color shades.

3.7. Productivity comparisons: China: Italy for kid and cow hide (1:2.5-3)

3.8. The importance of factory lay out and machines, for productivity, production flow, stable leather quality, and cleanliness of work.

Seminar 2 day: Cassette 5-8 Orientation on contents
Basic theory on tannage processes.

4. Scheme of development and applied, systematic research for new processes. In the Laboratory and for the improvement of existing processes.

4.1. - Effluent reduction in liming by recycling sulfides from 30 - 60%

4.2. - The conversion of sulfides to sulfates by mangan sulfate with compressed air, in idle tannery paddles.

4.3. - Modern chrometannage, to increase chrome (Cr_2O_3)exhaustion, from 68-70% to 96-98%. The short-bath tannage, with 1.4-1.6% Cr_2O_3 instead of 2.2-2.5%, the complexation of chrome under well controlled PH conditions and temperature.
The recycling of 4/5 of the residual chrome bath.

4.4. - The fixation of chrome and its dependance on the isoelectric point. page 11, lecture 5.

4.5. - The negative influence of unfixed chrome on the evenness of dyeing.

4.6. - The selection in wet blue. Its disposition.

4.7. - The importance of consistent weight, surface, PH and water content in retannage to obtain constant quality.

4.8 Retannages to determine the leather character, such as handle and softness.

4.9 The importance of intermediate work on the yield and leather finishing. (Samming setting out, Water content control), controlled relative Humidity in leather drying. Its influence on quality.

3. Day Casette 9-11 - orientation on contents

30. 5. 83

5. Basic aspects of Retannage by Chrome, Chrome-Synthetic mixtures combined with complexing agents.

5.1 The Neutralizing of leather and its tightness.

5.2 Basics on dyeing. Adsorption speed control by curves of Spectrofotometer.

5.3 The influence of free chrome in the dye bath on aggregation of dyes.

5.4 Reasons for uneven dyeing.

5.5 The selection of dyestuffs to obtain shade uniformity, by ELB -tests.

5.6 The importance of electrical charges.

5.7 The yield of dyestuffs, depending on surface charge.

5.8 The dispersing agents for even dyeing. Their action on dyestuffs.

5.9 Saturation point of leather dyestuffs.

Seminar

4. Day Casette 12-13 -orientation on contents

31.5.83

6 Basics on finishing on the example of Kid leather.

6.1 How to overcome too low or too high surface tension of the leather.

6.2 How to avoid the penetration of bottom coats to avoid hardening.

6.3 The importance of the polishing effect on the finishing of soft leathers.

6.4 Colourless coats to seal off, to obtain thereafter good

6.5 The formulae of glaze top coats for easy glazing, high anilin effect, natural high gloss- good wet rub-fastness. For Kid, pig full grain, cow-sides full grain.

5. Day 3.6.83 Casette 14-16 orientation on contents

7 .Reorganisation guided by a modern Tannery in a prefabricated pillarless building according to efficient lay out planing. To improve productivity 2-3 times, resolve effluent problems by modern formulae, efficient machinery + control.

7.1 The favourable costs of prefabricated multipurpose buildings for tanneries. In the view of experiences at Arzignano and Santa Croce, Italy.

7.2 Management improvement by case studies, for each type of leather, with practical and theoretical training in the Tannery institute and its implementation in a modern Tannery, in the vicinity of Shanghai, near Hong-Wei Tannery, to introduce efficient work flow, organisation and production control to ensure quality.

7.3 Answering of technical questions submitted.

7.4 Return to lecturing on basics:

A. Fatliquors in retanning, to obtain fine Emulsions of local Oils, with emulsifier oils and Turrax stirrers, with exceptionally high shearing action.

B. The use of Polyurethan dispersions with tanning effect, in combination with chrome-retannage for soft leathers. (Example: Levotan K)

7.5 Explaining the ELB-Test,(electrolyte resistance of dyestuffs), by slides, that show resistant and sentitive dyestuffs, with aggregations and precipitations. A study on 1400 dyestuffs, leading to about 70 dyes which can be easily combined for shading, to obtain level anilin dyeing.

7.6 The influence of the surface charge of the retannage and the yield of dyestuffs.

7.7 The speed of dyestuffs adsorption, in 5 min 80%, The influence of the dye-drum. Comparison of wooden drums against Dosemats and Wash machine type, retan equipment. The "dead" float of the wash machines- types, preventing short float formulations, with retanning packs of different size.

7.8 How to obtain brilliant anilin effects in drum dyeing, upper leather. pig nubuck and pig suede.

7.9 The "Silkglosseffect" on pig nubuck and suede for high class silk pig garments.

Seminars

6.Day Casette 17-19 orientation on contents

4.6.83

8. The dyeing of pastel , medium and dark shades, of Kid, pig and cow sides. formulae detail examples.

8.1 Explanation on lightfastness.

8.2 EMPA an active leather test institute of the VESLIC (Union of the Swiss Leather Chemists Association.) Their complete testing method range. Worked out with Bally and the Swiss chemical industry.

8.3 Intermediate operations of samming, setting out, drying, staking and toggling.

8.4 The basics on Finishing soft goat garment, pig garments and soft shoe uppers.

8.5 The advantages of Polyurethan dispersions, e.g. Bayderm 10 -UD to 80-UD, in combination with casein, albumin waxes and softeners. Their low thermoplasticity and high dry rub resistance, allow polishing and glazing.

8.6 Application of fine anilin finishes.

8.7 Top laquers for pig, Kid+sides for leather goods.

Seminars

7. Day Casette 20-22 orientation on contents

6.6.83

9. Retannage of anilin full grain sides Formulation exam[illegible] in detail.

9.1 Aspects to obtain level dyeing.

9.2 Choice of synthetic and veget. tannins to influence filling and ensure lightfastness.

9.3 Retannage without chromium, on the bases of Polyurethans, Polyesters and Acrylics, in combination with Syntans and veget. tannins.

9.4 The reducing of strechiness of soft leathers, for shoe uppers, for leather luggage cases and furniture leathers, to avoid deformations of finished leather articles. To be done by adapted, samming and drying. The gain of surface 8-12 %.

9.5 The finishing of anilin upper leathers Detail formulations.

9.6 Top finishes for glazing, plating and dry milling. The technique off kiss-embossing and dry milling, to get natural handle.

9.7 The transfer of the softy type retanning formulae on softy pig and Kidskins- Softies.

9.8 Mill - proof finishing by Polyurethan finishes in stainless

steel or leather lined Dry mill drums with lined shelves, avoiding pegs. The humidity control in dry milling.

Casette 22

Summary on the lectures held

10. The priority needs to improve Retannage and finishing in Chinese Tanneries.

11. The presentation of 12 additional, lectures as printed papers, of all together ca. 250 pages, on the subjects of retannage, dyeing fatliquoring, anilin-finishing, the function of the surface charge, Pig leather dyeing, Lightfastness of dyes, the sensitivity to dyestuff to electrolytes. 20 Foto copies have been prepared. Translation into Chinese and distribution to the 8 other Leather Corporations should follow. See Table of INDEX, page 1.

12. Recommendations

12.1 The Building of CLRDLS (Central Leather Research and Development Laboratory Shanghai) is expected to be finished by Aug.83. Fotos of the present state are included.

12.2 The machine Lay-out of the Leather Laboratory has to be urgently prepared, when all the ground floor measures are collected. Telex replies come in slow. Plan copies for the lay-out are prepared. A list of the home made machines should be added also.

12.3 The detail installation must and can only be started, when the lay-out of machines is approved by CLRDLS and UNIDO Vienna. Smooth flow of organized laboratory work is a precondition to the success of R+D work.

12.4 The project paper with the revised machine list of 9 Jun.1983 is agreed by Mr. Shi and the expert and the funds should be allotted at the earliest possible date.

12.5 It is to expect that:1. the delivery times for machines take 4-6 months. 2. The transport time 4-6 months and the installation, if well prepared, by machine lay-out 2-3 weeks. Hence 9-13 months are lost, to get the laboratory in full operation. Since 1 month is to be added for unexpected delays, it may last even 14 months. Every co-operation is needed to avoid further delay. In the mean time improvised installations have to serve for work to be made.

12.6 A D+R programme adapted to industrial necessities shall be set up.

Priorities are:

12.6.1 Retannages of Kid - Pig and Side full grain leathers with more softness and even anilin dyeing, by systematic case studies.

12.6.2 The correct intermediate work is to be implemented, controlled by check lists.

12.6.3 The Finishing, according to up to date finishing technique, is to be applied, step by step, by case studies.

12.6.4 Parallel to all case studies, the test laboratories, implement precise process controls and shall take part in the processing, until full -coordination between actual leather processing and control becomes routine team work.

12.6.5 Case study formulae shall be established on 6-12 skins, then confirmed by trial packs of 80-100 kg, before large-scale experiments in practice are done with 1000-3000 kg packs. Those are to be implemented by the same laboratory team under strict control.
The CLRDLS is bound to set impressing examples of advanced, controlled technology, to build up its reputation as a reliable partner, of the undoubtedly sceptical and traditional leather industry. The case study teams composition should consist of 1/3 practicians and 2/3 Institute personnel , exercising job rotations.

12.6.6 Urgent help for pressing industry problems is to be separated from long-range work. For such cases a "trouble shooter team" with feed back over short video films shall develop a collection of their experiences at the service of the entire leather industry in China. Mistakes are good instruction materials.

12.6.7 Pre-organisation of the chemicals needed, until in stock in sufficient quantities, needs another 6-10 months and must be started Aug.83. Names of chemicals, dyes, pigments, finishing materials were given by the expert and must be kept in controlled stocks. To ensure supply on time, case studies are to be backed by supply flow charts and complete collections of pattern cards, Chemical descriptions and safety sheets.

12.6.8 The quality and Productivity are the basics of economics, taking fully in account, material, labor, effluent costs

etc.

Therefore every case study should include by training the costings per M^2 leather, leading to integrated technical and economic thinking.

It cannot be stressed enough that the "quality back bone" of advanced leather technology, rests on formulae discipline, forming the future software for computer controlled production, which has already started in advanced tanneries.

12.6.9 To get data on effluent reducing new Soaking-limeing, Reliming, Bating, Degreasing, Pickling an Chrome tannages, an analylically controlled, regular wet blue trial-production should be set in operation. (ca. 50kg Trial packs) On this, wet blues, retannage and finishing studies shall be based. Recycling of Sulfides and chrome, reduce dangerous effluents from 30-70 %, leading to smaller effluent plants and reduced costs. In the same sense help efficient Drums like Dosemats for short bath techniques.

12.6.10 On the bases of such advanced processing a third phase, the construction of completely new tannery of medium size, of polyvalent conception, should be planned. By end of 1984, the lay-out should be ready. By 1985 construction should start, taking 1-1½ year, provided pre-organized planning is good and machines are ordered in time.

1986 the results of the CLRDLS should be so far progressed, that working methods could be step wise transferred to an industrial scale, under advanced conditions of production, regarding productivity and quality. Such a transfer phase may last 2 years until full capacity is reached.

12.6.11 Experience proves, that an R+D institute, without direct linkage to production:

- Drifts away from reality of production.
- Follows programms of low industrial value.
- Does not train realistic Management.

12.6.12 The training of advanced management at CLRDLS, is of cruicial importance. To this belongs video training daily, of English and German, to profit of literature, in the technical and management fields. However, only the transfer of R+D into the hard reality of daily production, will turn out economic high quality products at a sound productivity level.

13. ANNEXES

14. INDEX OF LECTURE BOOK

15. PROJECT DOCUMENT WITH MODIFIED MACHINE LISTS.

UNITED NATIONS DEVELOPMENT PROGRAMME

Project of the Government of

the People's Republic of China

DRAFT PROJECT DOCUMENT

Title: Leather Technology Centre

Number: DP/CPR/8-/xxx

Duration: Three years

Primary Function: Direct Support

Secondary Function: Institution-Building

Sector (Govt.Class.) Industry (05)

UNDP Class.and Code: Industries (051...

Sub-Sector (Govt.Class.) Leather

UNDP Class.and Code: Establishment and Extension of Manufacturing Industries (0520)

Government Implementing Agency: Ministry of Light Industry (Through SHANGHAI LEATHER CORPORATION)

Executing Agency: United Nations Industrial Development Organization (UNIDO)

Estimated Starting Date: January 1983

Government Inputs: RMB Yuan2,500,000 (IN KIND)

UNDP Inputs: U.S. Dollar 700,000

Signed: _____ Date: _____

On behalf of the Government

_____ Date: _____

On behalf of the Executing Agency

_____ Date: _____

On behalf of the United Nations Development Programme

PART I - LEGAL CONTEXT

This project document shall be the instrument referred to as such in Article I, paragraph 1, of the Agreement between the Government of the People's Republic of China and the United Nations Development Programme (UNDP), signed by the parties on 29 June, 1979.

The Government Implementing Agency, for the purpose of the Standard Basic Agreement, refers to the Government Co-operating Agency described in the Agreement.

PART II - THE PROJECT

A. Development Objective

Based upon the demand of the development of the leather industry of the People's Republic of China, the development objective of this project is to establish a national Leather Technology Centre which will serve to promote an increase of efficiency and productivity of the leather industry. This Centre, consisting of laboratories, pilot plants, training quarter and an information unit, equipped with modern machines and testing instruments, will perform the R & D activities in the field of leather, footwear and leather goods as well as the testing and standardization of product quality. These activities are to effect the best utilization of domestically available raw hides and skins into finished products, a substantial improvement in quality of these products, protection of the environment against pollution resulted from tannery effluents and economical utilization of energy. This Centre will also serve to promote international co-operation in the field of leather industry.

B. Immediate Objective

The immediate objective of the project during 1985-1985 is to

complete the establishment of a well-functioning Leather Technology Centre incorporating the following uints:

_____ a laboratory/ pilot plant for the development of leather processing and chemicals used in tanneries;

_____ a laboratory/ pilot plant for the development of techniques of making shoes and prefabricated shoe component parts;

_____ a laboratory for the designing and styling of leather goods, as well as improving the quality of metallic parts and accessories used in various kinds of leather goods;

_____ a laboratory for experimenting techniques to eliminate pollution and utilize wastes from tanneries;

_____ an information unit and a library to serve better communication and faster implementation of scientific and technical achievements through well-organized technical information system;

_____ classrooms and lecture rooms for training a group of technologists, instructors and fully qualified staff to carry out all the activities required from the Centre.

_____ a material testing laboratory, this laboratory has been set up as a result of the UNDP assisted Project (No. DP/CPR/80/007), only supplementary works for elaborating what have been accomplished ~~is~~ required during 1983-1985.

C. Background

The People's Republic of China has fairly rich resoures of hides and skins, and in particular pigskins. The raw material production is estimated at 70 million pcs. of pigskins, 5 million pcs. of bovine hides and 30 million pcs. of goat and sheep skins in 1981.

There are about 50 important tanneries distributed in the main leather manufacturing areas, such as Beijing, Tianjin, Guangzhou, Sichuan and the most important one, Shanghai. The quality of soft leather, mostly chrome tanned, is fair, but the dying and finishing should be

improved. Most vegetable leathers are tanned by extracts made domestically and the color appears to be dull. Key operations of the leather processing, such as sammying, splitting, shaving and especially retanning, dying and finishing require considerable improvement which involves increased inputs of production machines, chemicals, know-how, process control etc.

In the shoe industry, manual processes are still prevailing. The designing and construction of shoes are not satisfactory. Hence, mechanization of the shoe manufacturing as well as the use of prefabricated shoe component parts are of prime importance.

Both the leather and footwears industry are lack of adequately trained personnel —— especially in management, technology and product development. Training and re-training of specialists from industrial plants to transfer technical know-how to a higher level are required for the development of the national leather industry.

D. Output

1. A substantial improvement in quality of various kinds of leather, and in particular, improvement in quality of light and heavy leather made from pigskins.

2. A processing technology of shoe making to increase productivity accomplished by improving the design of shoe construction and application of assembling prefabricated component parts, this process will be more adaptable to mechanization in shoe manufacture.

3. Production of new varieties of leather goods of much better quality as a result of efforts made in elaborating the style and fashion-design and improving the quality of metallic parts and accessories. The popularization of the technique of high frequency flow-molding will contribute much to the development of new products.

4. Processes to treat tannery effluents that will eliminate or minimize the pollution resulted from its discharge.

5. Evaluation of product quality by regular testing, and based upon the data thus accumulated, revision and implementation of product specifications will be accomplished.

6. A group of technological and managing personnel qualified to carry out all the activities required from the Leather Technology Center being formed as the result of various training courses to be implemented.

7. Collection, communication and information service of documents and literatures in the field of scientific and technologocal achievements.

E. Activities

1. Invitation of Experts

_____ Pigskin Leather Tanning Expert (post 11-01)

The expert should have a thorough theoretical and pratical knowledge of leather tanning in general and specifically of the production of high quality pigskin grain leathers. He will advise and assist on chemicals to be used, best processing to be adopted as well as to train national counterparts on these subjects. He will be expected to achieve a substantial improvement in the quality of pigskin upper leather when compared with the products duly made in Shanghai.

Duration and planned starting date:

1½ monthd, July 1983

_____ Cowhide Leather and Kidskin Leather Tanning Expert (post 11-02)

The expert should have a profound theoretical and practical knowledge of leather tanning in general and be also quite

familiar with manufacturing technology duly processed in developed countries. He will be expected to advise on technological measures to be undertaken so that quality of finished leather made from domestic hides and skins would be improved and become highly compatible in the international market.

Duration and planned starting date:

1½ months, August 1984

_____ Leather Finishing Expert (post 11-03)

The expert should have the broadest possible theoretical knowledge and practical experience in the compounding of leather finishing materials and leather finishing techniques. He will advise on the chemical and physical properties of the materials to be used, the art of compounding and technological parameters for the finishing operations concerned. He will be expected to make up the deficiencies existed in various kinds of upper leather locally produced.

Duration and planned starting date:

1½ months, August 1983

_____ Effluent Treatment Expert (post 11-04)

The expert should be capable to resolve the existing pollution problem resulted from the discharge of tannery effluent. Based upon his extensive theoretical knowledge and practical experience, he will advise on and assist in the construction and operation of an effluent treatment pilot plant in the Centre as the first phase of the work. The discharge of water after treatment should satisfy the requirements of the governmental code, and the processing should be applicable as far as the economy and energy consumption problems are concerned. He will further advise on the construction of effluent and

sludge [illegible] plants to be established in tanneries [illegible] the second phase of the work.

Duration and planned starting date:

1½ months, Oct. 1983

_____ Footwear Technologist (post 11-05)

The expert should have an extensive experience in manufacturing different types of footwear, including pattern making, technologies and quality control as well as selecting appropriate equipment and prefabricated component parts for the production.

Duration and planned starting date:

1½ months, Sep. 1984

_____ Leather Goods Expert (post 11-06)

The expert should have the broadest possible practical experience in the manufacture of various leather goods, such as handbags, suitcases, clothings, balls and other leather articles. He will advise on style designing and product development as well as on purchases of auxiliary components and materials used (e.g. frames, metallic fittings etc.).

Duration and planned starting date:

1½ months, Nov. 1984

_____ Leather Chemical Expert, specialized in the manufacture and application of syntans, retanning agents, fatliquors and leather finishing agents (post 11-07)

The expert should have the profound theoretical knowledge and practical experience in the manufacture and application of the specified leather chemicals. He will be expected to advise and assist in the synthesis and product development of these leather chemicals and also to guide the proper application. He will further participate in the training and lecturing of chemists.

and technologists involved in this field.

Duration and planned starting date:

1½ months, July 1985

_____ Fur Expert, specialized in the manufacture of furs (post 11-08)

The expert should have a profound theoretical and practical knowledge in fur dressing. He will be expected to direct on the dressing processes to improve the quality of finished products utilizing domestically available furs, especially in the processing technique of shearlings utilizing sheep skins produced in the North-Western parts of our country.

Duration and planned starting date:

1½ months, Nov. 1985

_____ The listed experts will be provided with duties as preliminarily described above. Their respective job descriptions will be finally elaborated by the National Project Director.

2. Training

Training of the national counterpart staff is of prime importance to the successful management and operation of the Centre. The Project plans the implementation of the following training programme which is considered essential in view of the R & D activities to be carried out by the Centre.

The estimates for training and study tour are as follows:

Fellowship: US $	75,000
Study tour: US $	54,000
Total: US $	129,000

The programme will involve experienced technologists of required qualification and language proficiency to go abroad on fellowship for training in the field of (i) pigskin leather processing, (ii) kid leather processing, (iii) cow-hide leather

processing, (iv) footwear technology, (v) leather goods designing, (vi) synthesis of leather chemicals. It's estimated that 25man/month are needed to complete all the training courses.

The programme will also involve study tours which should be undertaken to study the managing experience and operation technique of factories of reputation in selected developed countries (e.g. pigskin leather tanneries in Hungary and Japan, B.A.S.F. and Bayer leather chemical works in West Germany and Stahl chemicals in Netherland , cow-hide leather and kid leather tanneries as well as shoe factories in Italy.).

Details of the training programme for fellowships and study tours will be elaborated by the National Project Director and applications be sent to relevant organizations for approval.

3. Equipment

The following machines and equipment and their estimated cost are planned for the Leather Technology Centre:

Description	Estimated Cost (CIF in US $) (in thousands dollars)
Tannery Pilot Plant	300
Footwear Pilot Plant	60
Laboratory Instruments	36
Effluent Treatment Equipment	34
Total	430

Exact prices for items of equipment can't be budgeted for the time being as equipment is purchased through competitive bidding by UNIDO. A detailed list of machines demanded is prepared preliminarily (Annex I), but this is liable to modification as the actual purchase price may change.

F. Inputs

1. Government inputs

The government will provide the capital for premises, locally available equipment and recurrent expenses as well as for asignment of the national counterpart staff. The chief items are as follows:

(a) Premises:

Appropriate land and buildings for the laboratories, pilot plants library and offices furnished and suitable equipped in accordance with the actual need of the project. The government will provide buildings of a total area of 6700M^2, of which a new laboratory of 3,300M^2 is now approching completion, a pilot plant of 900 M^2 has been renovated and another 2,500 M^2 is to be renovated in 1983. The tot cost is estimated to be 1,700,700 Yuan (RMB)

(b) National Counterpart Staff:

The government will appoint the Project Director and provide professional counterpart staff in accordance with the requirement of the project for the managing and running of the Centre's operation. The counterpart professional staff will consist of at least 30 members specialized in leather processing, leather finishing, footwear technology, leather goods production, effluent treatment and synthesizing leather chemicals.

(c) Equipment

The government will provide capital to purchase machines and equipment of good quality available domestically. The cost is estimate to be 600,000 Yuan (RMB).

(d) Miscellaneous

The government will provide office equipment and supplies, in-country cost for transportation, expenses to receive experts, recurrent expenses and other miscellaneous items. This is estimated to be 200,000 Yuan (RMB).

2. UNDP inputs

The allocation of UNDP inputs is described as follows:

(in thousand US dollars)

Description	Total	1983	1984	1985
1. Invitation of experts m/m	12	4½	4½	3
Expenses incurred US $	120	45	45	30
2. Fellowships m/m	25	5	10	10
Expenses incurred in US $	75	15	30	30
3. Study tours m/m	9	3	3	3
Expenses incurred in US $	54	18	18	18
4. Equipment cost	430	200	230	-
5. Miscellaneous	21	7	7	7
	700	285	330	85

G. Work Plan

Content \ Time	1983				1984				1985			
	1	2	3	4	1	2	3	4	1	2	3	4
1. National professional staff												
2. Buildings												
New laboratory 3,500M^2												
Pilot plant (renovated) 500M^2												
Pilot plant (renovated) 2,000M^2												
3. Equipment supplied Domestically												
4. International Team												
Pigskin leather tanning expert												
Cowhide leather and kid leather tanning expert												
Leather finishing expert												
Effluent treatment expert												
Shoe technologist												
Leather goods technologist												
Leather chemicals expert												
Fur expert												
5. Fellowships												
6. Study Tours												
7. Equipment Supplied Abroad												

PART III - SCHEDULES OF MONITORING, EVALUATION & REPORTS

A. Tripartite Monitoring Reviews, Technical Reviews

The project will be subject to periodic review in accordance with the policies and procedures established by UNDP for monitoring project and programme implementation.

B. Evaluation

The project will be subject to evaluation in accordance with the policies and procedures established for this purpose by UNDP. The organization, terms of reference and timing of the evaluation will be decided by consultation between the Government, UNDP and UNIDO.

C. Terminal Reports

1. A progress report will be submitted every six months.
2. At the completion of the project, a draft terminal report will be prepared by the National Project Director. UNIDO will complete the final version of the terminal report and distribute it to all parties concerned.

PART IV - PROJECT BUDGET

1. Project Budget Covering the Government Contribution

(in thousands RMB)

Country: The People's Republic of China

Project Number: DP/CPR/--/

Title: Leather Technology Centre

Designation	total	1983	1984	1985
1. Buildings				
1-1, New Laboratory (3,300M^2)	800	800		
1-2, Renovation of Pilot Plant (500 M^2)	200	200		
1-3, Renovation of Pilot Plant (2,000M^2)	500		500	
1-4, Improvement of Environment	200	100	50	50
2. Equipment supplied domestically	400	200	100	100
3. Water, electricity, steam supplies for the laboratory and pilot plant	200	100	50	50
4. Installation and transportation of equipment supplied abroad	50	20	30	
5. Preparation for study tours and fellowship training	15	5	5	5
6. Reception of Experts	25	10	5	10
7. Miscellaneous, Unpredictability	110	30	40	40
Grand Total	2500	1465	780	255

2. Project Budget Covering UNDP Contribution (in thousands US $)

Country: The People's Republic of China

Project Number: DP/CPR/--/-- Title: Leather Technology Centre

Designation	Total		1983		1984		1985	
	m/m	$	m/m	$	m/m	$	m/m	$
10. Project Personnel								
11. Expert								
11-01 Pigskin leather tanning expert	1½	15	1½	15				
11-02 Cowhide leather and kid leather tanning expert	1½	15			1½	15		
11-03 Leather finishing expert	1½	15	1½	15				
11-04 Effluent treatment expert	1½	15	1½	15				
11-05 Shoe Technologist	1½	15			1½	15		
11-06 Leather goods technologist	1½	15			1½	15		
11-07 Leather chemical expert	1½	15					1½	15
11-08 Fur expert	1½	15					1½	15
19 Total Personnel Counterpart	12	120	4½	45	4½	45	3	30
30. Training								
31. Fellowships	25	75	5	15	10	30	10	30
32. Study Tours	9	54	3	18	3	18	3	18
39. Total Training Component	34	129	8	33	13	48	13	48
40. Equipment								
42. Non-expendable equipment		430		200		230		
49. Total equipment Component		430		200		230		
50. Miscellaneous								
52. Reports		6		2		2		2
53. Sundries		15		5		5		5
59. Total miscellaneous component		21		7		7		7
Grand Total		700		285		330		85

ANNEX I Equipment for the Leather Technology Centre

The following equipments are listed im the order of priority use:

1.	Dosemat	dia. 1.4 x 0.6m	4
	(Dose)	(without auto-circulation)	
	"	dia. 1.4 x 0.6m	2
		(with auto-circulation)	
2.	Drum Door	stainless steel	2
	(Dose)	(suitable for dia. 1.4 x 0.6 wooden drum)	
3.	Shaving machine	working width	1
	(Rizzi)	600mm or 450mm	
4.	Setting-Samming machine (OMAC)	working width 1800 mm	1
5.	Dry cabin (TTH-Poletto)	with heat humidity control	1
6.	Toggling unit (TTH — Poletto)	with 2 glass plates 40 toggling frames 2300 1500mm	1
7.	Automatic spray booth EX or Tenebre (TTH-POletto)	2.5 x 1.6m 4 guns, Fixation 4 guns Next diagram Max. length 8m	1
8.	Spray booth EX (TTH-Poletto)	2.5 x 1.6m	1
9.	Spray guns (TTH-Poletto)	nozzle stainless steel 1.2 mm	6
10.	Staker (Cartigliano)	1300 mm	1
11.	Polishing machine (Ficini)	working width 600mm or 450mm	1

		stone cylinder	1
		textile discs cylinder	1
		felt cylinder	1
12.	Glazing machine (Vallero)	wooden frame	1
13.	Embossing machine (Tomboni)	with electronic control	1
14.	Plates (Tomboni)	smooth	1
		sand Blast	1
		kid design	1
		shrunk grain design	1
15.	Video camera and screen to distribute technical information and English training		1
16.	Hand iron round	dia. 25mm 15KG with thermostat	1
17.	Turrax (JANKE & KUNKEL)	dia. 45 generator T4	1
		dia. 45 generator TP4	1
18.	Electrode for alcaline and acid (Metrohm)	PH 14 and PH 11.0	12
19.	Humidity control balance (TTH-Poletto)	IR lamp	1
20.	Portable pH meter (Metrohm)		2
21.	Staking wheel (3-P)	150mm wide	1

22.	Buffing machine (Rizzi)	working width 450 mm	1
23.	Vacuum dryer (Cartigliano)	2300 x 1300 mm	1
24.	Finiflex Ironing machine (Mercier or Mosconi)	1800 mm	1

Shanghai agreed on 9th June 1983, Shanghai

Hua Hua

Reference to page 29, 3. Equipment

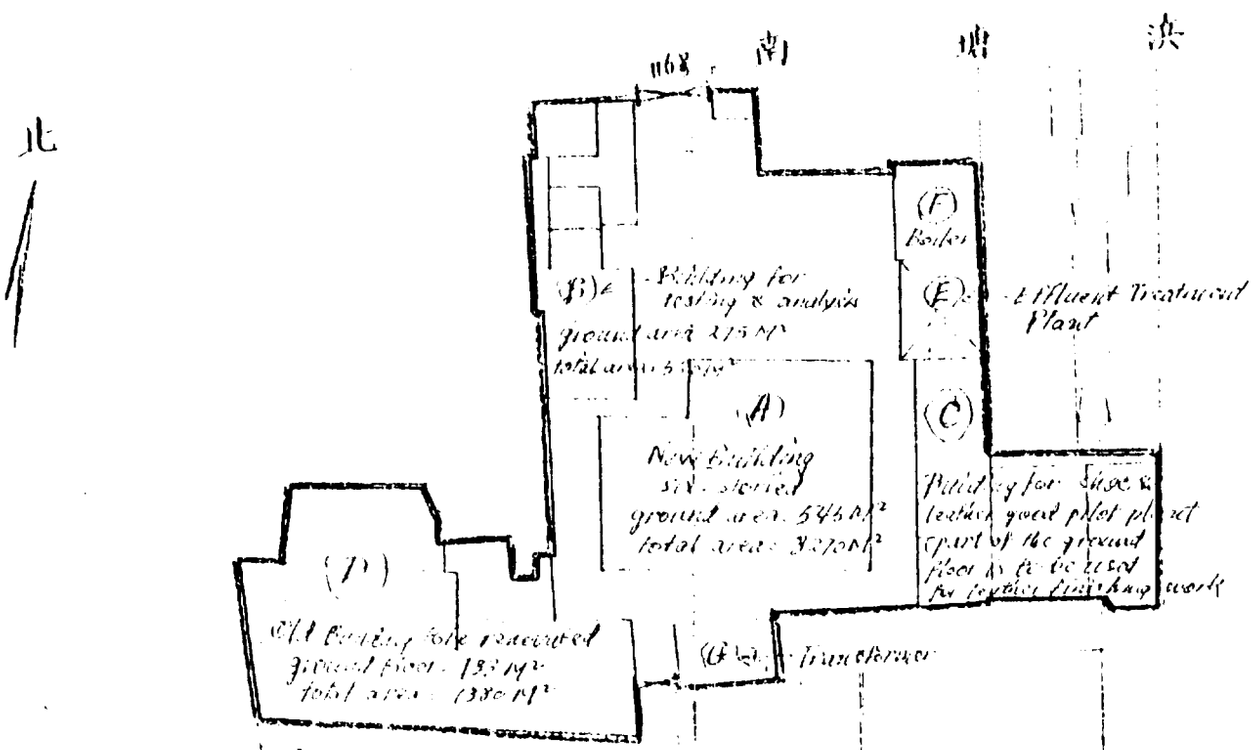
Description	Estimated cost CIF in US$ in thousand Dollers
Tannery pilot	Total: 430

The footware Pilot Plant,

The laboratory instruments, with the exceptions mentioned on the revised list (page 36) and Effluent Treatment Equipment, will be purchased in China

16. PLANS OF BUILDINGS FOR:

LAY-OUT OF MACHINES TO BE MADE

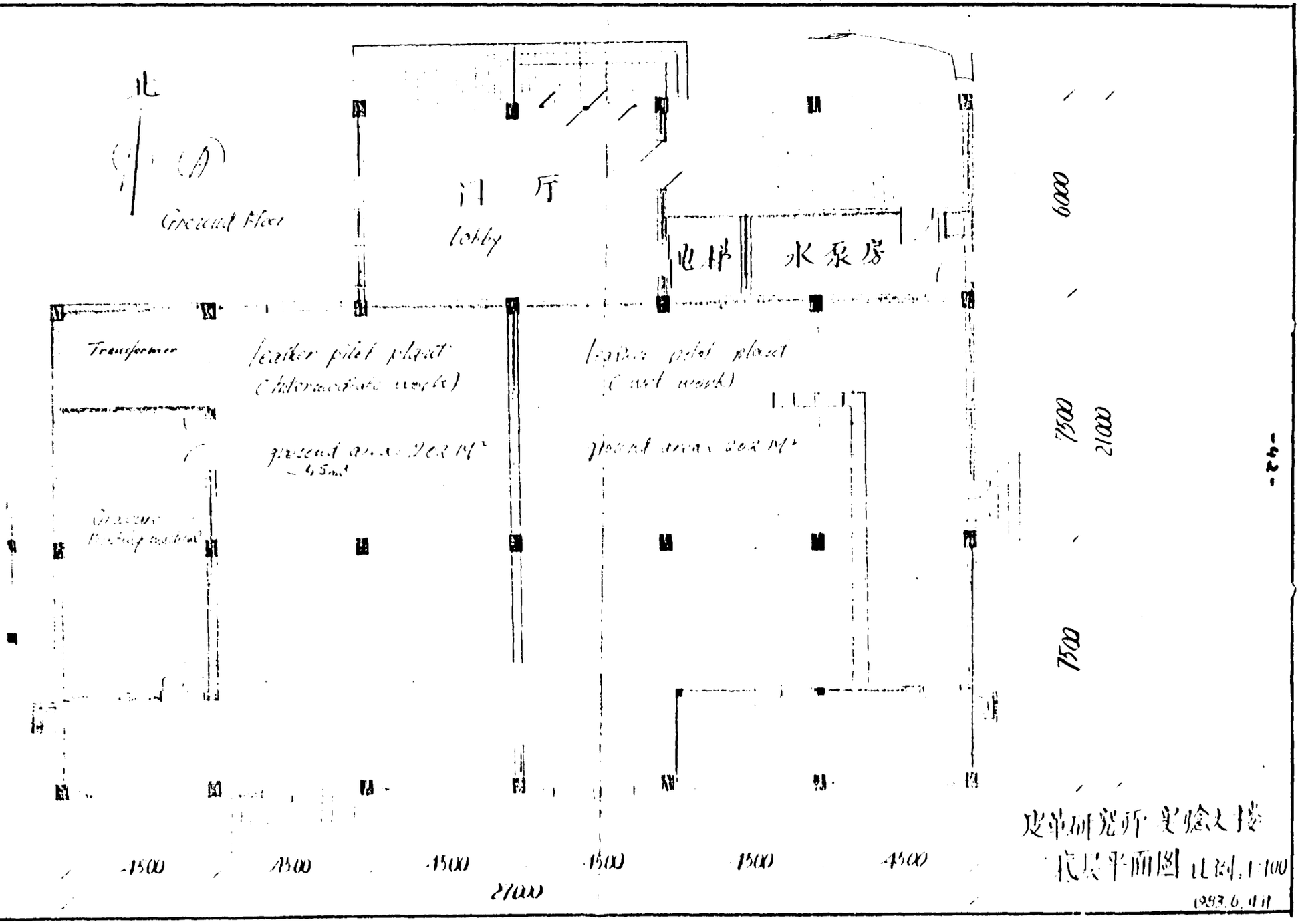


上海皮革工业研究所

地形图

比 例: 1:500

1984 6 4 11

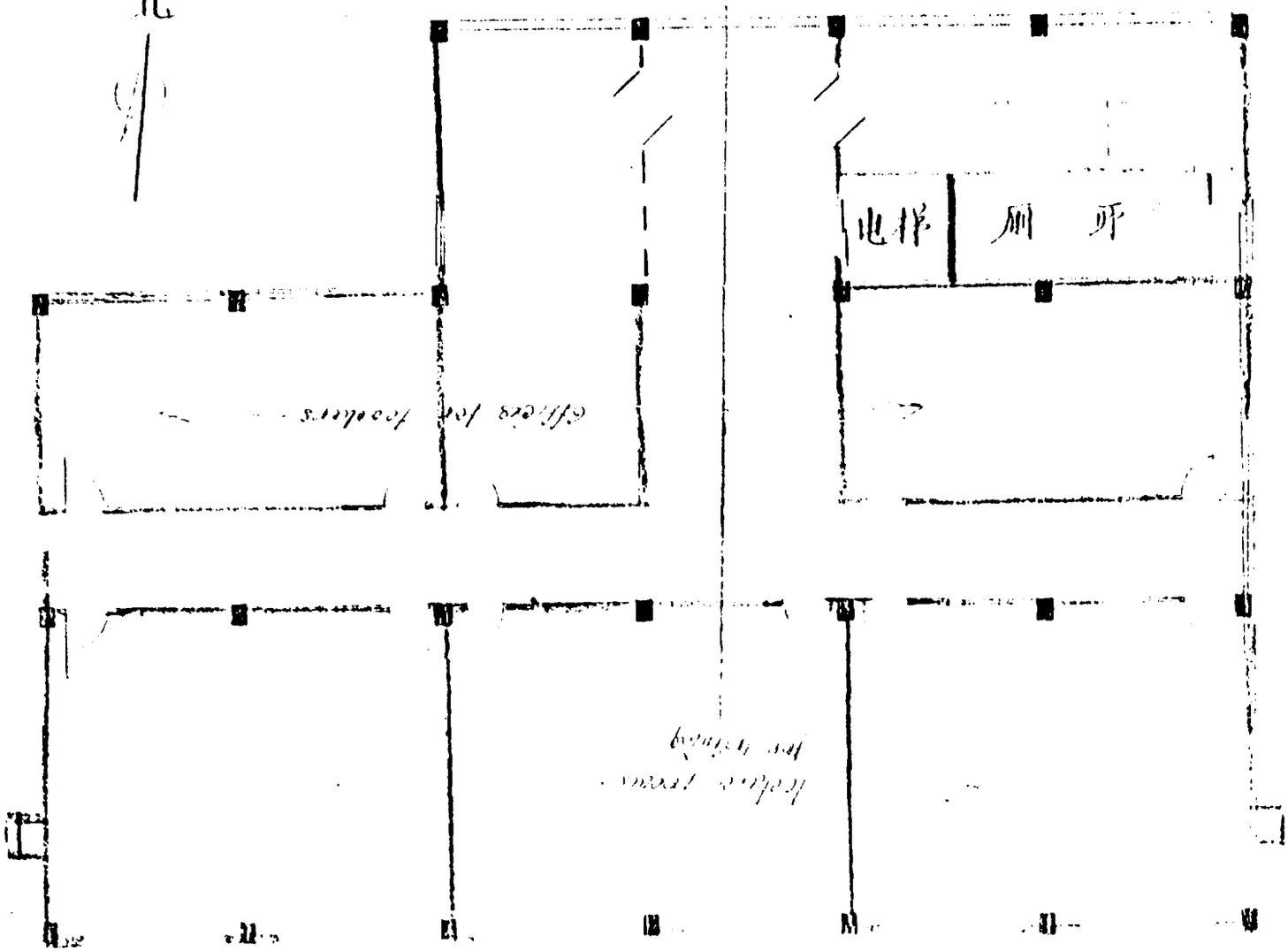


建筑研究所实验大楼
底层平面图 比例 1:100

1993.6.11

5. floor

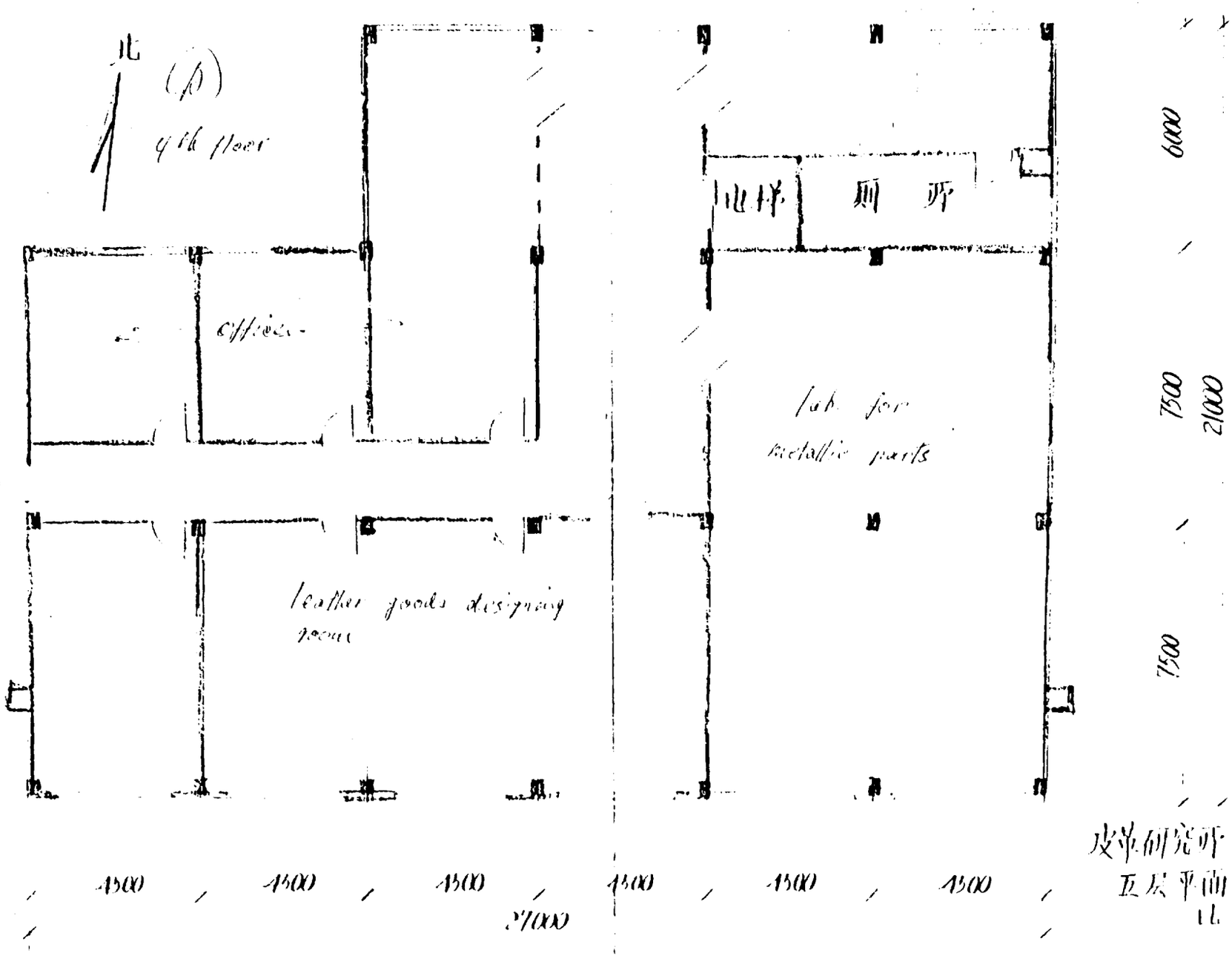
北



皮革研究所 实验大楼

六层平面图 比例: 1:100

1983.6.4日



皮革研究所 実験大棟
五階平面図
比例 1:100

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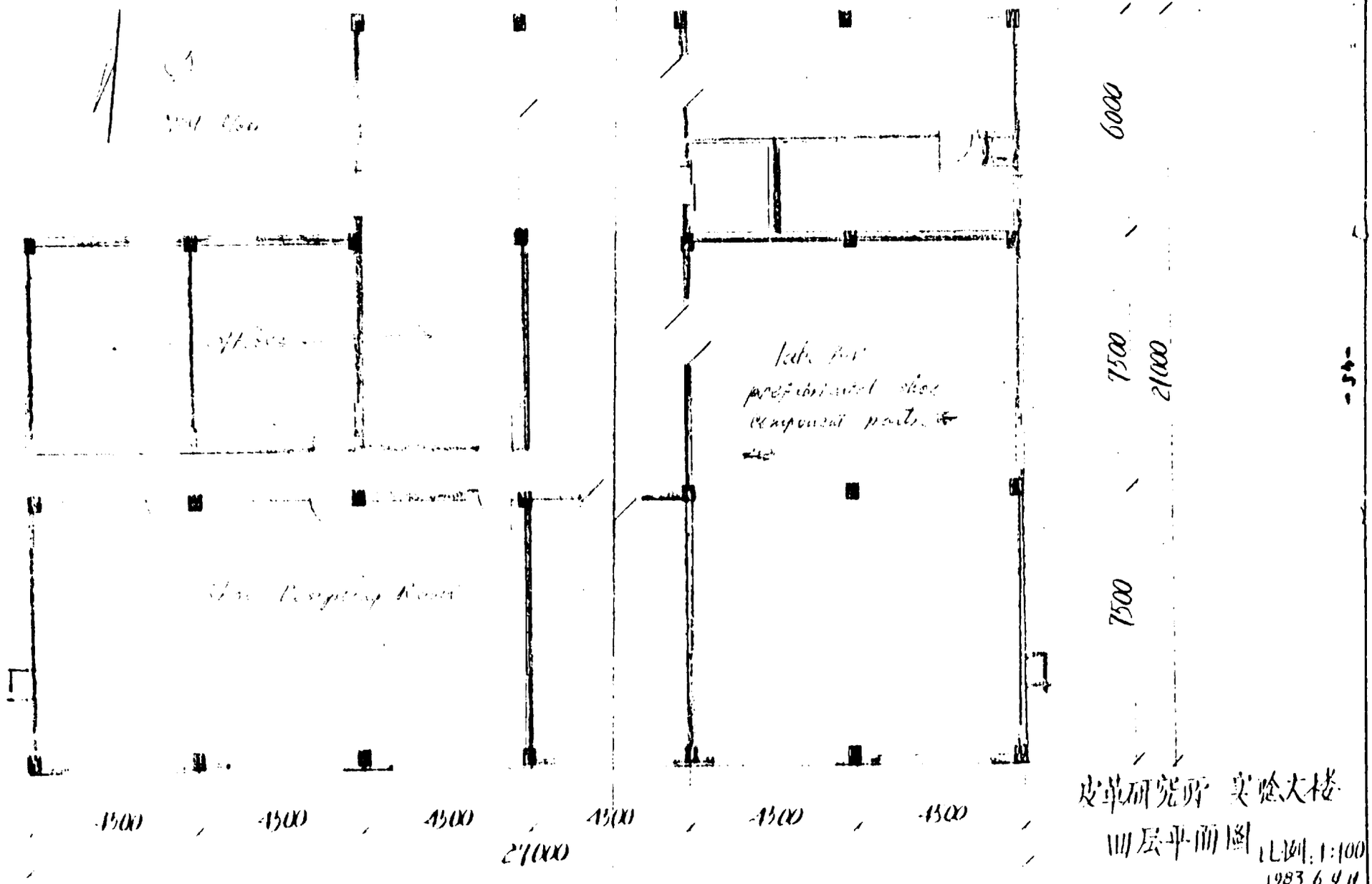
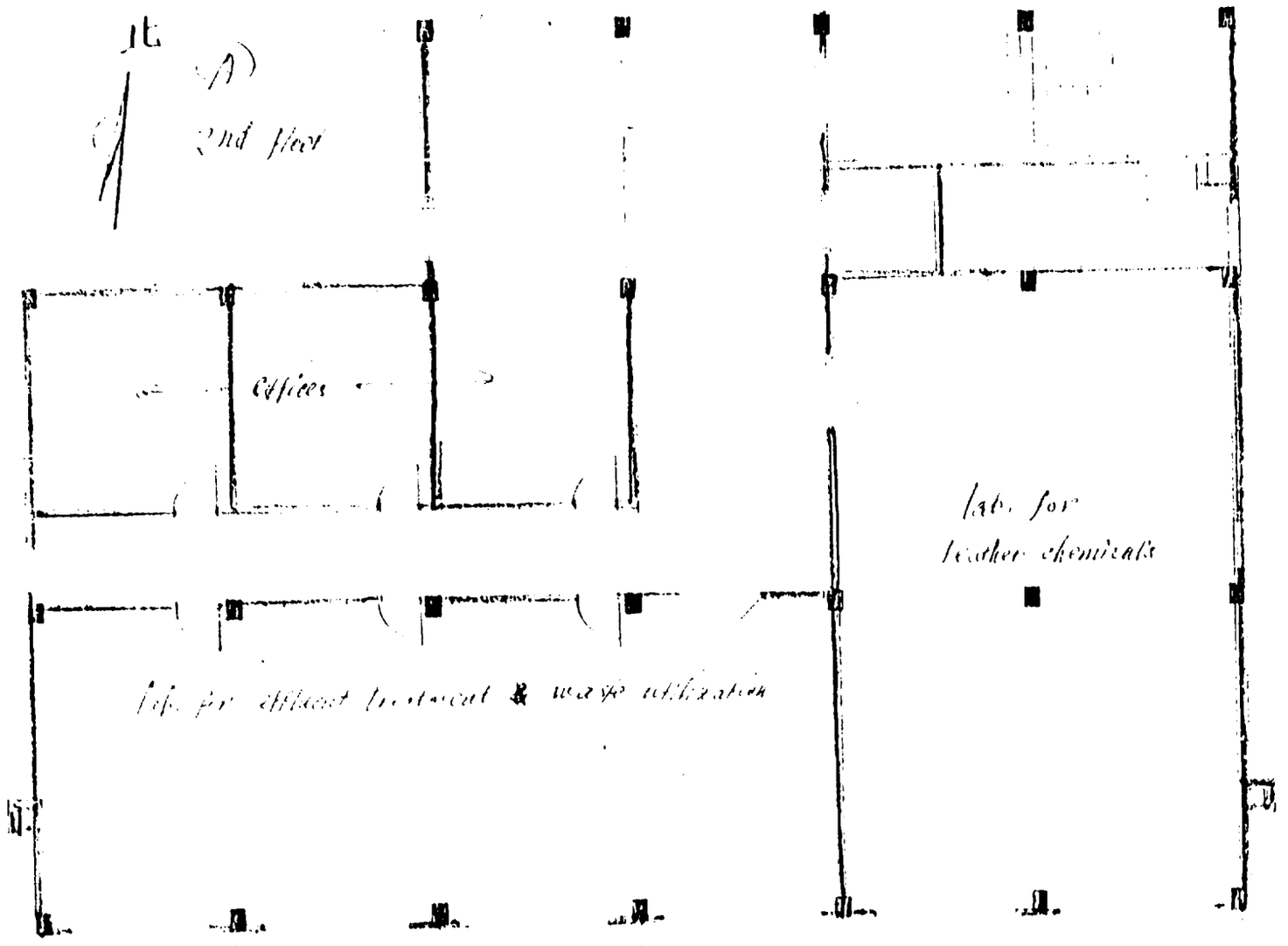
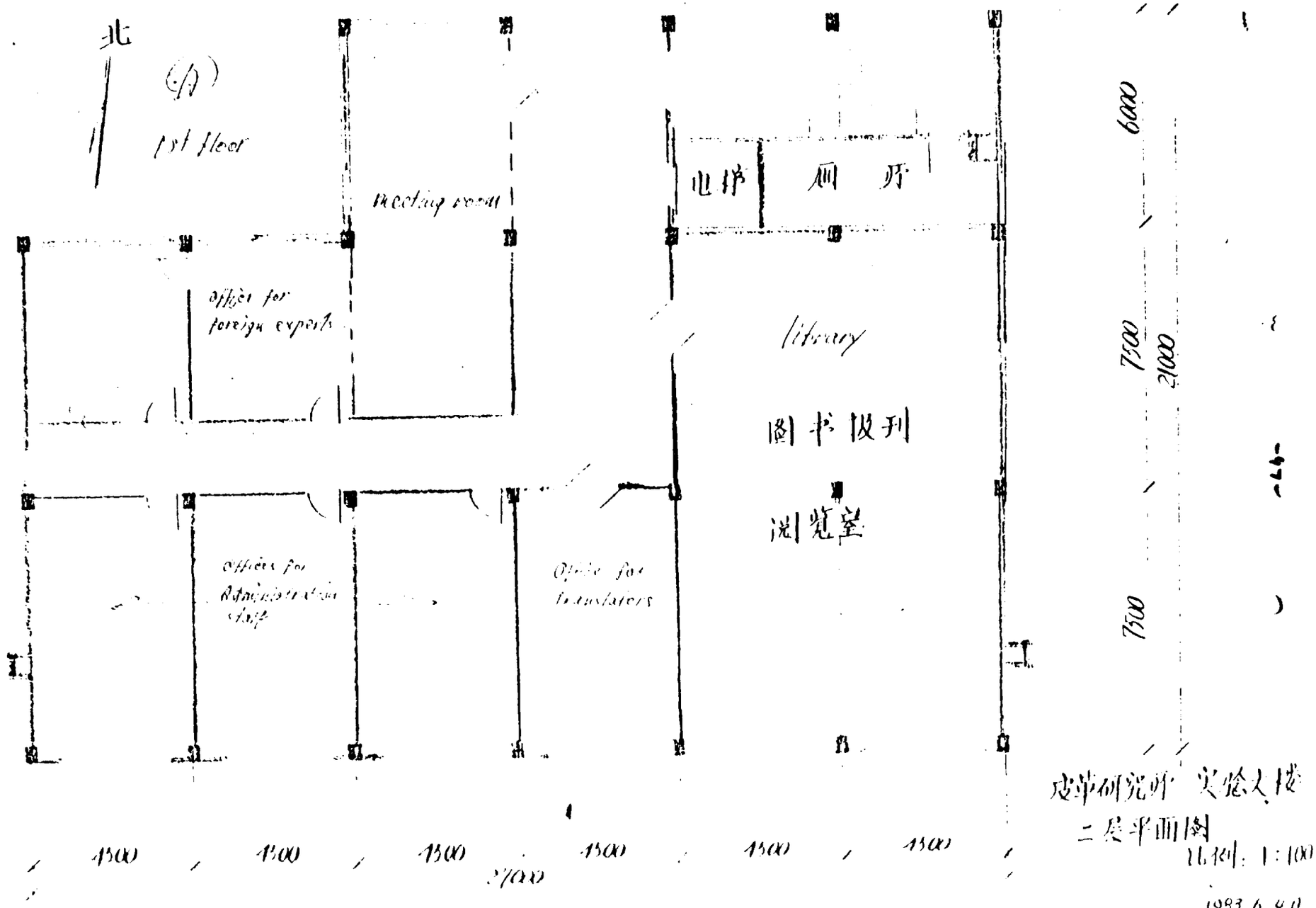


皮革研究所 实验大楼
四层平面图 比例 1:100
1983.6.4 n



皮革研究所 実験工場
二階平面図
比例: 1:100
1983 6 月



建筑研究所实验大楼
二层平面图
比例：1:100

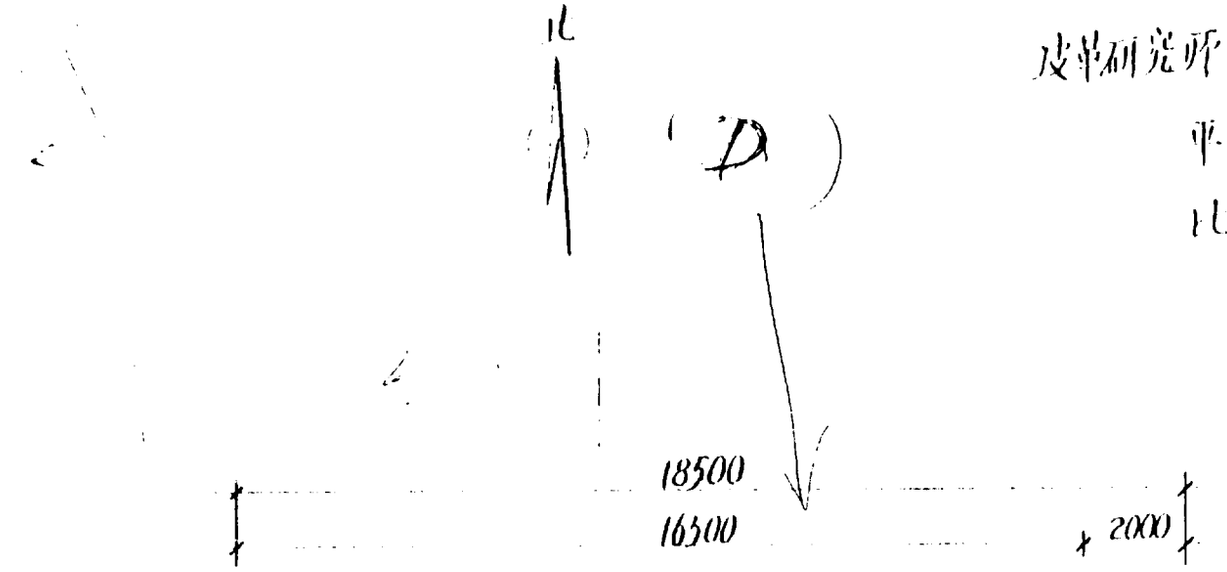
1983.6.4日

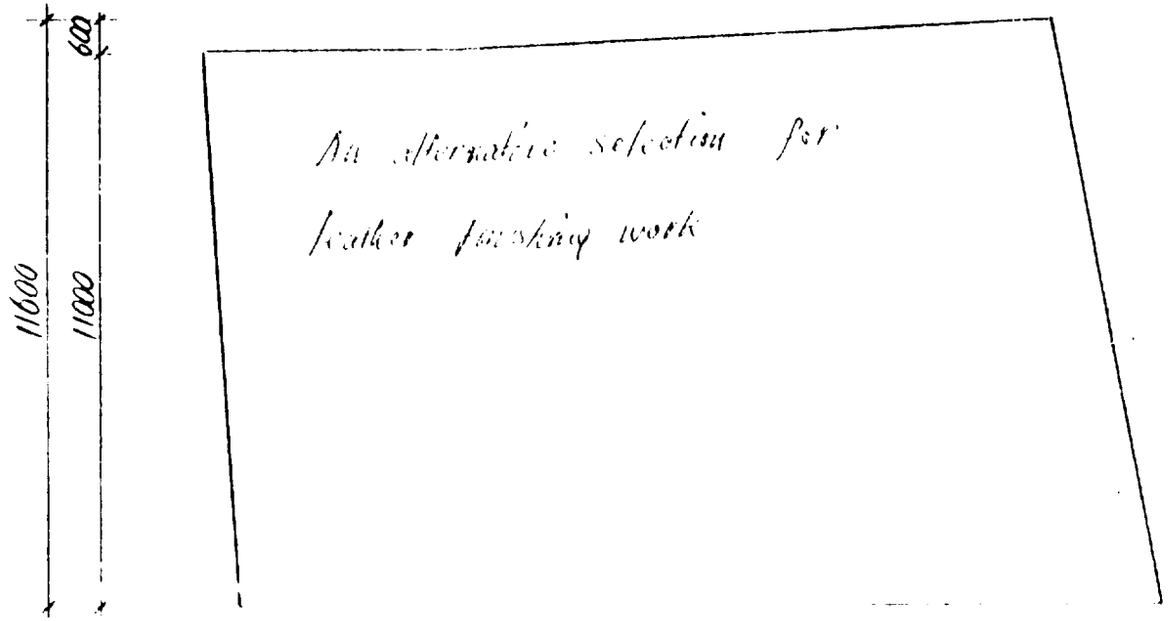
1987 6 11

皮革研究所（成皮塑场地）

平面图

比例：1:100





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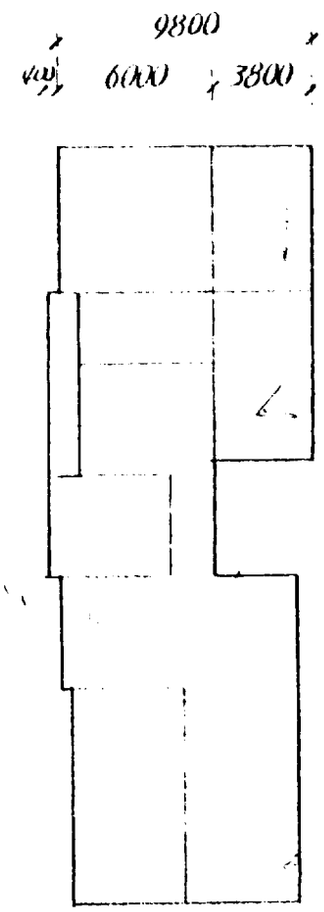
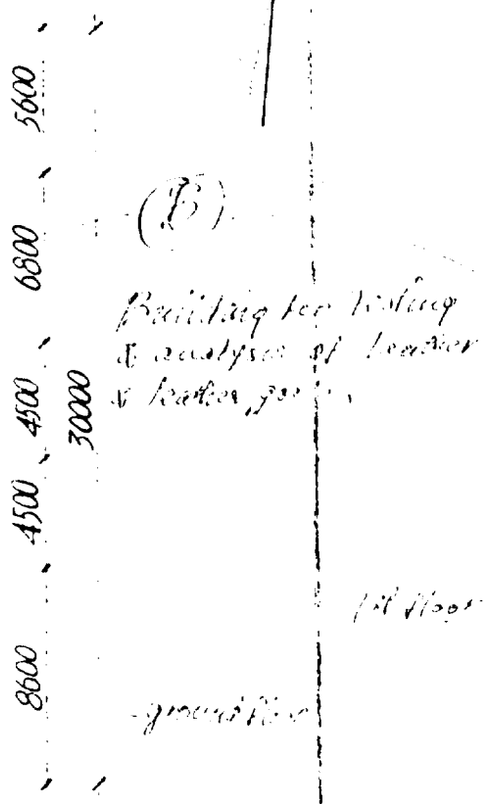
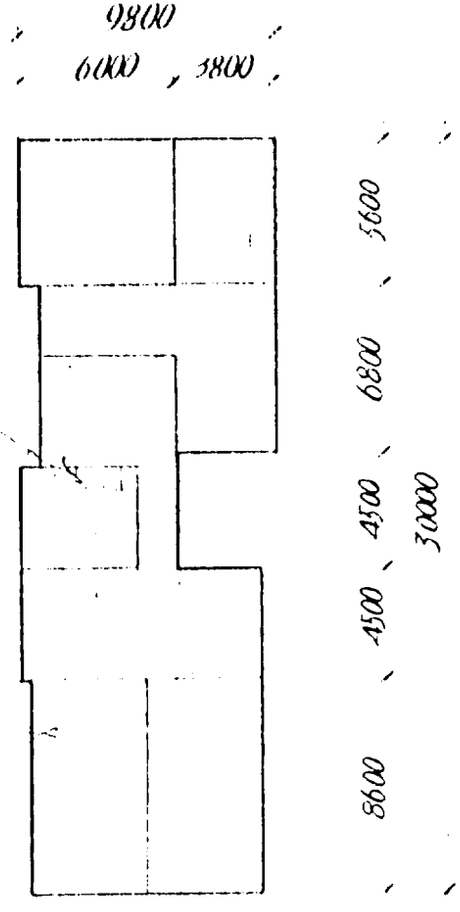






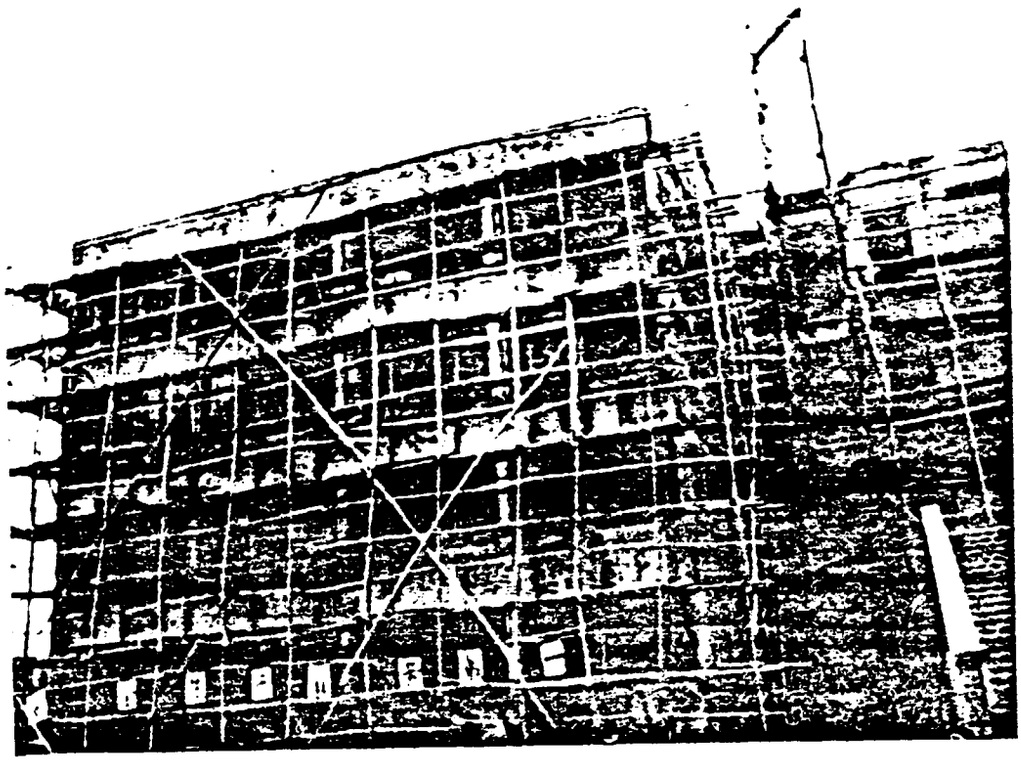
北侧（平理测试）

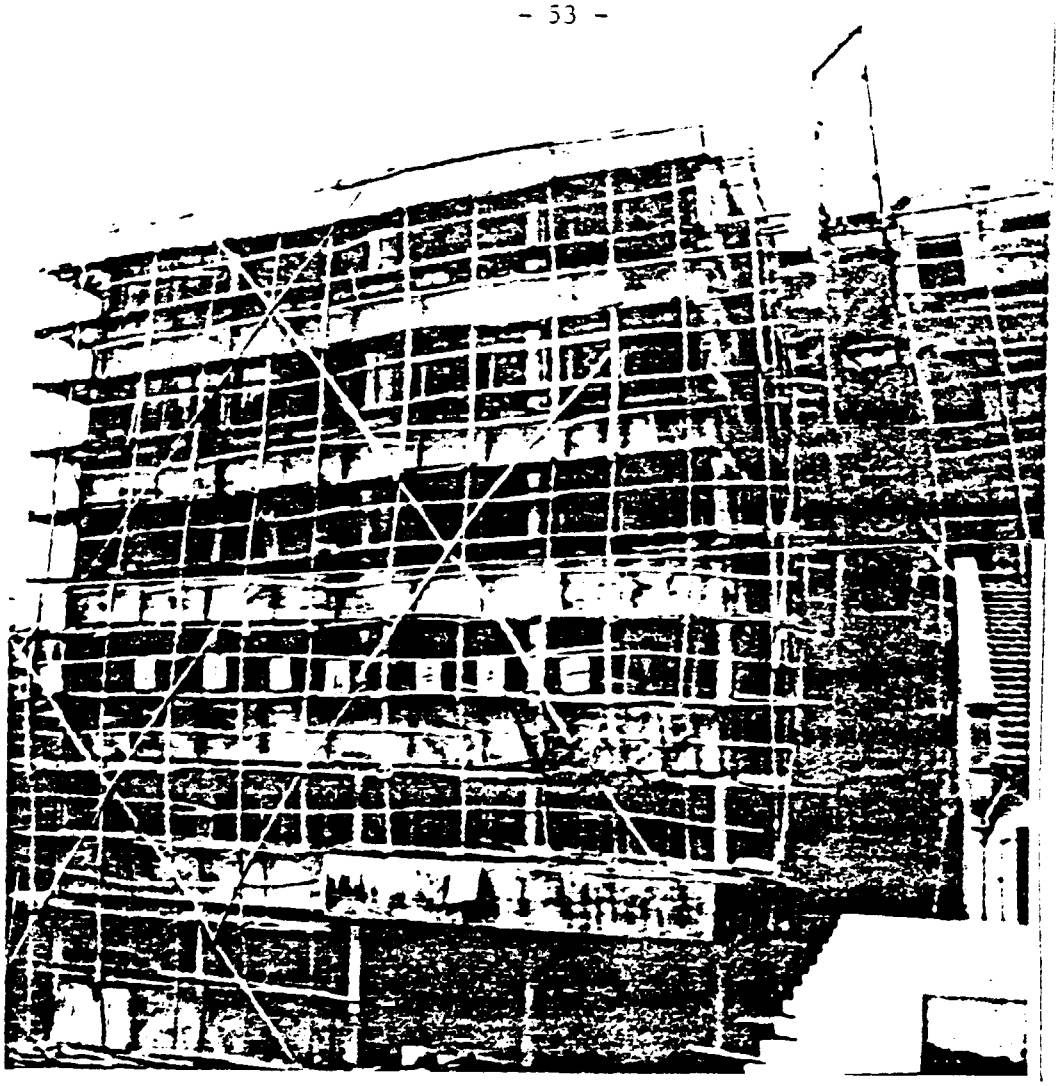
二层（化学分析）

皮革研究所 小试车平面图

比例：1:200

17. PHOTOS OF BUILDING OF 9 JUNE 83.



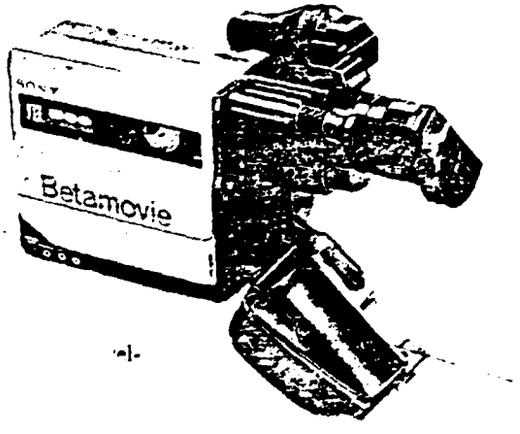


NEW PRODUCTS AND PROCESSES

A Camera and Recorder in One

Shooting home-style movies with videotape equipment has been a cumbersome affair, requiring a separate camera, a recording deck and often a battery-pack power source. Now Sony Corp., of Tokyo, Japan, has integrated the two key components—the camera and the recording deck—into a single, lightweight package called the Betamovie BMC-100 (photo). Standard, half-inch Beta-format video cassettes snap right into the body of this 5½-pound camera. Up to three hours of live action can be recorded and then played back instantly on a conventional video-cassette deck. The only additional equipment required for moviemaking with the BMC-100 is a 1½-pound rechargeable battery pack that is inserted into the camera's handgrip.

Numerous manufacturers have been developing video-recording cameras of this type but Sony's is expected to be the first to be commercially marketed when it debuts in Japan early this summer. And though a new generation of video equipment using quarter-inch tape is under development for the future, Sony officials claim the Betamovie recording camera will not become obsolete. "Several million people own Betamaxes and they're not just going to throw away their equipment," says Fred Wahlstrom of Sony Corp. of America. Price: between $1,150 and $1,500.



Addition to the Technical Report of 9 June 1983

Summary of the debriefing at Beijing

1.1 Reception by Mr. Liu Guanglu
Deputy Division Chief, 2nd Division of Foreign Affairs.
Department of Ministry of Light Industry, at the airport Beijing.

Briefing on observations made at Shanghai
Mr. Liu suggests a meeting next day with:

1.2 Mr. Yu Lianniau, Deputy Director of Foreign Affairs Dept.,
Ministry of Light Industry,
Mr. Xu Lungjiang, Engineer (Leather), Chief of Leather Division.
2nd Light Industry Bureau, Ministry of Light Industry.
Mme Tao Wuxin, Programme Officer, Dept. of International Organization,
Ministry of Foreign Economic Relations and Trade.
Mr. Liu Guanglu, Deputy Division Chief - translating personally.
Mme Wang Kuoying, Deputy Director of 2nd Light Industry Bureau.
The Head of this Ministry section, Mr. Hu Zungyuan was outside
Beijing at this time.
Mr. Sissingh (SIDFA)

1.3 Mr. Sissingh had been briefed the day before and given a copy of the technical report. He kindly followed the invitation by Mr. Liu.

1.4 The main points of the meeting:

The list of machinery and lay-out plan.
Phase 2 - National Leather Institute:
As it had to be changed in order to serve the purpose of the National Leather Institute Shanghai, the reasons had to be explained, especially to Mr. Yu Liannian and the Leather Engineer, Mr. Xu Lungjiang. The full approval by Mr. She was given by his signature, since he could not attend the meeting as I had suggested. The suggestions were received in an open-minded positive way.

The missing lay-out plan for the machines

The building is ready for installations of water and electricity. Without a detailed plan of the size and placement of each machine it was strongly recommended to prepare, based on the building plans included and machine sizes obtained by suppliers, a precise lay-out plan at Vienna to ensure the proper and speedy completion of work. If necessary, the expert could also do it. This was well understood.

2. The National Leather Institute - its immediate effectiveness

2.1 Even without the complete machine park, ca. 15 months behind schedule, some 60 young and able future managers of tanneries should be trained from October 1983 onwards.

2.2 The laboratory of phase 1, now dismantled, to be reinstalled as soon as possible, would play an important part in the training implementing analyt ical routine controls.

2.3 A study plan for 3 years should be set up and set into operation:

1st year basic theory and analytical work
2nd year case-studies on pig-kid-sheep-cow hides and fur double face
3rd year should cover practical, operational tannery management training in a modern model tannery. – The Chinese leather industry suffers severely under management skill. – This cannot be successfully overcome by new machinery and the leather institute alone. – After 40 years in leather industry, working in more than 500 tanneries, and in 80 different countries, the expert stressed the importance of a third study year in a modern medium-sized model tannery. To run it some 60 prepared students are needed guided by experienced managers.

2.4 The Model Tannery: a pilot production unit as a third development phase.

1. It should consist of a prefabricated building - also usable for other industries . A license of an advanced system could be obtained in Italy.

2. It should be a multi-purpose tannery for the tanning of pig, kid, sheep, cow hides etc. It should show a simple, efficient effluent canalisation and treatment facility.

3. It should contain at least one classroom and a standard control laboratory.

4. Its production volume should be about 300 - 400.000 sqft per month. That are ca. 50,000 sqft of each leather type, produced by the 3rd year students, plus assisting workers in the sense of strictly guided case-study production.

5. A lay-out should be prepared for such a management training unit. Time ca.4 months by four different specialists or about one man/year.

6. The implementation should be carried out in 2-3 years, to become operational.

7. The adapted standards of the building could be reproduced to modernize the Shanghai and later the Chinese leather industry.

2.5 The Transition Phase

The 15 or so tanneries which the expert has seen 4 years ago and again during this mission seem to require a lot of slow and expensive re-organization work before obtaining cost-covering production levels. Some new machines, espec. in intermediate work, as setting out etc. should be bought, further also finishing machinery which is at the lowest level. But, it should later fit into the modern model conception and be re-used there, to safeguard the return on investments, since tanning machines are very expensive and have an average "lifespan" of 15 years.

Such further reaching investments for the tanning industry

- besides developing a young and efficient management
- efficient tanning methods, reducing the dangerous effluent by 30-50%,

would have a most beneficial effect on the Chinese leather industry within the next 5-10 years.

On the other hand, the "patch work" improvement of existing tanneries, different also from case to case, will most likely - after 5-10 years, still produce relative low quality, at low productivity.

In fact, an assessment in detail is to be made which tanneries can be modernized and which not.

Since some Shanghai tanneries have to be moved out of town anyhow, for effluent reasons, the model tannery, after 2-3 years experience in practice, could serve as a guide for such an essential project.

Therefore, a model lay-out would serve both, the management training and the modernization of a healthy leather industry, at lowest costs and at a high return on investment.

3. Concluding Comments

The Deputy-Director, Mr. Yu Liannian, expressed a very lifely interest in the suggestions made and expressed his thanks for the advanced level of the 7 days of lectures and for other work done by the expert, connected with the hope of further fruitful co-operation. Mr. Sissingh (SIDFA) summarized that the lay-out plan for phase 2 was a most essential work.

The phase 3 was a new valuable element for the development of the Chinese leather industry. Owing to scarce funds, the financing by UNIDO had to remain an open question.

4. Additional suggestions by the expert (as afterthoughts)

The expert would like to suggest that added value could be mobilized by the leather corporations themselves. It was observed that e.g. first class kid skins are turned into third class finished kid leathers, leading to very considerable losses. Until equipment, technical know-how and management are further advanced, by measures explained, it is more economical to export first grade raw skins, to gain foreign currency, to pay for know-how and machines. The use of lower grade skins, under the present production conditions, hardly lowers the final economic result, creating at the sime time a challenge "to make the best out of it". It is a realistic technical possibility, exercised in many modern tanneries, leading to technical progress.

The second point is that not every tanning machine must be new. In closed-down plants there are often million worth of modern, not sensitive equipment, like embossingpresses (lifespan 20 years) or finishing equipment.

Such equipment could serve another 15 years and help to modernize, at lower cost and faster, tanneries in China. All what is needed is a trustable engineering inspection group, including Chinese specialists, for the take-over and control of the revision work. Arzignano, Italy, a centre of some 350 tanneries and the leather machine producing industry, is the given location for such an approach.

As production programmes change quickly, such exchange of good and revised, still modern equipment is normal practice in the modern Italian leather industry. There is no limit to utilize such possibilities also in China.