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JPRS 84474

5 October 1983

CHINA REPORT

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CONTENTS

PEOPLE'S REPUBLIC OF CHINA

ABSTRACTS

APPLIED SCIENCES

SWEDISH FIRM SELLS LICENSE FOR SHIP SCREWS, GUIDANCE SYSTEM

Stockholm DAGENS NYHETER in Swedish 1 Sep 83 p 21

[Article by Kjell Lofberg]

[Text] Johnson-owned Nordstjernan AB's subsidiary KaMeWa of Kristinehamn defeated some stiff competition to win the most extensive licensing agreement to date between Sweden and China.

KaMeWa has sold licenses to the China Shipbuilding and Trading Company (CSTC) for the production of propellers, thrusters, and control and guidance systems.

The contract was drawn up last May, but was not published until now because it was only recently approved by the Chinese government.

In the short term, the licensing agreement will generate no significant funds for KaMeWa and Nordstjernan, but could provide considerable revenues in the future. It is a 10-year agreement. KaMeWa will receive compensation at the same rate the Chinese begin production on the licensed products.

"This probably is the largest contract ever signed between Sweden and China," said Hugo Wolff, sales engineer at KaMeWa. "At least this is what the Chinese told us."

China is just beginning to build up an enormous shipbuilding industry. Many developing countries have chosen shipbuilding as an initial sector of industrialization. This was the path chosen by Japan and South Korea. Now China will enter the competition, first to meet its own needs for river and coastal ships, then for exports.

For Nordstjernan and KaMeWa, this could mean the opening of a new market in Asia, which currently is the world's most expansive shipbuilding market. The licensing arrangement means that the Chinese themselves will manufacture the ships whose licenses were sold by KaMeWa.

At the same time, however, it is highly probable that part of the production will occur in Kristinehamn, since China probably has an insufficient ship-building capacity. Thus, the licensing agreement could make it possible for

KaMeWa to produce various components.

KaMeWa is one of the world's leading companies in the area of propeller production. The company already has licensing arrangements with the United States and Japan.

KaMeWa refused to reveal how much money was involved. Millions of kronor probably are involved, however. KaMeWa representatives say, however, that the agreement could be extended after 10 years and that other licenses could be sold to China.

9336
CSO: 3650/281

NATIONWIDE COMPUTER USERS' INFORMATION RETRIEVAL SYSTEM

Nanjing NANJING GONXUEYUAN XUEBAO [JOURNAL OF NANJING INSTITUTE OF TECHNOLOGY] in Chinese No 2, 1983 pp 66-71

[Article by Sun Zhihui [1327 1807 2264], Zhu Yijian [2612 1837 0256] and Tang Yan [0781 7346]; other investigators who contributed to this work are Comrades Xie Hongyuan, Zhang Xiaotao, Zhang Hua and Chen Zhuowen]

[Text] I. Introduction

In order to facilitate the use of scientific methods in managing the computer users and the technical and financial data on different computers in this country, and to improve the quality and efficiency of management, it is essential to develop a nationwide computer users' information retrieval system with Chinese characters.

For this reason, the China Computer Technical Service Company joined force with the Nanjing Institute of Technology to undertake this task; they designed and implemented a practical Chinese-character information retrieval system with the following capabilities.

This system can store 41 pieces of technical data on every computer user and 40 pieces of technical data on all computer models used in the country (see Fig. 1). It has the capability of performing information retrieval, statistical analysis, data modification and deletion; the results can be displayed or printed in clear Chinese characters. For the user's convenience and to increase the user's confidence in using the system, all operations of the system are displayed on the screen in Chinese characters; also, diagnostic and editing capabilities are provided.

II. Data Model

The system contains two basic types of data: user data and computer model data. Because of the large data storage requirement, the constraint with the Sigma-10 microcomputer to store both system programs and user programs (including user data) on a single magnetic disc, and the difficulty in estimating storage size due to the variable record length (e.g., the computer model owned by each user can vary), the first priority in designing the data model for this system was to conserve storage space; increasing the system response speed was a secondary

consideration. For this reason, the system adopted a hierarchical data model, which has clearly defined paths for data transfer, and the concept of logical data base. The proposal data model is shown in Fig. 2.

In the hierarchical model of each data type, the entire logical structure is a tree composed of a number of different records and chains. The records are the nodes of the tree; each record in turn contains a number of data items. The order of the data in each record is indicated by its physical location in the diagram; the chains represent the relation between the records.

Some data items (e.g., peripheral devices, application software) are used in two different files. In order to reduce data redundancy, the concept of logical data base in the hierarchical data model is used to maintain a hierarchical structure logically and to share the data items physically. This approach not only provides a link between the two systems, it also greatly reduces data redundancy.

III. File Systems

The following factors were considered in the design of this system: (1) effective implementation of the hierarchical model; (2) efficient use of the magnetic disc storage in the form of variable-length logical records; (3) increase in the speed of retrieval and in the speed of conversion of Chinese character codes. During system initialization, different types of file structures were established: data files, index files, and Chinese character files (CHIN).

1. Data File. A computer model data record contains the complete information about a particular computer model; a user data record contains the complete information about the computers owned by a particular user. Because the latter is subject to frequent additions and deletions, its format has a chain table structure. The variable items in the two data files are linked to the index file using chains. The record formats of the user data file (DATA) and the machine model data file (KDATA) in the retrieval system are shown in Figs. 3(a) and 3(b), respectively.

In order to effectively allocate the storage space required by the data files and release the space back to the system after a record has been deleted, two storage pools are established in the system (storage pools 1 and 2). During system initialization, the storage pools are in a configuration as shown in Fig. 4.

The configurations of the storage pools and the chain table file when fetching a record space from the storage pool or returning a record space to the storage pool are shown in Figs 5(a) and 5(b), respectively.

When the storage pool on the magnetic disc is depleted, the system alerts the user to change the diskette and to initialize the new diskette. In this manner, the system is not constrained by the actual amount of data; as a result, the number of records in the data file can be greatly increased.

2. Index File. The index file primarily contains one item used for retrieval (e.g., the user name in the user index file) and a pointer for indicating the address of the data record. The data file is linked to the index file by linking the index item and the corresponding pointer with the chain table structural files DATA and STORAGE. In addition to the indexing scheme based on provinces, the index file includes other items such as user index (MAIN**), computer model index (KIND), date index (YEAR), domestic and foreign factory index (CFACTORY/FFACTORY), application software index (CSOFT), utility index (USE), and effectiveness index (CEFF). Because the system incorporates in the user index file the province (or city) in which the user is located (for example, the Jiangsu Computer Center is in file MAIN09 where 09 is the index of Jiangsu Province), one can retrieve all the users in the province by simply opening the appropriate file MAIN**. To retrieve a particular user in the province, it is necessary to open the user file according to the user index, then search for the user in this file. This is a level 2 search technique, which has the advantage of faster retrieval speed compared with other level 2 indexing schemes.

The peripheral device record (ODEVICE) contains such items as name, specification, and the name of manufacturer. The user data file and the computer model data file can share the same peripheral device record via the record number, thereby conserving storage space. During a search operation, the record can be retrieved directly from the peripheral device file based on the record number in the data file. The system software file (SSOFT) in this system also uses such retrieval techniques to minimize data redundancy.

A sequential search technique is used because the items in the index file are the Chinese character address codes, which cannot be easily arranged in order.

The structures and search techniques of the individual index files in this system are basically the same, hence only the user index file MAIN** will be used as an example for illustration. (See Fig. 6)

Fig. 6 shows the initial word of an item in the record; the Chinese character is stored according to the address code (indicated by *), each address code occupies a space of two bytes. The index pointer of each user is linked to the records containing information on various computer models (e.g., records in the user data file DATA). On the other hand, the reverse pointer of each record in the user data file points to the owner of the computer (i.e., the user) in the MAIN** file. This loop chain table structure facilitates the search for user name and address from any data record.

3. Chinese Character File (CHIN). In the Sigma-10 microcomputer, the display and printing of Chinese characters are accomplished by a three-stage conversion process using the Chinese character interpretive language. (See Fig. 7)

In order to reduce the conversion time and storage space for Chinese character codes, a Chinese character file (CHIN) is established to store the address codes of commonly used Chinese characters during a man-machine dialogue. When Chinese characters are used for inquiries and for user messages during system operation, the required Chinese character address codes are fetched from CHIN

to be used in the corresponding display/print operation. By storing only the Chinese character addresses, it is possible to reduce the storage requirement by one third, and at the same time eliminate the level 1 conversion time for converting a 6-digit Chinese character code to a 2-byte address code (during display/print).

The above description shows that space utilization is a primary consideration in establishing the data model for the retrieval system. An analysis of the system response speed is presented below. Because the user data file contains the largest amount of data during system operation, the system response speed is the slowest when retrieving user data. Therefore, by analyzing the response speed in retrieving user data files, one can determine whether the data model design and the corresponding retrieval technique are conceptually sound and feasible in practice.

The system response time is primarily determined by the number of visits to the magnetic disc; also, due to the limited core storage of the Sigma-10 microcomputer, it is not possible to transfer an entire file from the magnetic disc to the core memory, only a record at a time can be transferred. Therefore, under the worst condition, the system response time T for retrieving the operating status of all the computers of a particular user is:

$$T = (n + m\ (a+b+c+d))*t$$

where n is the number of users in the province

m is the number of computer models belonging to this user

a,b,c,d are respectively the number of peripheral devices, the number of terminals, the number of system software, and the number of application software of a particular computer

t is the time required for each visit to the magnetic disc (t is primarily determined by the time required for moving the tsk magnetic arm and the input speed)

Under most conditions the values of a, b, c, d are quite small. Actual test results show that the system response time completely meets the user requirement, and the speed of retrieval is satisfactory.

IV. System Implementation

This retrieval system can perform the typical functions of other conventional retrieval systems, i.e., creating, retrieving, editing, deleting, and displaying/printing. In addition, it has the capability of calculating statistics, initialization, and printing the record numbers of data files and index files. For considerations of readability and maintainability in the design and implementation of the system, these functions are divided into corresponding functional modules which are stored in the form of files on the magnetic disc. During system operation, a functional module can be fetched from the magnetic disc according to the user's selection.

The block diagram of the system program structure is shown in Fig. 8. It has the following specific functions:

Function 1: creating and adding user data records (module FI1), i.e., storing user information according to the format of the DATA file structure, and filling in and linking the various index files and data files.

Function 2: creating and adding computer model data records (module FI2), i.e., storing computer model information according to the format of the KDATA file structure, and filling in and linking the related files.

Function 3: editing user data (module FI3), i.e., editing the variable items in the user data file, so that the system always reflects the latest data information.

Function 4: deleting (module FI4), i.e., performing deletion operation on user data records and computer model data records.

Function 5: retrieving and computing statistics of computer model data (module FI5), i.e., all or part of the entries in the computer model data can be retrieved according to model type and application, and the calculated statistics can be displayed or printed.

Function 6: retrieving and calculating statistics of user data (module FI6); during the process of retrieving each item, partial or complete information about the item can be displayed or printed, and statistical data will be provided.

Function 7: printing the record number of data files (module FI7); the file contents are tabulated against the record numbers so that when executing other modules the user can input the record numbers in place of Chinese character codes to increase the speed of retrieval.

Function 8: initialization (module FI8); the soft diskette must be initialized before use, various file structures must be set up according to specific formats, and two large storage pools must be established (pool 1 and pool 2).

V. Concluding Remarks

The design, testing, and use of this system clearly demonstrates the feasibility of establishing a practical Chinese-character information retrieval system on a microcomputer. But due to the limited resources of a microcomputer, particularly the small storage space and other constraints, it is not possible to implement a conventional high-power data management system on a microcomputer. To overcome the difficulty of insufficient internal storage, the programs in this system are divided into 8 functional modules which can be overlapped internally to relieve the requirement on internal storage. In addition, the concept of logical data base in the hierarchical data model is used to reduce data redundancy, so that the amount of idle or redundant space is minimized. Since this retrieval system is a special-purpose management system, it is possible to arrange the program structure into a more compact form, and to

include more user-oriented features in the design of the man-machine Chinese character dialogue. These only reflect the special features of the system functions and structure; but other problems such as response speed and general utility must be considered. In summary, it can be concluded that many problems of time-space relations must be addressed before a high-efficiency, high-power information retrieval system may be realizable on a microcomputer.

省市1	用户名称2	通讯地址3	机型4	台数5	主机生产厂 国别6	主机生产厂 厂名7	安装日期(年.月)8	投入使用日期(年.月)9	内存介质10	内存容量11	内存单位12	外存 磁盘 容量13	外存 磁盘 单位14	外存 磁带 容量15	外存 磁带 单位16	外存 磁鼓 容量17	外存 磁鼓 单位18	缓存区19	机器效率(时/天)20	平均故障时间(时)21	故障种类22
主要用途23	经济效果24	使用效果25	维护人员 硬件人数26	维护人员 软件人数27	维护人员 负责人姓名28	外部设备 台数29	外部设备 名称30	外部设备 规格31	外部设备 制造厂32	外部设备 安装日期33	…	终端 台数34	终端 名称35	终端 规格36	终端 制造厂33	终端 距离	…	应用软件 名称31	应用软件 用途37	…	系统软件38	…

Fig. 1(a) Computer User Data

Key:

1. Province
2. User name
3. Address
4. Computer model
5. Number of units
6. Manufacturer of main frane
7. Country name
8. Factory name
9. Date of installation (year, month)
10. Date of start operation (year, month)
11. Internal storage
12. Medium
13. Capacity
14. Unit
15. External storage
16. Magnetic disc
17. Magnetic tape
18. Magnetic drum
19. Buffer region
20. Machine efficiency (hour/day)
21. Average down time (hours)
22. Failure type
23. Main application
24. Economic efficiency
25. Operational efficiency
26. Maintenance personnel
27. Number of hardware personnel
28. Number of software personnel
29. Person in charge
30. Peripheral devices
31. Name
32. Specification
33. Manufacturer
34. Terminals
35. Distance
36. Application software
37. Application
38. System software

机型名** 1	制造厂家 2	…	类别* 3	内存 4		外存9容量									接口15			首批出厂日期(年月) 19
				介质* 5	容量6 基本 7	容量6 最大 8	磁盘10 基本 7	磁盘10 最大 8	磁盘10 单位 14	磁带11 基本 7	磁带11 最大 8	磁带11 单位 14	磁鼓12 基本 7	磁鼓12 最大 8	磁鼓12 单位 14	缓存13 基本 7	缓存13 最大 8	缓存13 单位 14	串行数 16	并行数 17	最大数 18

出厂台数 20	最适应用* 21	发展情况* 22	目前状况* 23	字长 24	指令周期 25	主频率 26	器件 27	浮点加速 28	浮点乘速 29	30外部设备 台数 31	名称* 32	规格 33	生产厂* 34	…	有无硬件乘除部件 35	应用36软件 名称* 33	用途* 37	…	系统软件 38	……

Fig. 1(b) Computer Performance Data

Key:

1. Model name
2. Manufacturer
3. Type
4. Internal storage
5. Medium
6. Capacity
7. Basic
8. Maximum
9. External storage capacity
10. Magnetic disc
11. Magnetic tape
12. Magnetic drum
13. Buffer
14. Unit
15. Interface
16. Number of serial lines
17. Number of parallel lines
18. Maximum number
19. Date of first batch produced (year, month)
20. Number of units produced
21. Most suitable application
22. Status of development
23. Current status
24. Word length
25. Instruction cycle
26. Primary frequency
27. Equipment
28. Speed of floating point addition
29. Speed of floating point multiplication
30. Peripheral device
31. Number of units
32. Name
33. Specification
34. Manufacturer
35. With or without multiply/divide hardware
36. Application software
37. Application
38. System software

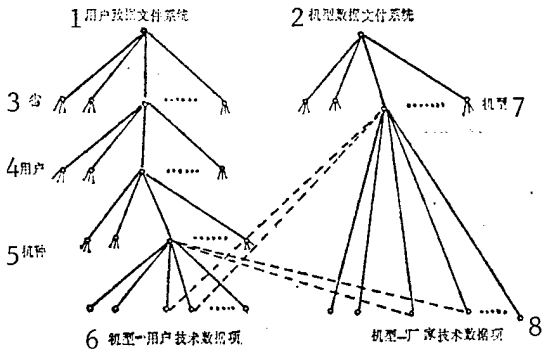
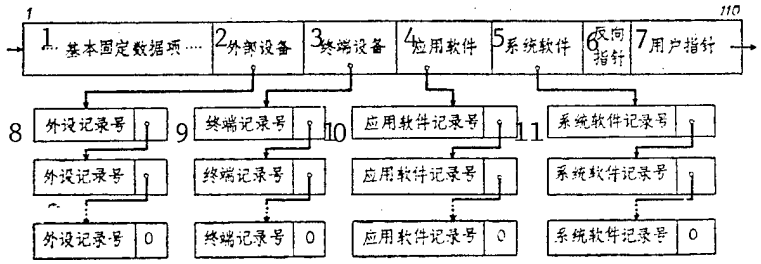
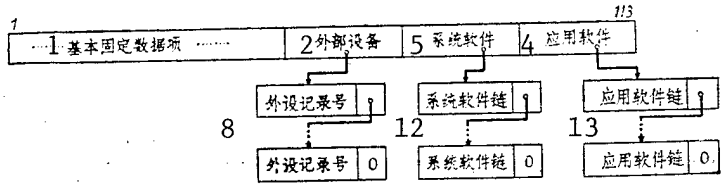


Fig. 2 Data Model

Key:
1. User data file system
2. Computer model data file system
3. Province
4. User
5. Machine type
6. Computer model-user technical data
7. Computer model
8. Computer model-manufacturer technical data



(a) DATA File Data Record



(b) KDATA File Data Record

Fig. 3

Key:
1. Fixed basic data item
2. Peripheral devices
3. Terminals
4. Application software
5. System software
6. Reverse pointer
7. User pointer
8. Peripheral device record number
9. Terminal record number
10. Application software record number
11. System software record number
12. System software chain
13. Application software chain

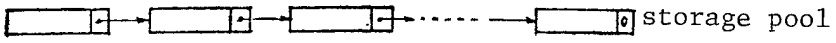


Fig. 4 Storage Pool

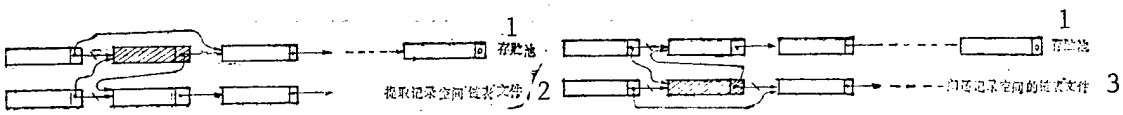


Fig. 5

(a) Fetching a Record Space From the Storage Pool

(b) Returning a Record Space to the Storage pool

Key:
1. Storage pool
2. Chain table file for fetching a record space
3. Chain table file for returning a record space

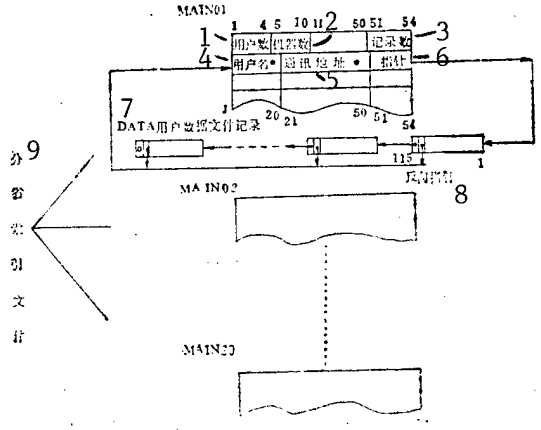


Fig. 6 Index File MAIN**

Key:
1. Number of users
2. Number of computers
3. Number of records
4. User name
5. Address
6. Pointer
7. DATA user data file record
8. Reverse pointer
9. Index file for each province

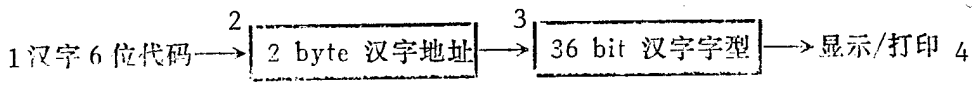


Fig. 7 Conversion of Chinese Character Codes

Key:
1. 6-digit Chinese character code
2. 2-byte Chinese character address
3. 36-bit Chinese word
4. display/print

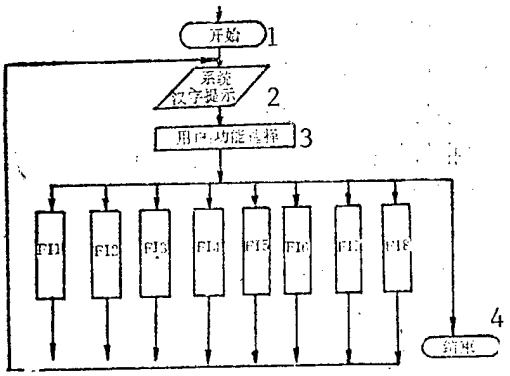


Fig. 8 Functional Modules of the Retrieval System

Key:
1. Start
2. System Chinese character prompt
3. User selected function
4. End

3012
CSO: 4008/160

CHARACTERISTICS OF NEW POLYBUTADIENE DESCRIBED

Beijing HUAGONG XUEBAO [JOURNAL OF CHEMICAL INDUSTRY AND ENGINEERING (CHINA)] in Chinese No 1, Mar 83 pp 84-89

[Article by Ni Shaoru [0242 1421 0320] and Tang Xueming [0781 1331 2494], Changchun Institute of Applied Chemistry, Chinese Academy of Sciences: "A New Polybutadiene"]

[Excerpts] Since 1,2-polybutadiene has many excellent characteristics, it is finding increasingly broad applications in such fields as rubber, plastics, paints, adhesives and the like; as a result, research on it throughout the world has been extremely active in recent years.[1-4]

A molybdenum catalyst system can be used to synthesize 1,2-polybutadiene, but earlier molybdenum catalyst systems had rather low activity, and it was necessary to use toluene, cyclohexane and the like as solvents. Using hydrogenated gasoline as a solvent, we systematically investigated the catalytic effects of the molybdenum system on the formation of 1,2-polybutadiene. A new, highly active molybdenum catalyst system was found. Its activity is close to that of Ni, Ti and Co systems and yields polymers with certain unique characteristics.

I. Polymer Synthesis

1. The Catalyst. It consisted of molybdenum alkoxytetrachloride ($MoCl_4OR$) and a suitable aluminum alkyl. The catalytic activity depends on the nature of the substituent R. It increases with increasing size of R. When R in the alkyl group is less than 7 carbon, the catalyst does not dissolve in the gasoline solvent and its activity is very low or nonexistent.

The catalytic activity is also affected by the distribution ratio of the main and auxiliary catalysts. With the quantity of $MoCl_4OC_8H_{17}$ fixed, the activity shows a peak value as the Al/Mo ratio is varied. The position of the peak shifts toward higher Al/Mo molar ratios as the quantity of $MoCl_4OC_8H_{17}$ used is decreased. This makes it clear that a certain aluminum alkyl concentration must be maintained in the polymerization systems to assure full formation of active centers.

The catalytic activity is also highly dependent on the polymerization temperature, i.e., it increases with higher polymerization temperature. If the

$MoCl_4OC_8H_{17}$ system is used for polymerization at less than 70°C, and when the Mo/Bd ratio of the catalysts (the molar ratio of main catalyst to butadiene) is equal to 5×10^{-5}, the conversion rate can reach 80 percent or more, but if the Mo/Bd ratio is close to 10^{-6}, it still can catalyze polymerization of the butadiene.

2. Molecular-weight distributions of the polybutadiene produced by the system are affected by the amounts of the main catalyst used. As the amount of the main catalyst is decreased, the molecular weight of the polymer increases rapidly; when the Mo/Bd ratio is 2.4×10^{-4}, the weight average molecular weight exceeds 1 million. When the amount of catalyst used is relatively large, the polymer does not gel; but when the amount of catalyst is decreased to an Mo/Bd ratio on the order of 10^{-5}, not only is the molecular weight of the polymer rather high, but also gels at times, resulting in difficulties for processing. Therefore it is necessary to regulate the molecular weight of the polymer. A rather effective regulation method is the addition of certain polaradditives during polymerization; these additives affect the molecular weight. For example, allyl halides have a considerable regulating effect on the molecular weight; at the same time, when it is used within a certain range, the activity is not decreased and may actually increase. Amongst the allyl halides, allyl iodide produces rather good results. When the Mo/Bd ratio is 8×10^{-5} and the polymerization temperature is 50°C, an (allyl iodide)/Mo ratio exceeding 10 can result in an average polymer molecular weight of less than 200,000.

The molecular-weight distribution is rather narrow with this system; with polymerization between 30° to 70°C, the polydispersity index is 1.5 to 2.0. The polymerization temperature and certain polar additives may be used to make the polydispersity greater. In particular, allyl iodide can produce this effect.

3. The distribution of chain structure in the polymer. We used infrared spectroscopy, ^{13}C-NMR, pyrolysis, etc. to study the chain structure produced by the $MoCl_4OR$ system. We found that the polymer always consists of more than 85 percent of 1,2-chain links. As for the 1,4-chain links, trans-forms were greater than cis-forms. The proportion of 1,2-chain links in the polymer can also be regulated by certain additives. Allyl halides can increase the formation of 1,2-chain links. The use of allyl iodide leads up to the production of 98 percent of 1,2-substitutes of butadiene.

Such additives as allyl iodide are also able to regulate the spatial structure of the polymer chains. Fig. 7 [not reproduced] is a ^{13}C-NMR spectrum for CH_2 = groups in the polymer. The spectrum shows clearly that as the amount of allyl iodide is increased, the characteristic curve for isotactic 1,2-chain links shrinks, while that of syndiotactic 1,2-chain links expands. Table 2 shows the relative amounts of the different types of 1,2-chain links obtained with ^{13}C-NMR; the data make it clear that allyl iodide can increase the stereoregularity of the polymer chains.

Table 2. Relative Content of Different Types of 1,2-Chain Links in Polymer

Allyl iodide/Mo (molar ratio)	0	0.3	1	4	8	10
Isotactic (percent)	48	36	28	25	22	21
Syndiotactic (percent)	13	22	29	31	34	34
Atactic (percent)	39	42	43	44	44	45

Based on the results of the NMR measurements, the amount of 1,4-chain links is very small; in essence they are only isolated elements distributed among the various isomeric 1,2-chain links. The sequential arrangement of the various 1,2-chain links is almot atactic, but as the amount of allyl iodide used is increased, the regularity of the chains increases. Table 3 shows the number-average and weight-average sequence lengths of isotactic and syndiotactic 1,2-chain links.

Table 3. Average Sequence Length of Isotactic and Syndiotactic 1,2-Chain Links

Allyl iodide/Mo (molar ratio)	0	0.3	1	4	8	10
$\langle Mi \rangle_n$	3.2	2.5	2.1	2.0	1.9	1.8
$\langle Ms \rangle_n$	1.4	1.7	1.9	2.0	2.1	2.2
$\langle Mi \rangle_W$	5.5	4.0	3.3	3.0	2.8	2.6
$\langle Ms \rangle_W$	1.9	2.3	2.8	3.0	3.2	3.4

Note: $\langle M_i \rangle$ and $\langle M_s \rangle$ indicate average sequence lengths of isotactic and syndiotactic structures respectively; subscripts n and W indicate the values of number-averaged and weight-averaged.

II. Physical and Mechanical Properties of the Polymers

The properties of the polymers are determined by their structure. The structural characteristics of the polybutadiene produced by the $MoCl_4OR$ system results in certain unique physical and mechanical properties. As Table 4 shows, the glass temperature of the polymer is rather high and increases with increasing amounts of allyl iodide. This characteristic is related to an increase in the proportion of 1,2-chain links in the polymer and also to an increased regularity of chain structure.

Table 4. Polymer Glass Temperature Tg, °C

Determination method \ Allyl iodide/Mo	0	1	2	3	4	8	10
Linear expansion	-27	-17	-16	-16	-16	-13	-12
DSC	-15	-10	- 8	- 9	--	-13	- 8

According to the results of X-ray diffraction analysis, under a constant-temperature static condition and when the allyl iodide/Mo molar ratio is less than 8, the polymers are all amorphous. However, under stress the situation is different. Fig. 8 shows stress-strain curves for the polymers obtained using different amounts of allyl iodide; when the curves for allyl iodide/Mo mole ratios of 2 and 4 exceed the yield strength, the slopes first gradually fall, then gradually rise, indicating that following stress fading a new stress has developed. There can be two reasons for the development of this new stress. One is that the polymers may have high molecular weight, gelling and cross linking when stretched. The other is that crystals may form after stretching. In the work reported here the first factor is not present because the polymeric characteristic viscosity factors [η] are all less than 4 when stretched as new stresses formed. The smaller the value of [η], the stronger the new stresses; but when [η] is greater than 4, stretching does not result in new stresses (see Table 5): after stretching, the polymers show no gellation or cross linking. Therefore, the new stress can only be the result of crystallization due to stretching. An absence of crystals in the static state, followed by crystal formation on stretching, is the stress-strain characteristic typical of natural rubbers, but is uncommon in synthetic polymers. When the allyl iodide/Mo molar ratio is 10, the polymer shows no stress fading prior to breakage, but there is some crystallization in the static state at constant temperature; the melting point of the crystals is 62°C.

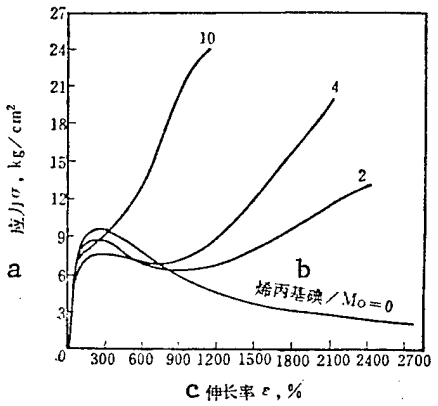


Fig. 8. Stress-Strain Diagram for Polymer

Key:
a. Stress b. Allyl iodide/Mo=0 c. Elongation

It is evident from Table 5 that the mechanical strength and elongation for this polymer resin exceed those of natural resins. These high values also result from the structural characteristics of the polymer. It can be seen from Table 2 that the regular 1,2-chain segments (isotactic or syndiotactic structures) account for 50 to 60 percent of the total. When these sterically regular chain segments are stretched they can produce microcrystalline regions which serve as cross-linking points, so that the polymer exhibits great strength. In addition, the polymers include 40 percent atactic

Table 5. Some Fundamental Physical and Mechanical Characteristics of the Polymer

烯丙基碘/Mo (摩尔比) a	[η], dl/g	屈服强度, b kg/cm²	断裂强度, c kg/cm²	断裂伸长, d %	塑性, e P	弹性恢复性 f (1—R)
0	6.24	8.26	0	>2800	0.19	0.38
0.2	5.10	8.13	0	>2600	0.19	0.35
2	4.03	8.34	12.22	>2500	0.30	0.18
4	3.29	7.96	21.17	>2900	0.51	0.04
8	2.43	6.55	22.08	2680	0.62	0.02
10	1.79	8.54	25.27	1700	0.68	0.02
g 天然橡胶*	6.93	5.30	18.00	800		
	3.74	3.40	5.30	760		

*Data from stress-strain curves of reference 5.

Key:
a. Allyl iodide/Mo (molar ratio)
b. Yield strength
c. Breaking strength
d. Breaking stress
e. Plasticity
f. Elastic recovery
g. Natural resins*

1,2-chain links and a small number of 1,4-chain links so that many of the polymers cannot crystallize in the static condition, but when stretched, the internal stress concentration of the atactic chain sections is low, so that the polymers have a very high elongation characteristic.

III. Conclusions

The catalyst system consisting of $MoCl_4OR$ and a suitable aluminum alkyl has a very high catalytic activity for the polymerization of butadiene; the molecular weight distribution of the resultant polymer is rather narrow, and the molecular weight of the polymer and the steric chain structure can be regulated by allyl halides. The resultant polymers have very high mechanical strength and breaking stress, and they show some promises of being a new type of polybutadiene with a variety of uses.

BIBLIOGRAPHY

1. Shalganova, V. G. SERIYA "PROMYSHLENNOST' SINTETICHESKOGO KAUCHUKA" [SYNTHETIC RUBBER INDUSTRY SERIES], TsNIITEN Neftekhim, Moscow (1978).

2. Takeuchi, Yasumasa NIHON GOMU KYOKAISHI [JOURNAL OF THE JAPAN RUBBER ASSOCIATION], Vol 52, p 481 (1979).

3. Duck, E. W. "IISRP 15th Annual Meeting, Proceedings," (1974).

4. Sehra, J. C., et al. CHEM. AGE INDIA, Vol 25, No 9, p 41 (1974).

5. Li Bincai [2621 2430 2088] et al. "Xitu Cuihua Hecheng Xiangjiao Wenji [Collected Papers on Rare-Earth-Catalyzed Synthetic Rubbers]," Science Press, p 347 (1980).

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DEVELOPMENT OF NATION'S RARE EARTH INDUSTRY VIEWED

Beijing ZHONGGUO XITU XUEBAO (JOURNAL OF THE CHINESE RARE EARTH SOCIETY) in Chinese No 1, 1983 pp 3-5

[Article by Zhou Zhuandian [0719 0278 0368], vice-minister of the Ministry of Metallurgical Industry, chairman of the Council of the Chinese Rare Earth Society: "Giving Full Development to China's Rare Earth Industry for the Four Modernizations"]

[Text] The initial issue of JOURNAL OF THE CHINESE RARE EARTH SOCIETY has been published. The publication of this journal will expedite the development of scientific technology, production and applications of rare earths. It will also promote the academic exchange at home and abroad and give impetus to better understanding and cooperation of the rare earth scientists and technologists in and outside China.

Rare earths are important materials for national economy and defense. China's rare earth resources are richly endowed by nature. The industrial reserves and prospective reserves of rare earths in China are respectively five times and three times that of other countries in the world. Rare earths occur in eighteen provinces and regions in China, mainly in Inner Mongolia, Jiangxi, Hunan and Guangdong provinces, of which Inner Mongolia occupies the first position. In China, rare earths are more plentiful than copper, lead, zinc and tin. There is significant value in comprehensive utilization and multi-purpose use of rare earths in China because they are found in association with many other metal-bearing minerals and are of high grade. In China, there exist not only bastinasite, monazite and mixed rare earth ore, mainly containing lanthanum and cerium, but xenotime, mainly containing yttrium. For instance, in Baiyun-ebo ore body near Baotou, rare earths are found in association with iron, niobium, manganese, phosphorus, fluorine, etc., and the europium oxide, samarium oxide contents in rare earth ore are double those of Mountain Pass' in the United States. The ion-adsorpion type rare earths in Jiangxi Province have great economic value because they are rich in yttrium, samarium, europium, terbium, etc., and easy to exploit.

The Communist Party and government of China have been paying great attention to the development of rare earth industry, especially for the comprehensive utilization of Baotou resources. Consequently, Baotou now can produce concentrate, containing more than 60 percent rare earth oxides by new ore dressing technology for associated oxidized ore, and the grade of rare earth content is

increasing with obvious reduction of production cost. Thus, Baotou is now the raw material base for the development of rare earth industry in China. For the treatment of rare earth concentrates, high temperature chlorination, high temperature sulphatization roasting and alkali-decomposition have been successfully conducted enabling the rare earth production technology to reach advanced level. Due to the improvement of the production technology, misch metal from chloride, individual rare earth oxides and individual rare earth metals are becoming commercially available. Having Chinese characteristics, the methods for preparing rare earth ferrosilicon alloys have been achieved with reduction of production cost and the products are highly competitive. In our country there are about ten plants which produce 200 kinds of rare earth materials, including intermediate products, compounds and metals. Their capacity of production ranks second in the world.

The abundant rare earth resources and the results obtained in scientific research work in China provided a material base and created favourable conditions both for domestic applications and export of rare earth materials. Rare earths have now been widely used in China in metallurgical industry, machinery industry, petrochemical industry, chemical engineering, light industry, glass and ceramic industry, electronics, military engineering, agriculture, etc. For a long time, China has been producing rare earth nodular graphite cast iron and has developed practical technology. For example, the yttrium base nodulizer which is capable of keeping nodulizing from degradation has already been used in special cast. In recent years, rare earth vermicular graphite cast iron has been developed and obtained tangible results in making steel ingot molds. By improvement of the addition of rare earths in steel there arose a big increase of consumption of rare earths in steel in China. The addition of rare earths in nonferrous metals, especially in aluminum, magnesium, and copper obtained good results. With the addition of rare earths, aluminum cable produced in Guangdong Province has successfully withstood the severe tests of twelfth grade tornado. In addition, there is a considerable production capacity of rare earth molecular sieve zeolite cracking catalysts in China. Rare earth catalyst for methanation has been used in our big synthetic ammonia plants.

Other miscellaneous uses of rare earths with striking results in China are: plastics, dyeing of knitting wool, polishing powder for glass, glass decolorizing, glaze, etc. Formerly, arsenic was used for glass decolorizing, which was very expensive and brought environmental pollution. We now use rare earths as a substitute for it. In recent years, rare earths in China are used in advanced technological applications. These uses include, rare earth-cobalt permanent magnets for microwave devices, miniature motor, earphone, microphone and physiotherapeutic apparatus, phosphors for cathode ray tubes, color television (especially of red color), fluorescent lighting and X-ray intensifying screens, etc. Besides, the use of rare earths in agronomy, pedology, toxicology, environmental science and microanalysis have been investigated and obtained certain results.

With the improvement of industrial technology, upgrading of the product quality, reduction of the production cost, China's rare earth products are gradually entering the international market in increasing quantity and species. With the

increase of the export of rare earth chlorides, we have augmented the export of rare earth oxides, rare earth fluorides, rare earth metals, alloys, concentrates and polishing powders as well.

China's rare earth industry has been established and developed on the basis of China's own scientific research works. Since its foundation in 1979, the Chinese Rare Earth Society has organized its members' activities in research and development, production and applications of rare earths. This society now has 2,000 members, including scientists, professors, engineers and manager staff. Through the activities of its twelve specific academic sub-commissions and local branches, The Chinese Rare Earth Society has been holding academic symposia, exchanging results of investigations, discussing the outlook of rare earths, at the same time, developing international contacts. In September 1983, the Seventh International Workshop on Rare Earth-Cobalt Permanent Magnets and Their Applications will be held in Beijing. We are waiting ardently for the holding of this conference and expressing our welcome to all foreign counterparts through this issue. We are looking forward to their cooperation, including technical exchange, coresearch, coinvestment, foreign trade, import of advanced equipment and technology.

This Sixth 5-Year Plan, approved by the Fifth National People's Congress of China has defined the investigation of the comprehensive utilization of the three big mines (Jinchuan, Panzhihua and Baotou) as key research projects and high priority has been given to rare earth production. This society will require all members to do their best to the fulfillment of all these goals.

I hope that JOURNAL OF THE CHINESE RARE EARTH SOCIETY will continuously expand its influence on and make contributions to the rare earth undertaking in our country.

CSO: 4010/92

PROGRESS IN RESEARCH ON RARE EARTH CHEMISTRY NOTED

Beijing ZHONGGUO XITU XUEBAO (JOURNAL OF THE CHINESE RARE EARTH SOCIETY) in Chinese No 1, 1983 p 12

[Article by Ni Jiazuan (Nee Jiatzan) [0242 0857 4957], Changchun Institute of Applied Chemistry, Academia Sinica: "Progress of Researches on Rare Earth Chemistry in China"]

[Summary] China is rich in rare earth resources. The rare earth chemistry and industry was founded under this favorable condition.

The development of rare earth chemistry is closely related to the growth of the rare earth industry. In the fifties the fractional crystallization, oxidation-reduction and ion-exchange processes for rare earths were studied to meet the need of separation processes. Meanwhile different methods for determining individual rare earth in the concentrate and mineral and impurities in pure rare earth oxides and metals were successfully developed. Further development of separation processes led to a thorough investigation on extraction and coordination chemistry of rare earths in the sixties. As the separation process is improved and the extractive metallurgy attains to advanced level, solid state chemistry and material science of rare earth have rapidly developed.

The main progress of the following areas of rare earth chemistry in China is briefly summarized as follows: 1. separation chemistry; 2. solid state chemistry; 3. coordination chemistry; 4. fused salt chemistry; 5. analytical chemistry; and 6. quantum chemistry and spectroscopic properties of rare earths.

CSO: 4010/92

YIDOYU-1: COMPUTER SYSTEM FOR OPTIMAL WING DESIGN

Beijing GUOJI HANGKONG [INTERNATIONAL AVIATION] in Chinese No 7, 5 Jul 83 pp 2-4

[Article by Yeh Kejia [5509 0344 1367], Lin Menghe [2651 1125 7729] and Liang Mengjue [2733 1125 3778]]

[Text] YIDOYU-1 is an application software developed by the Chinese Aeronautical Research Institute to perform optimal design calculations for large, general structures. It can be used to carry out optimal design of airplane wing structures under multiple constraint conditions.

YIDOYU-1 is a program system developed on the Ximengzi 7760 computer; it contains more than 40,000 lines of FORTRAN statements. The development work began in June 1979 and was completed in October 1982; it was certified and accepted by the Ministry of Aeronautical Industry in November of the same year.

The development of a large program which is practical and efficient in performing optimal design of wing structures is urgently needed by the airplane design community. With ever-increasing airplane performance, the analysis and synthesis of wing design are becoming more complicated. They must consider not only static strength requirements but also requirements of aeroelasticity; however, it is a difficult task to satisfy both requirements simultaneously. To perform separate analyses would require large amounts of labor and computational time; therefore, it is desirable to have an optimal design tool which can simultaneously take into account multiple constraint conditions (static strength, displacement, static and dynamic aeroelastic constraints) in order to improve the quality and increase the speed of design.

The YIDOYU-1 is a program system developed to meet the above requirements. Its main features are summarized below: 1) It uses nonlinear mathematical programming techniques to treat optimal wing design problems with multiple constraint conditions; it can also accommodate expanded constraint types according to input requirements. 2) It can be used to design wing structures with control surfaces and with attached fuselage sections. 3) Practical methods of stability calculations are introduced through allowable stresses for redesign. 4) It has good presolution and postsolution analysis capability. 5) It contains

user-oriented special language. 6) It uses analytical methods to compute various response coefficients and relies on many approximation techniques for the optimization model to increase the efficiency of optimal design.

Design Concept and Technical Approach

Special attention was given to the following criteria in the development of YIDOYU-1.

1. High efficiency. The following technical approaches were taken to increase the computational efficiency of the system: introducing approximation concepts and techniques, and using analytical methods to derive coefficients, in order to reduce the number of complete structural analyses as well as the number of coefficient computations and computational complexity; using a structure of multiple main programs to reduce the number of operational pages and to facilitate parallel processing; using dynamically allocated common blocks with dynamic protection regions in order to fully utilize virtual storage and reduce the number of accesses of disc files.

2. User-oriented and user-friendly design. The system uses an automatic data generation module to avoid large amounts of manual labor in filling out data sheets; the system can produce report-quality printouts and graphic outputs, which greatly reduce the amount of work required to process the results; the system has prestored data files for commonly used elements, materials, and typical strength characteristics curves which are available as user options; the system also provides a user-oriented special language and modular programming structure, so that the user can organize and perform analyses and optimal design according to specific needs.

3. Generality. The system can perform optimal wing design not only under multiple constraint conditions but also under each individual constraints; it can also perform various structural analyses. The system uses a stage-wise program organization and has independent modular structure; in addition, it provides preassigned input functions so that a user can expand or alter the system capability according to his needs.

System Capabilities

The YIDOYU-1 has the following capabilities:

1. It can perform optimal structural design under full stress conditions.

2. It can perform optimal design while satisfying completely or partially the following constraint conditions (using the method of mathematical programming): stress, displacement, vibration, flutter, various static aeroelastic constraints, and minimum dimension constraint.

3. It can perform one or more of the following tasks in structural analysis: calculation of flexibility influence coefficients, analysis of resonance characteristics, analysis of flutter characteristics, and analysis of static aeroelasticity.

4. The system can perform optimal designs of wing structures with the following limitations: finite element model with less than 3,000 degrees of freedom; less than 20 external loads; dynamic model with less than 200 degrees of freedom; flutter analysis with less than 20 flutter mode coordinates; nonstationary aerodynamics with less than 20 condensed frequencies; less than 100 design variables (including cross sectional parameters and matching weight variables).

Structural Model and Data Generation

The method of variable coupling has been used in developing the structural model to reduce the number of design variables. To perform structural analyses using the method of finite elements requires a large number of elements and design variables, which are difficult to handle mathematically and are unnecessary from the engineering point of view. Therefore, it is desirable to use a method where each design variable is related to a set of elements, so that hundreds of elements can be represented by just tens of design variables. Such an engineering treatment is called variable coupling.

In analyzing the dynamic characteristics of structures, the system must first reduce the high order state model to a dynamic model with less than 200 degrees of freedom by using the method of flexibility influence coefficient.

To facilitate structural modeling, various types of finite element models are used, including conventional structural elements, indexed elements, generalized elements, and mass elements. There are nine different structural elements in the system.

To perform optimal redesign under stress constraints, the system calculates the allowable stresses based on stability characteristics of the structure, and also considers the characteristics under supercritical conditions due to bending. The allowable stresses under supercritical conditions are calculated using semiempirical methods given in the stability handbook with corrections for plasticity.

The system contains a data generation module and provides a special language for data generation; the special language allows the user to automatically generate preliminary data for analysis and design by giving a simple description of the structure. The data generation module has 10 important functions.

The system has a data base which contains characteristics data of commonly used materials, and a subroutine which computes the nondimensional curves of allowable stresses based on given material characteristics. The user can also incorporate new material data according to his particular needs.

Structural Analysis

The system uses the finite element method in performing static analysis of structures. Because a number of repeated static analyses are required during the optimal design process, special efforts are made to preserve the intermediate results which do not vary with the design. After optimal arrangement of the node points, a chained rigidity matrix is obtained which can be processed using the highly efficient Gauss decomposition method; the decomposed rigidity matrix is stored for later use. To minimize computation, the system can be directed to analyze only certain key components. On the basis of experience, the designer selects a portion of the structure as key components to participate in the optimal design under stress constraint. First, the structure is divided into several blocks according to the design variables; then a representative key component is selected from each block to participate in the redesign, where the allowable stress for this component is calculated using the same method as for the design unit under consideration. This approach ensures the practicality of the system.

In performing characteristic analyses of the structural dynamics, the system uses the method of automatic matrix reduction to solve the vibration equations, and uses the QL method to determine the complete eigenvalues and eigenvectors, from which the vibrational modes and frequencies are obtained.

In performing flutter analyses, the results of subsonic nonstationary aerodynamic calculations are used to represent basic flutter characteristics because most severe flutter conditions occur at low altitudes near sonic speeds, but they must be corrected for compressibility effects. The system uses the method of subsonic spatial dipole grid points to perform the nonstationary aerodynamic calculations, and has provision for incorporating improved subsonic kernel functions. The flutter equations are solved using the improved LR method to find the complex eigenvalues, then the reduced frequency value corresponding to zero damping is determined, and finally the flutter characteristics are obtained.

In performing static aeroelastic analyses, the wing is divided into equal sections, and aerodynamic influence coefficients are calculated using kernel functions; the influence coefficients are calculated by substituting the surface sample strip matrix into the formula. The wing efficiency and wing divergence speed can be calculated by solving the static aeroelasticity equilibrium equation.

Calculation of Various Response Derivatives

The optimal design of structures is a nonlinear programming problem. It solution requires various constraint derivatives to determine the most effective direction for redesign. In addition, to reduce the number of analyses of the complete structure in the optimization process, it is necessary to construct explicit approximation formulas for the constraint functions, which also requires

calculation of the constraint derivatives. Since most state constraints are complicated nonlinear implicit functions of the design variables which are difficult to obtain directly, a key issue in the optimal design problems has been to find an effective method of calculating the constraint derivatives. There are two basic approaches in computing constraint derivatives: numerical differentiation and analytical derivatives. The numerical differentiation approach is easy to implement, but it requires large amounts of computation, and is relatively inefficient and inaccurate. Therefore, this system uses the analytical method to determine constraint derivatives; it is more efficient computationally and has higher accuracy. The constraint derivatives that can be calculated in this system include: generalized displacement derivatives, stress derivatives, influence coefficient derivatives, derivatives of fundamental vibration characteristics, derivatives of flutter speed, efficiency derivatives and divergence speed.

Method of Optimization

The system uses nonlinear mathematical programming technique to perform optimization, but in the case of stress constraint only a simpler full-stress method of design can be used; or the results of full-stress design can be used as initial values for the mathematical programming procedure to improve computational efficiency.

Whether nonlinear methematical programming techniques are feasible for solving the problem of optimal design of complicated structures under multiple constraints has always been a controversial issue primarily because of its low computational efficiency. For this reason, the system implemented a series of approximations and organized the programs so that marked improvement in computational efficiency was achieved.

The basic technique used in this system is the sequential unconstrained optimization technique (SUMT), which converts a multiple-constraint optimal design problem (constrained extremal-value problem) into a sequence of unconstrained extremal-value problems by using internal penalty functions. In order to ensure that the design points may deviate from the admissible region due to the use of approximate functions and other reasons, and to relax the strict limitations imposed on the initial points, the penalty function is chosen to be in the form of a second-order expansion. The solution of the unconstrained extremal-value problem can be obtained by the gradient method, the conjugate method, Newton's method, the DFP method, or the BFGS method; the one-dimensional search problem can be solved by using the method of parabola or the method of golden division. There are a combination of 10 different methods which can be selected at the user's option.

Postsolution Processing

During the computation or at the end of computation, the user can issue commands to have selected results printed in wide-margin tabular form or presented in graphic form. The graphic outputs include: numbered diagram of the model and node points, stress distribution plots, displacement plots, plots of variable

data, plots of flutter characteristics, plots of vibration node lines, plots of load pressure center, plots of parameter variation during interation (variation of object function and constraint responses) and aerodynamic block diagram.

Program Organization

The system has a level-oriented program structure with independent modules; it uses files and dynamic data blocks for information exchange, and provides preassigned interfaces. There are four program levels: master control, main programs, modules and common subroutines. The system has 9 functional main programs, 34 functional modules, and a number of subroutines. The main programs can operate either in series or in parallel, and can exchange information through the data files; the modules can exchange information either through data files or through the dynamic common data blocks. The master control contains several main programs for operational management and data management, language translation and module assembly as well as programs for testing and timing control.

The system has 3 operational commands, 17 data generation instructions, 18 flow instructions, 2 instructions for printed output, and 2 instructions for graphic output. The user can assemble the individual modules into main programs by using the flow instructions, then use the operational commands to control the overall operation of the system.

By using multiple main programs, the system can reduce the operation page size, and the computation cycle of each link. The system can also operate in a parallel processing mode, thereby reducing the overall computation cycle. The core of this system is the optimization program; all the other main programs are primarily designed to facilitate its operation in computation time and storage.

The modular structure of the system contains a relatively large library of functional modules; new modules can also be added according to needs. The main programs can be assembled by user computation information, user-supplied instructions, or FORTRAN codes. In using the system, sophisticated users can develop their own modules to be incorporated in the module library, so that the system can be continually expanded and improved.

In addition, the system uses a dynamically allocated common block with dynamic protection region. The data in each module are dynamically allocated in this common block; data which require protection are stored in the dynamic protection region. This approach allows full utilization of virtual storage and minimizes the number of accesses to the magnetic disc files so that higher computational efficiency can be achieved.

The structure of the system programs are shown in Fig. 1 and Fig. 2.

Verification of Sample Calculations

In order to test the various functions of the system, 55 sample calculations were performed during its development. The algorithms for different parts of the system were tested for reliability, and the results were compared with those which had been previously verified or with published results. Thus, the validity of the methods was verified from a number of different aspects.

During the stage of component tests, 50 sample calculations covering 110 different configurations were validated; comparisons were also made between the analytical method and the finite difference method in computing derivatives for flutter and static aeroelastic responses, with very good agreement.

During the stage of integrated tests, calculations of two simplified wing models were carried out, and the results were accurate.

In addition, calculations of the vertical tail of a supersonic airplane were also performed to test the system capability in treating complex structures.

The YIDOYU-1 provides a practical application software for China's design departments to perform optimal design of wing structures under multiple constraints. In the future, it is suggested that the following improvements be made: 1) develop the capability of optimal design using composite materials; 2) incorporate the capability of optimal design of wing structures with suspended objects.

For detailed technical description and procedure of using the system, the reader is referred to the technical reports covering the YIDOYU- model.

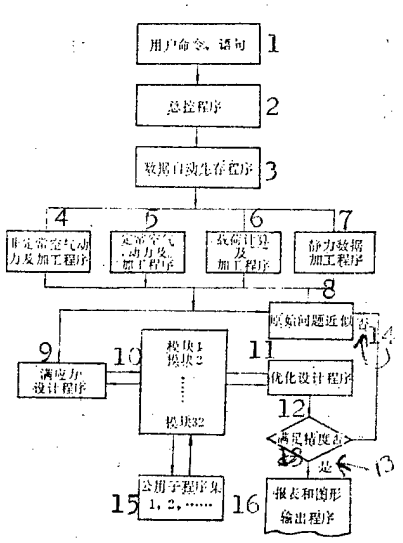

图 1 系统运行粗框图

Figure 1. Schematic Block Diagram of System Operation

Key:

1. User commands, instructions
2. Master control program
3. Data generation program
4. Nonstationery aerodynamics and processing program
5. Stationary aerodynamics and processing program
6. Load calculation and processing program
7. Statics data processing program
8. Approximation of original problem
9. Full stress design program
10. Modules 1, 2,.....,32
11. Optimal design program
12. Is accuracy requirement satisfied?
13. Yes
14. No
15. Common subroutines
16. Printed and graphic output program

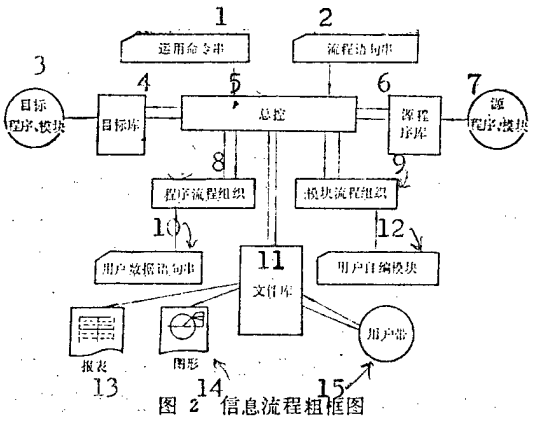

图 2 信息流程粗框图

Figure 2. Schematic Block Diagram of Infomation Flow

Key:

1. Operating command string
2. Flow instruction string
3. Object programs, modules
4. Object file
5. Master control
6. Source program file
7. Source programs, modules
8. Program flow organization
9. Module flow organization
10. User data instruction string
11. File storage
12. User-developed modules
13. Printed reports and tables
14. Graphs
15. User tapes

3012
CSO: 4008/159

DEVELOPMENTS IN TRANSPLANTING ORGANS SUMMARIZED

Beijing ZHONGHUA YIXUE ZAZHI [NATIONAL MEDICAL JOURNAL OF CHINA] in Chinese
No 5, 1983 pp 312-314

[Report by Xia Suisheng [1115 4482 3932], Institute of the Transplantation of Organs, Wuhan Medical College: "New Advances in the Transplantation of Organs in China"; this article was received on 6 December 1982]

[Text] The transplantation of organs in China has continued to gain many new achievements since the First Academic Symposium on Organs Transplantation was convened in Wuhan City, June 1981. (See this Journal 6:647, 1981). A comprehensive report is made as follows:

I. The Rising of the Clinical Transplantation of Small Visceral Organs

1. The transplantation of bone marrow. According to reports on the National Symposium on Bone Marrow and Blood-Forming Hepatic Cells held in May 1982, nine transplantations of histocompatible typed isogene bone marrow were performed in China, one of them was performed at the Institute of Blood Disease, Beijing Medical College, postoperative surveillance continued for over 10 months and its permanent vitality was proven.[1,2] The case was that of a male patient with mononuclear leukemia. In 6-9 months after the operation was done, a great many analyses on the chromosomes of peripheral blood and bone marrow were conducted and proved that the chromosome of the acceptor had changed from 46XX to 46XY; and the acid phosphatase of the patient's red cells was BA type before but had now changed to B type, the same as the donor's; the blood group of his red cells also changed from MN before the transplantation to M.[2] Of the remaining eight cases, three were not permanently vital, one was bone marrow autorecovered and four died because of antihost diseases and other reasons. In addition, the infusion of blood-forming tissues, such as those of bone marrow and fetal liver, were applied in over 100 cases and 50 cases, respectively, and definite clinical curative effects have been gained, especially in treatment of certain aplastic anemia, the autorecovery of bone marrow was definitely seen and blood-forming tissues infused can also be vital for a short period.[1]

2. The transplantation of adrenal gland. The hospital attached to the Guangxi Medical College performed China's first case of adrenal gland transplant in November 1981. The case was that of a patient with adrenal hypernephroma in both kidneys. After the total excision of the adrenal glands of

both kidneys, the adrenal cortex could not function perfectly. They performed a homotransplantation of the adrenal gland with bases of blood vessels and connected the vein of the donated adrenal gland with the acceptor's great saphenous vein and the inferior arteries of the donated adrenal gland with the acceptor's lateral arteries of the circumflexible femur. The application of immunosuppression was stopped 10 days after the transplantation, postoperating surveillance continued for more than 4 months and the excretory volume of 17-hydroxy corticosteroid and 17-ketosteroid in urine went up successively; the amount of acidophil granulars was increased in counts from time to time and the patient gained weight as well; all these indicated the gradual function of the transplanted adrenal gland.[3]

3. The transplantation of pancreatic islets. On the basis of getting experiences from the pancreatic islet heterotransplantation of large white mice with alloxan diabetes and the culture of human fetus' pancreatic islet tissues, in November 1981, the Shanghai First People's Hospital developed heterotransplantation of pancreatic islets in the treatment of 11 cases of patients with insulin-dependent diabetes.[4] The tissues were taken from an induced fetus. After culturing for 2 weeks, those tissues were transplanted in muscles in seven cases, and transplanted in the abdominal cavity in four cases. After operations, patients were infused with antilymphocyte globulin (30mg/kg) by intravenous drip. Three of the 11 cases were under postoperative surveillance for more than 5 months, and satisfactory curative effects were gained. In 10 of the 11 cases, the volume of insulin applied had dropped more than one-third to three-fourths compared with those applied before operations, and patients' conditions were under control, the value of blood sugar when the stomach was empty remained normal and even below normal level, and it was proven that the heterotransplanted pancreatic islets continued to function fairly well.

4. The transplantation of parathyroid glands. The First Hospital attached to Zhongshan Medical College conducted heterotransplantations of parathyroid glands with bases of blood vessels[5] in a total of 14 cases and 15 times. The longest postoperative surveillance lasted 42 months and among the 13 cases which were observed for over 3 months, 12 cases were successful and 1 was not, so that the curative effects were fairly satisfactory. Standards put forward for the successful transplantation by this hospital are: the value of blood calcium should go up to or close to normal; Chrostek's and Trousseau's signs should turn to negative; tetania, abnormal feeling, weakening strength, jactitation, melancholy and mental symptoms should be alleviated or disappear; calcareous medications can be stopped or taken only in small doses with no intravenous injections at all.

5. The transplantation of testis. This kind of program is still on trial. In 1981, the Municipal First People's Hospital of Changzhou and the Huashan Hospital attached to the First Medical College of Shanghai conducted separate testis autotransplantation in patients with testis atrophy and pelviotestis.[6,7] They connected spermatic veins and arteries with epigastric inferior arteries. Postoperative surveillances continued for 8 and 6 months respectively. Sizes of testes became normal, and small amounts of sperm were found in the Changzhou case in semen checks, their activity was fairly good but the fecundity has yet to be proven.

II. The Recent Development of the Clinical Transplantation of Large Visceral Organs

The Transplantation of kidneys is still in the lead. According to the November 1981 report of the First National Academic Conference on Urological Surgery[8,9], there were 900 cases of kidney transplantations nationwide (1,000 cases at present). The longest survival time was 6 years. More than 120 kidney transplantations have been performed in Beijing Friendship Hospital. In China, the success rate of this kind of transplantation is 50 percent, the rate of 1-year survival is 75 percent, 2 years is 43-47 percent while 3 years is 33 percent. All these figures are similar to those listed in the 13th Report of the International Registry for Transplantations. About 30 percent of former patients who have recovered for more than 1 year returned to work again. Patterns of technique applied in kidney transplantation have been formed with comparatively mature operations, it generally holds that 30 to 50 analyses on fluoroscopy and actinogram are to be done before every operation; the occurrence of tempering ischemia in the excision of the donor's kidney should be controlled in a limit of 10 minutes. Three cases on the application of both kidneys of infants as a whole set transplanted into adults' bodies have been reported, the transplanted kidneys functioned well in two cases.[10] There are also reports of transplanting both kidneys taken from dead newborn babies to adults.[11]

As to the aspect of infusion and conservation of the donated kidneys, a great number of units are applying the simple conservation method of low-temperature infusion, it can be applied in conserving kidneys taken from a donor at an operating room even as far away as 1,000 to 2,000 km, and the transplanted results are still good. Infusing fluids are the hypertonic citrate purine for glands (HC-A) made in Shanghai, the internationally commonly used Euro-Collins and Sacks II. The donated kidney can be kept for 36 hours, in certain cases, the conserving time may even reach as long as 38 to 50 hours and the function of the kidneys recovered well after transplantation.[8] In experimental research, the Zhongshan Hospital attached to the First Medical College of Shanghai used special equipment to conserve dog kidneys for 72-96 hours by successive low-temperature infusion with 10 percent of perfluorotributyle amine-Euro-Collins, and those dog kidneys still functioned well.[9] The Shanghai Central Blood Station and the Second Military Medical University of the PLA conserved dog kidneys for 72 hours by simple low-temperature with HC-A, with five out of seven dogs surviving after transplantation.[12] The Institute of the Transplantation of Organs, Wuhan Medical College conserved dog kidneys for 72 hours by simple low-temperature infusion with WHO I made by its technicians and then conducted autotransplantations. Kidneys of 9 out of the 17 dogs who could be used for analysis recovered to function well and 2 of the remaining died due to reasons other than the conservation, and at death their kidney functions were recovering, so the function-recovery rate of kidney transplantations is 64.7 percent.[13]

Development of other clinical transplantation of large visceral organs is comparatively slow. The transplantation of livers numbers only 55 cases nationwide, 10 of them performed in Wuhan Medical College. Six out of the 55 cases survived over 6 months and the rate of half-year survival was 10.9

percent. Diseases adapted to liver transplantations were, in 49 out of the 55 cases, primary liver cancer; the others were congenital biliary atresis, liver lentiform-nucleus degeneration and cancermetastasis from gall bladder to liver. Fifty-three of the 55 cases were liver orthotopic transplantation while the remaining 2, heterotopical ones.[14,15] New reports on the transplantations of heart and lungs have not yet been seen, they remain at three and two cases, respectively.

III. Medications for Controlling Rejective Reactions

Regular medications used for controlling acute rejective reactions are sulfazole purin and adrenaline. To deal with the acute occurrence of rejective reaction after kidney transplantation, the general tendency is, in comparison with that of a few years ago, applying smaller doses of hormone as a booster in order to reduce complications.[8] In recent years, the acute rejective reactions occurring after liver and kidney transplantations have mostly been treated with the combination of the above medications and the antihominothymolymphocyte globulin. It has been proven to be effective in the alleviation of symptoms, the reversion of critical phenomena of serious rejection, the decrease of the applied volume of hormone and the reduction of the frequency of rejection as well as delaying of its occurrence.[16] There are also reports on the applications of local radiotherapy and thorax conduit drainage after kidney transplantation.[8]

IV. Experimental Transplantation of Visceral Organs

The meanings of the creation of an operating model on the experimental transplantation of animal organs are shown in two respects: 1) providing experimental means for the theoretical study; 2) as simulated operations, they can lay a foundation for clinical application. In recent years, many countries have extensively adopted the transplantation of small animal organs as the experimental models of basic theoretical study in order to save manpower, materials and to conduct a series of experiments. The Institute of the Transplantation of Organs, Wuhan Medical College, after the success in the creation of kidney heterotransplantation and the heterotopical heart transplantations of large white mice, again created liver orthotopical heterotransplantations in 1982 and has had a preliminary success. Of these mice, 63.6 percent survived for a week after the transplantation and one survived for more than 11 months, the longest period of survival among the mice.[17] The longest period of observation after kidney heterotransplantation of large white mice created by this institute was 1 year and 4 months, and after heart transplantation, 1 year and 7 months and both also continued to function well.

The experimental transplantations of animal pancreas have been developed in Wuhan and Zhengzhou one after another in order to discover a set of operating methods which can be provided for clinical applications. At present, the difficulties in pancreas transplantations concern the handling of the pancreatic ducts and the control of rejective reactions. The Institute of the Transplantation of Organs, Wuhan Medical College, developed the transplantation of opened segments of pancreatic ducts of dogs, conducting autotransplantation or homotransplantation with the end of pancreas with bases of spleen veins and arteries (one-third of the whole pancreas), and it proved to be enough to

maintain blood-sugar function after operation.[18] The fluid came out from the opened pancreatic ducts and flowed to the abdominal cavity, in circumstances without contamination and infection, the peritoneum can tolerate and absorb it, then the secretion of pancreatic fluid would be automatically and gradually stopped and the function of pancreatic islet remained good. Twenty dogs were autotransplanted, the longest observation period was 5 months; 16 dogs were homotransplanted under conditions of applying regular 2-unit immunosuppression, the function of the transplanted pancreas lasted 9.5 ± 5.8 days on the average, and the survival period of dogs was 26.5 ± 17.3 days, these are similar to the 9 and 13 days reported by McMaster.[19] At present, the institute is also developing the autotransplantation of segments of dog's pancreatic ducts blocked with n-octylester cyanoacrylate, the function of the pancreas rapidly recovered after operation, the longest period of observation on one dog was 6 months and the blood sugar always remained normal until that dog was put to death.[19]

V. The Study of HLA

Typing in line with HLA is conducted in many countries for clinical transplantation of organs. HLA is one of the key factors for having a high survival rate in kidney and bone-marrow transplantation. At present, 92 HLA antigens have been found from international tests, it holds that HLA-DR is especially meaningful to kidney transplantations. The study of HLA was started relatively late in China, but the development is fairly rapid. Thirteen HLA antisera with antigenetic specificity have been found and put forward by the National HLA Coordination Team at its Second Meeting held in Beijing, in April 1982, and were approved by the Appraisal Meeting organized by the Ministry of Health. They are HLA-A_1, A_2, A_9, A_{28}, A_{11+3}, B_5, B_7, B_{13}, B_{17}, B_{w22}, B_{27}, B_{w35}, B_{40}, in addition, there are two antigenic antisera with less antigenic activities--HLA_{10} and B_{15}.[20] Investigations, statistics and analyses on the distribution of HLA antigens of the Han [3352, Chinese] population have been conducted in Shanghai, Shenyang, Beijing and other cities. A new antigen was found in the population of China by the Shanghai Central Blood Station. This antigen located at the B position point related to B_{w6}, and named temporarily SH_6, according to the report, its frequency in people unrelated with Han is 0.0095, and its gene frequency is 0.0048.[21] This station also succeeded in making and producing the HLA standard 72-holed serum plates and supplying them to other units. The National HLA Coordination Team which originally consisted of 8 units in Shanghai, Beijing, Xinjiang, Shenyang, Sichuan, etc., is enlarged to include 10 units by adding units in Wuhan and Changsha, and a 3-year plan has been worked out as well. Situations described above show that the study of HLA has been actively developed in China. According to reports, relations have been established with more than 10 countries including the United States, Japan, England and so forth, and this enables China to have now 59 standard cells of specifity (15 at position point of HLA-A, 28 at that of B, 7 at that of C and 9 at that of DR.)

In addition, in order to meet the needs of the clinical transplantation of organs, studies on applied transplanting anatomy have started in China. The applied dissections on the abnormal distributions of kidney blood vessels, the kidneys of fetuses and newborn babies, the adrenal glands of children and adults, the parathyroid glands of fetuses and infants, the pancreas of

newborn babies and adults, especially the systematic observations on the normal and abnormal distributions of the arteries and veins of a particular organ, which have provided useful data for the transplantation of its kind, are very meaningful in selection of suitable blood vessels for operation.

REFERENCES

1. Lu Daopei [7120 6670 1014], et al.: "An Academic Summary on the Special Topic of Bone Marrow Transplantation at the Symposium on Bone-Marrow Transplantation and Blood-Forming Hepatic Cells Sponsored by the Medical Society of China," ZHONGHUA QIGUAN YIZHI ZAZHI [National Journal of Organ Transplantation of China], 3:146, 1982

2. Same authors as 1: "Report on a Case of Permanent Survival Transplantation of Isogenes Bone Marrow of an Acute Leukemia Patient," ibid., 3:149, 1982

3. Wang Zhirou [3769 2784 2677], et al.: "Report on a Case of Homotransplantation of Adrenal Gland," ibid, 3:122, 1982

4. Hu Yuanfeng [5170 6678 1496], et al.: "A Brief Report on Clinical Research on 11 Cases of Pancreatic Islet Transplantation of Patients of Insulin-Dependent Diabetes," SHANGHAI YIXUE [Shanghai Medical Sciences], 5:485, 1982

5. Chen Guorui [7115 0948 6904], et al.: "Roles Immunosuppression Plays and Complications Which Occur After the Transplantation of Parathyroid Gland," same as in 1, 3:165, 1982

6. Zhao Weipeng [6392 0251 7720], et al.: "Report on a Case of Testis Autotransplantation," ZHONGHUA WAIKE ZAZHI [National Surgical Journal], 20: 351, 1982

7. Chao Zhifu [1560 1807 1788], et al.: "Testis Autotransplantation," ibid, 20:368, 1982

8. Xie Tong [6200 2717], et al.: "Summary on the Special Topic of Kidney Transplantation at the First National Academic Conference on Urological Surgery Sponsored by the Medical Society of China," same as in 1, 3:51, 1982

9. Xiong Rucheng [3574 3067 2052]: "Review and Prospect on Kidney Transplantations in China," ibid, 3:49, 1982

10. Yu Huiyuan [0060 1920 0337], et al." "Clinical Research on Transplanting Infants' Kidneys to Adults," ibid., 2:1, 1981

11. Yu Tianlin [0205 1131 7792], et al.: "Rough Dissections on Kidneys of Dead Newborn Babies and the Clinical Application of Those Kidneys in Sets To Transplant to Adults," ibid., 3:53, 1982

12. Liu Shuyuan [0491 2579 0337], et al.: "The Research and Production of the Kidney Conserving Fluid HC-A and Its Clinical Applications," same as in 6, 20:438, 1982

13. Gu Xiangjun [7357 3276 0689] et al.: "An Experimental Report on Autotransplantation of Dogs With Their Kidneys Conserved for 48-72 Hours in LoMo-I Fluid Made by Us," restricted material, 1982

14. Qiu Fazu [5941 3172 4371]: "Several Opinions on Present and Future Clinical Liver Transplantations," same as in 1, 3:1, 1982

15. This author and others: "Experiences on Orthotopic Liver Transplantations (with reports on 10 cases)," ibid., 3:2, 1982

16. Tang Jinshi [0781 6930 3112] et al.: "The Application in Liver Transplantation of Antihominothymolymphocyte Globulin," same as in 1, 3:115, 1982

17. Chen Zhihua [7115 1807 5478] et al.: "Orthotopic Liver Transplantations of Large White Mice," same as in 13, 1983

18. Chen Shi [7115 1395] and others: "The Transplantation of Opened Segments of Dog's Pancreatic Ducts," same as in 13, 1983

19. Same authors as 18: "The Transplantation of Blocked Segments of Dog's Pancreatic Ducts," same as in 13, 1983

20. Materials of the National Appraisal Conference on Screening HLA Antisera, 1982

21. Zhao Tongmao [6392 2717 5399], et al.: "SH_2, a New Antigen at HLA-B Position Point Found in the Population of China," same as in 1, 3:99, 1982

12272
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LIFE SCIENCES

TRAINING OF SENIOR DOCTORS MUST NOT BE NEGLECTED

Beijing RENMIN RIBAO in Chinese 5 Jul 83 p 3

[Article by Bai Qin [4101 38301]: "Do Not Neglect the Training of Senior Doctors"]

[Text] At present, many senior and middle-ranked doctors and technicians in key hospitals are seriously advanced in age. Using my hospital as an example, the oldest of the specialists at the professor rank is 85 years of age, and their average age is 70; the average age for associate rank specialists is also 59. This is to say that there are not that many years which they can serve our country's medical services. Therefore, at the same time when we are energetically training junior doctors and technicians, we have to diligently train many senior doctors and technicians so that we can keep abreast of the development of medical enterprises and guarantee the constant elevation of the standard of our country's medicine.

In order to meet the needs of the rural areas, medical schools and colleges will reform the method of admitting students and it is essential that we should strive for the training of relatively more doctors at the college level in a short period of time. Yet, it seems that the urgent task of training senior doctors has not aroused the serious attention of the people in general. My concrete proposal is this: Beginning this year, a number of outstanding students from every graduating class of undergraduates should be selected and placed in key hospitals for further studies; and, counting internship, they will study for 4 more years, i.e., 1 year of internship and 3 years of key training. Taking the number of major key hospitals in the country to be 100 (the number is far greater than this if hospitals affiliated with medical schools are included), if every hospital selects 50 outstanding students each year, the country can train the first 5,000 senior doctors in the years 1983 to 1987. If the figure continues to increase like this every year, we would have trained from 70,000 to 100,000 senior doctors by the end of this century. I believe that it is possible to train a large number of senior doctors using the aforementioned method.

At present, there are some middle-aged and old specialists in every major hospital. They have not only advanced medical skills but are also eager to serve the country and they have a strong sense of responsibility and urgency in training successors.

The large medical units have better laboratories and sophisticated instruments and facilities, as well as widespread scholarly exchanges and special topic lectures which will widen the students' horizon and inspire them to investigate new subjects.

As for the teachers, the fixing of the course of study at 4 years will enable them to arrange the curricula in a planned way and in accordance with the abilities of the students, while emphasizing the guidance toward certain directions or certain special skills so that capable persons will be trained as quickly as possible.

The urge to imitate among youths is strong. Under the guidance of the old teachers whose morality, habits and professional skills are excellent, a good foundation for the students can be layed in such things as medical ethics, style of learning, scientific attitude and style of work and they can obtain good experiences not found in books.

Of course, every hospital at present has the problem of shortages in housing and beds. If 50 are enrolled each year, there will be 200 in 4 years and dormitories will be a difficult problem. If we make some calculations, keep a stiff upper lip and gradually reduce the number of graduate students currently being trained in various key hospitals while allowing the number of doctors receiving key training to increase gradually, and, in addition, creating conditions to solve some of the dormitory problems, then the difficulties described above can be resolved.

I hope that at this time of reform everyone will work together with one mind to overcome difficulties and create a new situation and add a new splendor to the work of training high-level medical personnel.

12380
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LIFE SCIENCES

NEW PATHOGENIC GERM DISCOVERED

Shanghai WEN HUI BAO in Chinese 3 May 83 p 1

[Article by Li Jianping [2621 1696 1627]: "Liao Wangqing [1675 5502 3237] Discovers New Pathogenic Germ"]

[Text] A new pathogenic germ was discovered by Liao Wanqing, lecturer and chief medical officer of the Dermatology Department of the Long March Hospital affiliated with the Second Medical College of Military Surgeons. His report, entitled, "New Invisible Coccus Shanghai Mutation Causes Meningitis," given in a national conference of dermatologists has won outstanding critical reviews from specialists in the conference. Everyone considers this to be a gratifying discovery which shows that our country has a new level in fungus research.

Fungi belong to the lower plants and are widespread in the natural world. As many as 120,000 different kinds have been identified and more than 100 of them are pathogenic germs. After graduating from college in 1962, Liao Wanqing has been taking care of patients in the Dermatology Department and often encountered some deep-seated fungus diseases that are hard to cure. Therefore, he directed the thrust of his scientific research on deep-seated fungus and conditional pathogenic germs. In the past few years, he has done a lot of sophisticated research work and discovered successively the pathogenic germs of polished coccus-like saccharomycete and Chaoluokebaojun [1560 5453 8199 132A 4624], creating conditions for the clinical treatment of deep-seated fungus diseases.

In 1980, he isolated a kind of germ from the cerebrospinal fluid of a meningitis patient. Through animal experiments and microscopic observations, he believed that it might be a new kind of germ. At the request of Liao Wanqing, the Institute of Dermatological Diseases Research of the Chinese Academy of Medical Sciences and the Department of Microorganism Research of Fudan University conducted an evaluation and the result was identical to that of Liao Wanqing's experiment. According to international regulations for giving names, the new germ was named the New Invisible Coccus Shanghai Mutation.

After the completion of the evaluation of techniques, Liao Wanqing again engaged himself in the preparatory work of evaluating the result. France has published a report on a new invisible coccus gattii mutation. He read a lot of materials and finally found the report on the gattii mutation. He compared the documentary report with his discovery and found that they are markedly

different. The hospital brought him the gattii mutation from Belgium and the $B3_93_9$ mutation from the United States. Liao Wanqing, the Institute of Dermatological Diseases Research of the Chinese Academy of Medical Sciences and the Department of Microorganism Research of Fudan University carried out successively a great deal of observation and experimentation. The result shows that the newly discovered germ, besides being different from those introduced from other countries, also possesses the characteristics of self-dissolving and strong pathogenic capabilities, and is a new pathogenic germ first seen in our country.

12380
CSO: 4008/146

BRIEFS

CHROMOSOME RESEARCH--The topics for chromosome research on hereditary diseases jointly completed by the Shenyang Family Planning Research Institute and the Biology Department of Liaoning University have been evaluated by China's specialists and professors concerned and have been determined to have reached the advanced level of our country, filling in a blank in our province's scientific research work in family planning. The successful completion of the topics for chromosome research on hereditary diseases has tremendous practical significance for the prevention of the birth of babies with hereditary deformities, the improvement of the population's health, and the strengthening of the prevention of chromosome hereditary diseases. Ever since 1980, the Shenyang Family Planning Research Institute and the Biology Department of Liaoning University have respectively set up the G.C. visible tape, the method of the S.C.E. experiment, the method of examining sex chromosome, the method of determining the quantity of protein in the amniotic fluid of the embryonic shell and the method of culture amniotic fluid cells, and applied them to clinical practices. They have conducted 716 cases of advisory outpatient services and cell genetic examination was carried out on outer layer blood in 537 of the cases, thereby establishing firmly the test method and gradually elevating the level of diagnosis and effectively guaranteeing the quality of advice on hereditary matters--the outpatient work before delivery. Establishment of the method of experimenting in chromosome technology provides the scientific basis for chromosome research on hereditary diseases and the diagnosis of chromosome diseases. [Text] [Shenyang LIAONING RIBAO in Chinese 23 Jun 83 p 3] 12380

CSO: 4008/146

AUTHOR: ZHOU Faqi [0719 4099 1477]
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ORG: None

TITLE: "Synthesis of Some Aromatic Trinitro Compounds"

SOURCE: Beijing BINGGONG XUEBAO [ACTA ARMAMENTARII] in Chinese No 3, 1983 pp 1-10

TEXT OF ENGLISH ABSTRACT: In this paper the synthesis of nine new aromatic trinitromethyl compounds is reported: namely that of para-chloro-meta-nitro, parabromo-meta-nitro-, para-methoxy-meta-nitro-, 4-methoxy-3, 5-dinitro-, 4-amino-3, 5-dinitro, 4-dimethylamino-3, 5-dinitro-, 4-methyl nitramino-3, 5-dinitro-phenyl trinitromethane, 1, 3-bis(trinitromethyl) benzene and 5-nitro-1, 3-bis(trinitromethyl) benzene.

In addition, synthesis of four more new aromatic dinitromethyl compounds is also reported: namely that of para-chloro-meta-nitro-phenyl-dinitromethane, 4-methylnitramino-3, 5-dinitro-phenyl-dinitro-methane, 1, 3-bis(dinitromethyl) benzene and 5-nitro-1, 3-bis(dinitromethyl) benzene.

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ORG: None

TITLE: "Generalized Nielsen's Equations for Nonholonomic Mechanical Systems with Variable Mass"

SOURCE: Beijing BINGGONG XUEBAO [ACTA ARMAMENTARII] in Chinese No 3, 1983 pp 11-19

TEXT OF ENGLISH ABSTRACT: In this paper, the Jourdain's principle and its Nielsen's forms for the mechanical systems with variable mass are given. Then various forms of generalized Nielsen's equations for nonholonomic mechanical systems with variable mass are obtained. Finally an example is given.

AUTHOR: WANG Yuanyou [3769 0337 2589]

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TITLE: "Viscoelastic Analysis of Stresses and Strains in Solid Propellant Grains Under Pressure Loadings"

SOURCE: Beijing BINGGONG XUEBAO [ACTA ARMAMENTARII] in Chinese No 3, 1983 pp 20-33

TEXT OF ENGLISH ABSTRACT: This paper is devoted to the viscoelastic analysis of stresses and strains resulting from pressure loadings. Some engineering methods for solving this classical problem have been developed. For example, formulas were derived on the assumption that propellants are incompressible or motor cases are undeformed, and some other formulas are derived without these assumptions, with Schapery's approximate inversions used to obtain viscoelastic solutions. In this paper, a new method is developed without using the above assumptions and approximate inversions. Therefore, the stress and strain solutions are more accurate than those derived from the above methods.

The solutions of these two planar problems result from suddenly-applied pressure and gradually-applied pressure.

AUTHOR: XIAN Mengmei [5029 1125 2734]

ORG: None

TITLE: "The Relationship Between Adiabatic Shear and Ballistic Properties in Al-Alloy Targets"

SOURCE: Beijing BINGGONG XUEBAO [ACTA ARMAMENTARII] in Chinese No 3, 1983 pp 34-44

TEXT OF ENGLISH ABSTRACT: The crater analysis for Al-alloy targets of different ballistic properties by metallography is presented in this paper. It is found that the ballistic property of the target is concerned with the adiabatic shear. Dynamic stress-strain curves of two kinds of Al-alloys are determined with a strain rate of 100 per second ($\dot{\varepsilon} = 10^2/s$) by a one-dimensional Split Hopkinson Bar. The effect of dynamic behavior on the adiabatic shear and ballistic properties is analyzed and compared with critical conditions of strain and strain rate, where yield stresses of two alloys are used.

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TITLE: "A Study of the Low Frequency Instability of the Solid Propellant Rocket Engine"

SOURCE: Beijing BINGGONG XUEBAO [ACTA ARMAMENTARII] in Chinese No 3, 1983 pp 45-52

TEXT OF ENGLISH ABSTRACT: This paper presents a new concept of the low frequency λ^* instability based on experiments and analysis of the flowing field of combustion gases in the engine. It shows the relationship between tube grain design parameters (ratio of inside-port to outside-port parameter λ and chamber pressure p) and its effect on the low frequency instability. A formula for analyzing the low frequency instability of the tube grain engine is derived through theoretical study. The theoretical analysis conforms with the experimental results. This paper will be useful in determining tube grain design parameters (p and λ) and their effect on the damping of the low frequency instability.

AUTHOR: CHEN Hongzhang [7115 3163 4545]
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TITLE: "Ignition and Initial Peak Pressure of Small Solid Propellant Rocket Motors"

SOURCE: Beijing BINGGONG XUEBAO [ACTA ARMAMENTARII] in Chinese No 3, 1983 pp 53-59

TEXT OF ENGLISH ABSTRACT: This paper studies the cause of the initial peak pressure of small solid propellant rocket motors formed at high temperatures, proposes a specific method for predicting the initial peak pressure and discusses the specific measures for reducing or eliminating the ignition peak pressure at high temperatures. These studies are of practical importance to further improvements in the design of solid rocket motors and their comprehensive performances.

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ORG: None

TITLE: "The Application of Modern Control Theory to Tank Gun Stabilizer"

SOURCE: Beijing BINGGONG XUEBAO [ACTA ARMAMENTARII] in Chinese No 3, 1983 pp 60-68

TEXT OF ENGLISH ABSTRACT: This paper deals with the application of modern control theory to tank gun stabilizers in consideration of the existing conditions of tanks. Explorations into finding out the cost function and computation of the minimal error control and minimal time control have been made in this paper. The possible improvements of stabilizer properties are discussed.

9717
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LI Keliang [2621 0344 0081]
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ORG: All of Tianjin Municipal Research Institute of Labor and Health

TITLE: "A Modified Apparatus To Measure Nerve Conduction Velocity"

SOURCE: Beijing SHENGWUHUAXUE YU SHENGWUWULI JINZHAN [BIOCHEMISTRY AND BIOPHYSICS" in Chinese No 2, Apr 83 pp 64-66

ABSTRACT: Determination of nerve conduction velocity is often necessary for clinically differentiating myogenic from neurogenic diseases or for studying the effect of a given toxin, drug, or organ on the function of nerve conduction. There is yet no device made in China suitable for measuring nerve conduction velocity. The electromyographic instruments available on foreign markets all belong to the stimulation type but can't be used to compare induced potential waveforms at two or more locations. This paper reports an apparatus designed and made by the authors, using a double stimulation process to determine the conduction speed of the motor nerve trunk quickly by calculating the difference between two incubation periods. The work process, the circuit theory, and the major technical indices of the apparatus are described.

This paper was received for publication on 16 August 1982.

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TITLE: "A New Assay for Superoxide Dismutase (SOD) Activity: Chemiluminescence Method"

SOURCE: Beijing SHENGWUHUAXUE YU SHENGWUWULI JINZHAN [BIOCHEMISTRY AND BIOPHYSICS] in Chinese No 2, Apr 83 pp 59-63

ABSTRACT: In the presence of oxygen, the catalytic base of xanthopterin oxidase (XO), xanthopterin or hypoxanthopterin (X or HX), will excite luminol to cause it to be luminescent when it returns to the base state. As SOD can eliminate $O\bar{z}$, it can prevent luminol from becoming luminescent under the above condition. On the basis of this theory, a test is designed to determine SOD activity, more sensitive than other methods of testing. The Massey method is adopted to extract XO from milk; HX and luminol are imported from England; the Cu,Zn-SOD is a freeze-dried powder extracted from bovine blood by the authors. When a special luminescence measuring instrument, such as a liquid scintillation counter, is used, this method may detect a content of 10^{-10} - 10^{-11} M of SOD. Details of the experiment are reported and discussed.

This paper was received for publication in August 1982.

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TITLE: "Symposium on Biophysics Education Work"

SOURCE: Beijing SHENGWUHUAXUE YU SHENGWUWULI JINZHAN [BIOCHEMISTRY AND BIOPHYSICS] in Chinese No 3, Jun 83 p 68

ABSTRACT: A nationwide higher education biophysics education work symposium, sponsored by China Society of Biophysics Education Work Committee, was held in Beijing on 21-23 January 1983 and attended by more than 50 delegates representing various colleges, the departments of higher education, and the People's Education Publishing House, etc. The purpose of the symposium was to exchange domestic and foreign experience in biophysics education and the training of a teaching staff. At present, different areas of biophysics are emphasized in the colleges, depending mostly on the qualification of the teachers. In some colleges, there may be a department of biophysics and a department of molecular biophysics; in others it may be incorporated in such departments as physiology, biochemistry or radiation biology. In still others, the subject is a graduate research specialty, supervised by a group of teachers of various departments. Among the major problems discussed at the symposium, the first was the difficulty of obtaining job assignments for graduates of such a specialty

[continuation of SHENGWUHUAXUE YU SHENGWUWULI JINZHAN No 3, Jun 83 p 68]

as biophysics. The second is the difficulty of designing the course. It was resolved that a series of lectures on biophysics should be organized for the coming summer by the Ministry of Education, with lecturers recommended by the society.

AUTHOR: None

ORG: Sichuan Provincial Applied Nuclear Energy Institute

TITLE: "Technique of Preserving Pork by Radiation Certified by the State"

SOURCE: Beijing SHENGWUHUAXUE YU SHENGWUWULI JINZHAN [BIOCHEMISTRY AND BIOPHYSICS] in Chinese No 3, Jun 83 p 25

ABSTRACT: The technique of preserving pork by radiation is a research topic assigned by the National Science Committee and completed by 10 organizations including the Sichuan Provincial Applied Nuclear Energy Institute, Sichuan College of Medicine, Sichuan Provincial Research Institute of Industrial Public Health, Sichuan Provincial Food Company, etc. With the technique pieces of boned pork are vacuum packed in plastic wrappers and irradiated with 1.5 megarad of 60Co-4. According to the opinion of all types of consumers, the quality of the pork, thus treated, is very close to fresh even after more than 2 months of storage under room temperature. The specifications of the plastic wrapping material, the nutritional and sanitation analyses of the pork, the problem of adverse effects of eating the pork, and the economic benefits of this preservation technique are briefly discussed in the paper.

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TITLE: "Processing Information on Moving Objects by Computer"

SOURCE: Beijing SHENGWUHUAXUE YU SHENGWUWULI JINZHAN [BIOCHEMISTRY AND BIOPHYSICS] in Chinese No 3, Jun 83 pp 26-30

ABSTRACT: The capability of using a computer to interpret a motion picture composed of three frames depicting a frog picking fruits has been reported in a foreign country [Japan]. This paper reports the attempt by the authors to design a motion picture composed of five frames to be processed by a computer. In order for the project to be successful, the authors believe the computer must be able to recognize the moving objects and their positions, distinguish them from those at rest, and report the appearance of new objects. A FORTRAN program is written to simulate such an information processing design to be run on a CROMEMCO microcomputer. This paper was delivered at the 2d National Symposium on Artificial Intelligence in September 1981 and revised for publication in the journal.

This paper was received for publication on 7 July 1982.

AUTHOR: None

ORG: None

TITLE: "Tool Enzymes for Genetic Engineering Produced and Supplied by the Institute of Biophysics

SOURCE: Beijing SHENGWUHUAXUE YU SHENGWUWULI JINZHAN [BIOCHEMISTRY AND BIOPHYSICS] in Chinese No 3, Jun 83 inside back cover

ABSTRACT: A biochemical reagent conference was called by the Division of Biology, Chinese Academy of Sciences, in Beijing on 23-26 March 1983 to examine the production of tool [1562 0367] enzymes for genetic engineering and to make arrangements for research and production of tool enzymes in 1983-85. The biochemical plant of the Institute of Biophysics is in charge of the research and production work. It has formally informed all research units of the country that it is ready to supply them with DNA polymerase, polynucleotide kinase, T4-DNA polymerase, polynucleotide phosphatase, DNA ligase, RNA ligase, RNA polymerase, Ribonuclease 1, Ribonuclease TI, DNAase II, λ-DNA, pBR322, EcoRI, BgIII, SaII, alkaline phosphate esterase, and alkaline phosphate diesterase. Moreover, the plant also supplies hexose kinase, creatine kinase, alcohol dehydrogenase, glucose-6-phosphate dehydrogenase, malic acid dehydrogenase, lysozyme, protein kinase, etc. The quality of the above items and their availability are guaranteed.

6248
CSO: 4009/215

AUTHOR: WANG Shouwu [3769 1343 2976]

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TITLE: "Large-Scale and Very-Large-Scale Integrated Circuits"

SOURCE: Beijing WULI [PHYSICS] in Chinese No 5, May 83 pp 269-275

ABSTRACT: Following an introduction on the importance of single-chip integrated circuits in the national economy and a brief description of techniques for preparing silicon materials, growing and depositing thin films, ultraprecise processing, choosing doping agents, designing and manufacturing masks, and testing the finished wafers, the paper proceeds to report briefly that the integrated circuit industry in China has had a history of nearly 20 years. The task on hand is mainly clarifying the factors affecting the quality of workmanship to set standards for all work processes in order to guarantee the quality and the rate of finished products and reduce the production cost so as to implement the results of the laboratories in production and apply them extensively. In this manner, the development of large-scale integrated circuits in China can be very rapid and successful.

AUTHOR: TONG Shihuang [4547 0013 3874]

ORG: Institute of Automation, Chinese Academy of Sciences

TITLE: "Management of Information Systems and Advisory Decision Making"

SOURCE: Beijing ZIDONGHUA XUEBAO [ACTA AUTOMATICA SINICA] in Chinese No 3, Jul 83 pp 237-239

ABSTRACT: This paper discusses the necessity and possibility of using computers in industrial management in China. A great shortcoming of the current system is the inability to obtain the needed information on time. It is very time-consuming to gather reports from layer to layer while data analysis and information processing necessitate further delay. For example, when a railway bureau wants to formulate a freight plan for the month, persons must be dispatched to all the branches at the beginning of the month to hold meetings which usually last 20 days, leaving the bureau no more than 2 days to make decisions approving or revising the plans of the branches. Moreover, there is always a large quantity of superfluous information and the papers containing all the data can easily be damaged or lost in transit. Sometimes, the current method of information transfer causes errors. In foreign countries, computers are popularly used in industrial management; it is by no means rare that an

[continuation of ZIDONGHUA XUEBAO No 3, Jul 83 pp 237-239]

industry of several thousand workers uses nearly 100 computers. In China, although modernization of management has produced benefits in departments of materials, automobile factories, steel and iron mills, textile mills, etc. nationwide, there are very few industries using computers for management. It is only a matter of time before computers are extensively used, however, because in the process of economic reform, economic benefits are being emphasized more and more to create the condition for industries to use computers for economic management in order to realize modernization. The paper also briefly describes the process of using computers instead of holding meetings of branch bureaus to gather freight data in 2 days instead of 20 days to demonstrate the advantage of using computers in industrial management and decision making.

6248
CSO: 4009/213

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TITLE: "Brief Report of the 6th National Conference on Crystal Growth and Materials"

SOURCE: Beijing WULI [PHYSICS] in Chinese No 5, May 83 p 320

ABSTRACT: The 6th National Conference on Crystal Growth and Materials was held in Xiangshan, Beijing on 12-17 October 1982 and attended by 227 delegates and over 50 guests. Abstracts of the 233 papers received were published in RENGONG JINGTI. Deliveries of the 108 papers were divided into the five groups of laser oscillation crystals and growth, nonlinear crystals and growth, solution growth, growth of optical crystals and testing of their properties, growth of superhard crystals, and growth of thin films. Developments in the science of growing crystals in China since the last conference held in Suzhou in 1979 were briefly reviewed. The paper maintains that papers reporting research on growth of monocrystal thin film and physical properties of new crystals are few in number, methods of growing crystals are not complete, and the degree of precision of the equipment and automatic control remains poor in China. These shortcomings, as demonstrated at this conference, are not in keeping with the development and

[continuation of WULI No 5, May 83 p 320]

application of new crystal materials. Following negotiations, it was resolved that the 7th National Conference on Crystal Growth and Materials will be held in Yantai in 1985.

6248
CSO: 4009/213

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ORG: None

TITLE: "First Conference on Electric Light Source Standardization Held in Xiamen"

SOURCE: Beijing BIAOZHUNHUA TONGXUN [STANDARDIZATION JOURNAL] in Chinese No 6, 1983 p 15

ABSTRACT: The First Electric Light Source Standardization Conference, sponsored jointly by the China Standardization Association and Beijing Institute of Electric Light Source, was held 22-27 March 1983 in Xiamen, Fujian Province. Representatives of illumination companies, lamp plants, and related research units of Beijing, Tianjin, Shanghai, Shenyang, and Chongqing, and some specialized schools, colleges and universities were present. Economic results of standardization of electric light source and future work were among the topics thoroughly discussed from theoretical as well as practical viewpoints in the 47 papers received by the conference. According to preliminary statistics, if the energy efficient high-pressure sodium lamps are used to substitute for China's 2.6 million fluorescent high-pressure mercury lamps, 400,000 kw of electricity may be saved each year, the equivalent of the production of a large

[continuation of BIAOZHUNHUA TONGXUN No 6, 1983 p 15]

power plant. A shortcoming of sodium lamps is poor color differentiation, which is being studied by related organizations and some results have been obtained. Problems relating to the adoption of international standards in the electric light source industry were also discussed at the conference.

AUTHOR: YU Desheng [0205 1795 3932]

ORG: None

TITLE: "Ministry of Textile Industry Calls Conference on Reforming Standards of Polyester Short Fiber, Polyester and Cotton Mixed Fiber and Fabrics, and Printed Fabrics"

SOURCE: Beijing BIAOZHUNHUA TONGXUN [STANDARDIZATION JOURNAL] in Chinese No 6, 1983 p 23

ABSTRACT: In the middle of March 1983, the Science and Technology Department of the Ministry of Textile Industry called a conference in Beijing to discuss the revision of standards of polyester short fiber, polyester and cotton mixed fiber and fabrics, and printed fabrics. Participants included representatives of textile bureaus and plants of Beijing, Shanghai, Hebei, Jiangsu, and Tianjin, the State Bureau of Standards, State Merchandise Inspection Bureau, Ministry of Commerce, and Hong Kong Huarun Company. Revision of standards is an important task of the Ministry of Textile Industry because it will create the conditions and provide experience for future revision of other yarns and fabrics. The delegates were keenly aware of the importance of product quality

[continuation of BIAOZHUNHUA TONGXUN No 6, 1983 p 23]

in world markets. Furthermore, the domestic market has changed from a seller's to a buyer's market and only good quality products are acceptable. High quality products require high standards. Necessary revisions to raise the standards much higher and to adopt common international indices for inspection are briefly mentioned in the paper.

6168
CSO: 4009/210

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TITLE: "13C-(19F)NMR Decoupling Method"

SOURCE: Shanghai YOUJI HUAXUE [ORGANIC CHEMISTRY] in Chinese No 3, Jun 83 pp 211-212, 187

ABSTRACT: Since the introduction of the FT nuclear magnetic resonator, the spin coupling constant of 13C-19F and the chemical displacement of 13C may be directly determined, but for many polyfluorine compounds containing many types of anisotropic fluorine, the spectral lines of the 13C spectrum are complex and mutually overlapping. If the fluorine-carbon coupling is not removed, it is definitely difficult to distinguish the property of the lines and their corresponding coupling constants. To date there has been no report of a 13C-(19F) NMF decoupling experment. Due to the relatively great range (300ppm) of displacement of 19F and because the value of Jc-F is greater than that of Jc-H, decoupling is generally difficult. A 19F noise decoupling experiment requires great irradiation power, thus it is especially difficult. The authors used

[continuation of YOUJI HUAXUE No 3, Jun 83 pp 211-212, 187]

the Varian XL-200 superconduction nuclear magnetic resonator to carry out the experiment, including both the noise decoupling and selective decoupling methods. The coupling constant of many fluorine-containing compounds was measured and satisfactory results were obtained.

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TITLE: "Constant Potential Meter for Electrical Organic Synthesis Research"

SOURCE: Shanghai YOUJI HUAXUE [ORGANIC CHEMISTRY] in Chinese No 3, Jun 83 pp 213-216

ABSTRACT: A constant potential meter is indispensable in electrical organic synthesis. The available domestic constant potential meters are all very inconvenient to use, however, because of the difficulty in controlling precision and response. The authors used related foreign literature as reference and made one with relatively better properties. Preliminary laboratory experiments proved it to be satisfactory for routine electrolytic reaction and small scale electrical synthesis work. The purity and productivity of electrolytic products are both acceptable. All components are domestic products and most of them are installed on one piece of printed circuit board. Thus the instrument is very low in cost and can be assembled by the user. The major technical indices, the basic theory, the circuit analysis, and a sample application are included in the paper.

6248
CSO: 4009/214

AUTHOR: None

ORG: Carburetor Group, Tianjin Internal Combustion Engine Research Institute

TITLE: "Conference To Establish Small Gasoline Carburetor Industry Group Held in Fuling"

SOURCE: Tianjin XIAOXING NEIRANJI [SMALL SIZE INTERNAL COMBUSTION ENGINES] in Chinese No 2, 1983 p 23

ABSTRACT: For the purpose of exchanging technical information and developing interindustry competition and criticism work, the conference to establish the Machine-Building Industry Ministry Small Gasoline Carburetor Group was held in Fuling, Sichuan Province, on 10-15 December 1983 and attended by 43 delegates of 23 units. The two documents concerning the technical conditions and quality inspection methods of small gasoline carburetor proposed by the Tianjin Internal Combustion Engine Research Institute and approved by the ministry were earnestly discussed and the "Industrial Standard for Determining the Cleanliness of Small Gasoline Engine Carburetors" was formulated for trial implementation within the industry. The delegates agreed that the conference was very productive and they learned many methods for strengtheing industrial management and improving product quality. The direction for developing production techniques of the industry has thus been further clarified.

6168
CSO: 4009/208

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