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PEOPLE'S REPUBLIC OF CHINA SCIENTIFIC ABSTRACTS

No. 178

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AERONAUTICAL KNOWLEDGE

AUTHOR: None

ORG: None

TITLE: "Air Force Contributions to Industrial and Agricultural Construction"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE] in Chinese
No 5, May 77 pp 2-4

ABSTRACT: During 1976, the Chinese Air Force flew more than 7,000 missions to participate in socialist construction work and to support the disaster relief efforts. Members of the Air Force were particularly motivated by the anti-"gang of four" movement and the dynamic leadership of Chairman Hua. Examples of the Air Force missions include aerial exploration of mineral reserves, aerial measurement of magnetic field, aerial surveillance of Mt. Everest, extinguishing forest fires, seeding clouds to produce artificial rain, air-dropping supplies to earthquake victims, and aerial spraying of pesticides. To encourage such efforts, the Air Force gave citations to over 200 units and over 4,000 individuals.

AUTHOR: KU Ch'i-hsing [7357 0366 5887]

ORG: None

TITLE: "Aviation and Human Environment"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE] in Chinese
No 5, May 77 pp 4-5

ABSTRACT: Due to the increased traffic density, larger aircraft engines, and higher speeds, modern aviation poses a threat to the human environment. The two most important environmental factors affected are noise and atmospheric pollution. In this article, the author explains the noise problem and the measure of the "effective sensory noise level" as used in the Noise Standards established by the International Civil Aviation Organization. He also discusses the following topics in connection with atmospheric pollution caused by aviation: 1) the harmful effects of specific pollutants such as carbon monoxide, hydrocarbon, and nitrogen dioxide; 2) the conditions of flight which produce pollutants; 3) the "pollution coefficient," which is a measure of the level of pollution in the atmosphere; and 4) practical methods of reducing pollution. In addition, it is pointed out that certain environmental issues have political implications; for example, the banning of the supersonic airplane Concorde in New York, and the monopoly of the sales of anti-pollution devices by the major powers, etc.

AUTHORS: SZU Chi [1835 0370]
YU Nung [5148 6593]

ORG: None

TITLE: "Electronic Interference"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE] in Chinese
No 5, May 77 pp 6-7

ABSTRACT: Most modern strategic and tactical airplanes are equipped with electronic interference devices to detect or deceive enemy radars. There are two basic methods of electronic interference: passive interference and active interference. Passive interference involves the use of metallic chaffs to saturate enemy radar or radio wave absorbent materials to alter the characteristics of the reflected waves. Active interference involves the transmission of jamming signals to camouflage the true target or false signals to deceive enemy radar.

AUTHOR: FU Ch'ang-ch'ing [4569 7022 7230]
LAN Ta-ying [3663 1129 5391]

ORG: None

TITLE: "Armed Helicopters"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE] in Chinese
No 5, May 77 p 8

ABSTRACT: Since the 1960's, helicopters have been widely used in tactical warfare. Early armed helicopters were mostly modified from transport helicopters by installing such weapons as machine guns, cannons, rockets, anti-tank missiles, and grenade launchers. The modified helicopters, however, generally suffer losses in performance and durability. During the last decade, high performance and special purpose helicopters were developed. They include transport helicopters, reconnaissance helicopters, antisubmarine helicopters, and hauling helicopters.

AUTHOR: T'AN Hsueh-shu [6223 1331 2579]
PAO Hsiao-lin D545 4607 2651]

ORG: None

TITLE: "Aerodynamic Compensation Devices"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE]
No 5, May 77 pp 9-10

ABSTRACT: Aerodynamic compensation devices are designed to reduce the pilot's effort in operating the controls of an airplane. The common types of compensation devices include the following:
1) passive compensation devices, which produce a moment that partially counteracts the aerodynamic moment of elevators;
2) angular compensation devices, which produce counteracting moments on rudders; 3) shifted axis compensation devices; and
4) internally sealed compensation devices. In addition to improving the operation of the levers, some compensation devices (e.g., the angular compensation device) also enhance the aerodynamic control moment.

AUTHOR: HSIN Ch'un [6580 5028]

ORG: None

TITLE: "Shoulder Fired Missile"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE]
No 5, May 77 pp 10-11

ABSTRACT: The shoulder fired missile is a single-man air defense weapon developed in the 1960's. The weapon system consists of the missile, the launch tube, the battery and the launch mechanism. Currently, the range of the shoulder fired missile is limited to low altitude targets (less than 3 km); the missile may be guided either by radio commands or by an infrared or laser homing device. Due to the portability requirement, the shoulder fired missile system weighs only 14-15 kg. To ensure safety, the weapon system has two rocket engines: a launch engine which ejects the missile from the launch tube, and a main engine which is ignited after the missile has left the launch tube. Future developments in shoulder fired missile systems include larger warheads, improved sensing device in the guidance system, and the installation of "target interrogators" to discriminate enemy targets from friendly ones.

AUTHOR: WU Ling-yao [2976 3249 5069]

ORG: None

TITLE: "Radio Telemetry For Artificial Satellites"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE
No 5, May 77 pp 13-15]

ABSTRACT: The main function of radio telemetry on an artificial satellite is to transmit information back to the ground. The transmitted information include both performance data of the satellite and measured parameters or photographs. The basic components of a radio telemetry system consist of the sensing devices, the low frequency amplifiers, and the transmitters. To transmit the information, the signals must be modulated onto high frequency "carrier waves". There are three basic types of modulation: amplitude modulation, phase modulation, and frequency modulation. The received signals are then demodulated to recover the transmitted information. Radio telemetry can also be classified into real time telemetry where information is transmitted instantaneously, and time-delayed telemetry, where information is recorded and stored before transmission.

AUTHOR: CH'I Fan [6259 0028]

ORG: None

TITLE: "Reflections On World Travel"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE]
No 5, May 77 pp 16-17

ABSTRACT: In this article, the author describes the time change phenomenon which he encountered during a journey from Peking to North America. In particular, he explains the 24 time zones across the globe and the definition of the international date line. A table showing the times of major cities in the world relative to Peking time is presented.

AUTHOR: WU Hsiao-kan [0702 1321 1949]

ORG: None

TITLE: "Physical Requirements Of A Pilot -- The Brain And Speech"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE]
No 5, May 77 pp 18-19

ABSTRACT: The operations performed by a pilot on a sophisticated flight mission or during air combat require a highly sensitive and a highly stable brain. Sensitivity of the brain refers to fast response and accurate judgement when stimulated by external events. Stability of the brain refers to the ability to function for long periods of time under demanding conditions. Sensitivity can be developed by means of academic exercises and physical activities. To improve stability requires sufficient sleep and "active rest" such as cultural activities. The ability of a pilot to speak clearly and fluently is important in communicating with the ground and with other pilots. Clear and fluent speech can also be developed by participating in social and political activities and by avoiding bad speaking habits.

AUTHOR: FENG Ts'ai-chang [7458 1752 4545]

ORG: None

TITLE: "Transporting Patients By Air"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE]
No 5, May 77 pp 20-21

ABSTRACT: Transporting the sick or disaster victims by air has definite advantages over ground transportation. It reduces the chances of fatigue and improves the patient's chances of recovery. However, there are certain risks involved in air transport, such as air sickness, adverse effects of reduced atmospheric pressure, and lack of oxygen. In addition, patients with the following diseases should be transported with great caution: cardiovascular disease, brain disease, ear or nose infection, lung disease, stomach or intestine disease, or eye disease. The transport airplanes should also carry emergency medical equipment and trained medical personnel in order to provide necessary medical treatment to the patients during transit.

AUTHOR: KUAN Jui-chang [7070 3843 4545]

ORG: None

TITLE: "Application Of Electronic Computer In Airplane Research And Design"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE]
No 5, May 77 pp 22-24

ABSTRACT: A fundamental procedure in airplane research and design involves the study of aerodynamic forces and moments acting on the airplane. There are two basic techniques of obtaining aerodynamic data: wind tunnel testing of a scale model and numerical calculations of a mathematical model using electronic computers. The basic types of problems which can be solved on a computer include the following: 1) calculation of aerodynamic forces and moments for a given body shape; 2) designing the body shape for a given load distribution; and 3) design optimization problems. In comparison with the wind tunnel, the computer approach of aerodynamic research is faster, more economical, easier to apply, and generates more data. It can also simulate conditions which are not realizable in a wind tunnel. However, it can only provide an approximate solution to

[continuation of HANG-K'UNG CHIH-SHIH No 5, May 77 pp 22-24]

the Navier-Stokes equations and in many cases, the mathematical model must be established on the basis of experimental results.

AUTHOR: SU Yu [5685 4417]

ORG: None

TITLE: "Laser Communication"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE]
No 5, May 77 pp 24-25

ABSTRACT: Over the past decade, the use of lasers as a medium for communication has become a reality. Practical laser communications devices such as laser telephone, and laser television have been successfully tested. Generally, a laser communications system can be divided into two sections: the transmitting section, which consists of the laser generator, the modulator, and the transmitting telescope; and the receiving section, which consists of the receiving telescope, photo-electric elements, amplifiers, and demodulators. The advantages of laser communication are: 1) wide bandwidth to provide large information capacity; 2) low scattering angle to provide highly secure communications link; and 3) easy to transport and low cost. The disadvantages are: 1) it suffers severe atmospheric attenuation; 2) it requires precision instrument for alignment; and 3) it cannot propagate around obstacles.

AUTHOR: YANG Jung [2799 2837]

ORG: None

TITLE: "Two Small Examples Of Innovation"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE]
No 5, May 77 pp 26-27

ABSTRACT: This article describes two examples of innovative ideas of Chinese technicians to improve certain designs on imported airplanes. The modifications include: 1) the installation of a gas filling valve which saves 2-3 minutes in service time; and 2) the installation of a coordinating circuit which allows both auxiliary fuel tanks to be dropped simultaneously from a small airplane to maintain flight stability. It is pointed out that both ideas were implemented by the foreign manufacturers on later models of the airplanes.

AUTHOR: HSU Chih-ning [4958 3112 1380]

ORG: None

TITLE: "The Turbo-Pump of a Liquid Rocket Engine"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE] in Chinese
No 5, May 77 pp 28-30

ABSTRACT: The turbo-pump serves the important function of transporting a sufficient amount of propellant under high pressure to the combustion chamber of a liquid rocket engine. In this article, the basic structure of the turbo-pump is described and the operating principle of a centrifugal pump and the problem of vapor corrosion are explained. The operating principle of a turbine and methods of adjusting its output power are discussed. The importance of the starting characteristics of a turbo-pump is emphasized. In conclusion, the basic requirements of a turbo-pump in a liquid rocket engine are summarized.

AUTHOR: LI Chia-ch'i [2621 1367 7784]

ORG: None

TITLE: "Methods of Spraying Pesticides From Airplanes"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE] in Chinese
No 5, May 77 p 31

ABSTRACT: There are two methods of spraying pesticides from airplanes: the directional spraying method and the drift accumulation method. The directional spraying method provides relatively narrow but concentrated coverage from low-flying (3-5 meter) airplanes. The drift accumulation method provides wide and uniform coverage from airplanes flying at approximately 20 meters. Because of its high efficiency and low cost, the aerial spraying method is also used to spray fertilizers, weed killers, and seeds.

AUTHOR: SUN Hai-hsin [1327 3189 9387]

ORG: None

TITLE: "Pressure Instruments in Aviation"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE] in Chinese No 5, May 77 pp 32-35

ABSTRACT: Pressure operated instruments play an important part in monitoring the conditions of an aircraft and the operating conditions of an engine. On the basis of their structures, pressure instruments can be divided into three categories: mechanical, electro-mechanical, and electronic. Commonly used pressure instruments include the altimeter, the air speed indicator, the Mach number gauge, the rate-of-climb and rate-of-descent indicator, and the hydraulic pressure gauge. Pressure sensors are used to monitor the thrust level of an engine, the pressure levels of fuel system or lubrication system, and the pressure level in the afterburner. In addition, pressure gauges are also used to measure and control the air pressure and oxygen pressure inside the cabin of an aircraft, to monitor the load on a pilot during acceleration, and to monitor the pressure in the heating or air-conditioning systems. In recent years, highly sensitive and accurate pressure transducers have been developed using solid-state and integrated-circuit technologies. Their applications

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have been extended to wind-tunnel testing, high altitude simulation testing, as well as artificial satellites and space vehicles. On the inside back cover of this issue, schematic diagrams of several applications of pressure instruments are illustrated.

AUTHOR: None

ORG: Vacuum Electron-Beam Welding Group of Bureau X

TITLE: "Vacuum Electron-Beam Welding"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE] in Chinese No 5, May 77 pp 36-37

ABSTRACT: Vacuum electron-beam welding is a relatively new welding technique developed in the 1960's. Its basic operation involves the conversion of all the kinetic energy of an electron-beam into heat energy to generate high temperatures. Its energy density can be as high as 10000 times that of electric arc welding. Electron-beam welding must be performed in a vacuum to avoid energy losses due to collisions with air molecules. The advantages of electron-beam welding are: 1) ability to weld pieces of large thickness and to weld metals that have a very high melting point; 2) ability to produce high purity welds without oxidation. However, it also has the following disadvantages: 1) complex and expensive equipment are required; 2) long preparation time is needed to evacuate the vacuum chamber; and 3) the dimensions of the welded piece are limited by the size of the vacuum chamber.

AUTHOR: LIU Chin-hai [0491 6930 3189]

ORG: None

TITLE: "Engine Stall"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE] in Chinese No 5, May 77 pp 38-39

ABSTRACT: The acceleration regulator is a device which controls the amount of fuel supply to the engine so that an optimum relation between engine speed and fuel supply can be maintained. However, the operation of the acceleration regulator is sensitive to variations in ambient temperature. In the summer, the high ambient temperature causes lower exit pressure from the compressor, which reduces the fuel supply and limits the engine speed. This phenomenon is called "cold engine stall". During the winter season, the low ambient temperature causes higher compressor pressure and excessive fuel supply to the engine. This leads to overheating of the engine which also limits the engine speed. This phenomenon is called "hot engine stall". On new aircraft engines, different designs of acceleration regulators have been used which avoid the problem of engine stall.

AUTHOR: HUNG Te-pin [3163 1795 1755]

ORG: None

TITLE: "Merits of Standardization"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE] in Chinese No 5, May 77 pp 40-42

ABSTRACT: Standardization is an approach adopted by both capitalistic and socialistic countries to improve production and economy. Specifically, it provides the following advantages: 1) ensuring and improving the quality of production; 2) reducing the development cycle and production cycle of new products; 3) increasing labor efficiency via specialization in production procedures; 4) improving the efficiency of utilizing national resources and raw materials; 5) improving the efficiency of assembly, maintenance and repair procedures by ensuring compatibility of products; 6) providing guidelines for developing new products and utilizing advanced technologies; 7) improving the exportation of merchandise, foreign aid, and international exchange of technologies; and 8) reducing the time of defense mobilization and preparation in time of war.

AUTHORS: HUANG Shu-nien [7806 3412 1628]
CHANG Yung-ts'ai [1728 0737 5475]

ORG: None

TITLE: "Structure of the 'Liberation-5' Glider"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE] in Chinese No 5, May 77 pp 44-45

ABSTRACT: This article introduces the 'Liberation-5' training glider which is designed to teach beginning students in gliding. The technical specifications are given as follows: length--6.636 m; wing span--12.332 m; net weight--185 kg; maximum payload--150 kg; maximum speed--150 km/hr; and maximum glide ratio--12 to 1. In addition, the detailed designs of the fuselage, the wing, the vertical and horizontal tails, and the control mechanisms for the flaps, the rudder, and the elevators are described.

AUTHOR: None

ORG: Group of Cancer Research, Shanghai Second Medical College and Blood Products Section, Shanghai Institute of Biological Products

TITLE: "Preparation and Some Properties of the Human Transfer Factor"

SOURCE: Shanghai SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI-HSUEH-PAO [ACTA BIOCHEMICA et BIOPHYSICA] in Chinese Vol 8, No 4, Dec 76 pp 283-292

TEXT OF ENGLISH ABSTRACT:

Transfer factor (TF) is a dialysable (ultrafilterable) extract of sensitised leukocytes. It transfers cellular immunity from a skin test positive donor to a skin test negative recipient. Currently TF is recognized as one of the most potent immunological reagents. In this paper the detailed method for preparation of transfer factor from normal blood bank donors has been described and some physico-chemical and biological properties of the TF preparations have been examined. The production of TF is briefly as follows: After separation of the plasma (for plasma products), the buffy coats are harvested and pooled. The contaminating red blood cells are disrupted by tris buffered or isotonic NH_4Cl solution. The pooled leukocytes having been washed twice with cold normal saline are then alternately frozen and thawed ten

[continuation of SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI-HSUEH-PAO Vol 8, No 4, Dec 76 pp 283-292]

times with dry ice in acetone and a 37°C water bath. The cell lysate is placed in dialysis tubing and dialysed in the cold for 36~48 hours against running pyrogen-free deionized water. The dialysate is lyophilized. The yellowish white powder is saved and redissolved in the desired volume of pyrogen-free deionized water, and passed through a Seitz filter (EKS). 2ml of the sterile TF solution (equivalent to the dialysate of 4×10^8 leukocytes) are placed in each ampoule. The final product is stored at -20°C .

The TF preparation is protein-free as determined by protein precipitating reagents. It contains ca. 148 μg of peptides and 14 μg of ribose per mg of dry powder. The ultraviolet absorption curve gives a peak at 250~251 nm. Adenine, guanine and uracil are present in the paper chromatogram of the TF acid hydrolysate. Silica-gel thin layer chromatography reveals four spots stained with ninhydrin. Sephadex G-25 filtration gives reproducibly a characteristic elution pattern yielding 3 main peaks and several small peaks with many of the eluted peaks beyond the total volume of the column. The results of animal experiments show that the TF preparations are non-toxic, non-anaphylactic and non-antigenic.

[continuation of SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI-HSUEH-PAO Vol 8, No 4,
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So far over 160 patients (variously afflicted with herpes zoster, chronic hepatitis B, systemic lupus erythematosus, primary carcinoma of the liver, carcinoma of the lung and leukemia) have been treated with the TF preparations. The results will be published elsewhere.

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CHOU Te-ming [6650 1795 2494]
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ORG: Biomembrane Research Group, Department of Cell Biology, Peking Institute of Zoology, Chinese Academy of Science

TITLE: "Comparative Studies on the Energy Linked ATPase Complex of Biological Membranes I. Reconstitution of the Submitochondrial Membrane Vesicles from the Soluble Mitochondrial ATPase (F_1) and the Depleted Inner Mitochondrial Membrane and the Binding of ANS to the ATPase of Rat Liver Mitochondria"

SOURCE: Shanghai SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI-HSUEH-PAO [ACTA BIO-CHEMICA et BIOPHYSICA] in Chinese Vol 8, No 4, Dec 76 pp 293-305

TEXT OF ENGLISH ABSTRACT:

The present investigation was undertaken to study the dissociation and reconstitution of the inner mitochondrial membrane of rat liver mitochondria. The binding of the fluorescence probe ANS to the mitochondrial ATPase before and after reconstitution was also studied in order to analyze the relationship between the ATPase (F_1) and the inner mitochondrial membrane. The results obtained may be summarised as follows:

(1) Three types of inner mitochondrial membrane vesicles deficient in ATPase (F_1) have been obtained by exposing submitochondrial particles (SMP) to the action of trypsin and urea (TU-membrane vesicle), silicotungstate (STA-membrane vesicle) and Nagarse (N-membrane vesicle). It was found that when oligomycin-insensitive soluble ATPase (soluble F_1) was added to these three types of membrane vesicle preparations, the F_1 was bound to the membrane vesicle and the ATPase activity of these reconstituted SMP was restored fully in the case of TU-membrane and partly in the case of the STA-membrane vesicle and the N-membrane vesicle. In all cases the ATPase activity of reconstituted SMP became sensitive to oligomycin. Moreover, electron-microscopic examination of negatively stained specimens, ANS-binding estimation as well as cold treatment (0°C , 2 hrs) of these reconstituted SMP all showed that the reconstitution experiments were successful.

(2) Experiments using the fluorescence probe ANS indicated that the enhancement of ANS fluorescence in the SMP was due to the binding of ANS with mitochondrial ATPase (F_1). It was found that the response of the ANS fluorescence was almost abolished when the ATPase (F_1) had been removed from the SMP by urea

treatment. After rebinding of soluble F_1 to the depleted SMP both the ATPase activity and the response of ANS fluorescence in these reconstituted SMP were restored. Cold treatment (0°C , 2 hrs) of soluble F_1 cut down 84% of ATPase activity and 96% of the enhancement of ANS fluorescence; when soluble F_1 was bound again to the inner mitochondrial membranes, it became resistant to cold inactivation. At the same concentration of $6 \mu\text{M}$, ANS did not affect the ATPase activity of SMP. From these experimental results, it was suggested that ANS may be located in the hydrophobic region among the subunits of the F_1 molecule. Cold treatment of soluble F_1 may decrease this hydrophobic interaction and alter the conformation of the enzyme molecule, leading to loss of ATPase activity and ANS fluorescence response. The membrane may have a stabilising effect on the hydrophobic interactions among the subunits and on the conformation of F_1 .

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TITLE: "Comparative Studies on the Energy Linked ATPase Complex of Biological Membranes II. Reconstitution of Hybrid Submitochondrial Membrane Vesicles from the Soluble ATPase of Rat Liver Mitochondria and the Inner Mitochondrial Membrane of Human Primary Liver Carcinoma, with an Analysis of Genetic Control in Carcinogenesis"

SOURCE: Shanghai SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI-HSUEH-PAO [ACTA BIO-CHEMICA et BIOPHYSICA] in Chinese Vol 8, No 4, Dec 76 pp 307-317

TEXT OF ENGLISH ABSTRACT:

The oligomycin-sensitive ATPase activity of mitochondria and submitochondrial particles isolated from human primary liver carcinoma (two patients) has been determined. For comparison, the ATPase activity of mitochondria from human cirrhosis liver, rat Walker sarcoma as well as from normal rat liver were also determined. It was found that the ATPase activity of mitochondria and submitochondrial

[continuation of SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI-HSUEH-PAO Vol 8, No 4, Dec 76 pp 307-317]

particles of human primary liver carcinoma was very low ($0.04 \sim 0.107 \mu\text{moles} \cdot \text{min}^{-1} \cdot \text{mg protein}^{-1}$). The ATPase activity of mitochondria from rat Walker sarcoma and from human cirrhosis liver was of the same order as that found in primary liver carcinoma, whereas in normal rat liver mitochondria the corresponding values were about ten times higher. Electron-microscopic observations, ANS binding estimations as well as experiments with 2, 4-dinitrophenol all showed that the mitochondria of human primary liver carcinoma is characterised by the loss of ATPase (F_1) from the inner mitochondrial membrane. By adding soluble F_1 isolated from rat liver mitochondria to the inner mitochondrial membrane of human primary liver carcinoma it was found that this soluble F_1 could bind to the inner mitochondrial membrane and that the resultant hybrid submitochondrial particles (SMP) had an ATPase activity much higher than that of the original SMP. The oligomycin-sensitive ATPase activity of hybrid SMP was also increased. Electron-microscopic examination of the negatively stained preparations showed that the hybrid SMP had the appearance of characteristic inner mitochondrial particles. The enhancement of ANS fluorescence intensity in the hybrid SMP over the original SMP was about 2.7 times. After binding of soluble F_1

[continuation of SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI-HSUEH-PAO Vol 8, No 4,
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of rat liver mitochondria to the SMP of human primary liver carcinoma the ATPase activity and the enhancement of ANS fluorescence of the hybrid SMP became resistant to cold inactivation. From these experimental results it may be concluded that the hybrid SMP had a number of properties similar to natural SMP. The significance of these findings in studies on the molecular evolution of biological membranes and on genetic control in carcinogenesis was discussed.

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AUTHOR: None

ORG: Labor Hygienics Section, Institute of Public Health, Chinese Academy of Medical Sciences

TITLE: "Determination of Serum Ceruloplasmin of Patients with Silicosis by Electroimmunodiffusion"

SOURCE: Shanghai SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI-HSUEH-PAO [ACTA BIO-CHEMICA et BIOPHYSICA] in Chinese Vol 8, No 4, Dec 76 pp 319-324

TEXT OF ENGLISH ABSTRACT:

A simple method for the isolation and purification of ceruloplasmin was described in this paper. An electroimmunodiffusion method used to determine the human serum ceruloplasmin was also reported.

The serum ceruloplasmin contents of 178 cases including normal subjects, silicosis suspects, simple silicosis patients in stages I, II and III, and cases of silicosis complicated with tuberculosis in stages I to III, were estimated with this method.

It was found that the serum ceruloplasmin values of patients with silicosis and silicosis suspects were significantly different from those of normal subjects.

Received 2 March 1976

AUTHOR: None

ORG: Labor Hygiencics Section, Institute of Public Health, Chinese Academy of Medical Sciences

TITLE: "Observations on the Protective Effects of Several Drugs on Alveolar Macrophages of Experimental Silicotic Rats"

SOURCES: Shanghai SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI-HSUEH-PAO [ACTA BIO-CHEMICA et BIOPHYSICA] in Chinese Vol 8, No 4, Dec 76 pp 325-332

TEXT OF ENGLISH ABSTRACT:

The chemical composition and the enzymatic activities of normal and silicotic alveolar macrophages were compared in order to investigate the changes occurring after the introduction of quartz into the lung. As shown from the SDS-PAGE results, the protein composition of the silicotic alveolar macrophages was different from the normal in three places. Two protein lines showed increased intensity and one protein line was absent from the gel of the silica containing cells.

The lecithin and lysolecithin contents were both increased in the silicotic macrophages. The presence of an increased amount of lysolecithin may indicate that the cells were destroyed by the quartz.

The acid phosphatase activity and the oxygen consumption of the silica containing

[continuation of SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI-HSUEH-PAO Vol 8, No 4, Dec 76 pp 325-332]

cells were both lower than normal cells.

After treatment of the silicotic rats with PVNO, the composition and the enzymatic activities of the macrophages were all returned to the normal level. This shows that PVNO protects the alveolar macrophages from destruction by the quartz particles. Other drugs tested also showed some protective effect on the cells.

Received 2 March 1976

AUTHOR: None

ORG: Shanghai Institute of Materia Medica, Third People's Hospital of Shanghai Second Medical College

TITLE: "Studies on the Transaminase-Lowering Principles of Schisandra Sphenanthera Rehd Et Wils"

SOURCE: Shanghai SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI-HSUEH-PAO [ACTA BIO-CHEMICA et BIOPHYSICA] in Chinese Vol 8, No 4, Dec 76 pp 333-340

TEXT OF ENGLISH ABSTRACT:

Six principles were extracted from the Chinese traditional drug *Schisandra sphenanthera* Rehd et Wils., and their chemical structures were characterized. Schisantherin A, B, C and D have been shown to be effective in lowering the serum glutamic-pyruvic transaminase (GPT) of hepatitis in experimental animals and in patients, while deoxyschisandrin and schisantherin E were not.

Ultrastructural modifications of hepatic cells were observed by electron microscopy after carbon tetrachloride intoxication in mice. The hepatic cellular injuries were protected by schisantherin A. This drug has no direct toxic action on the liver cells.

Tritium labeled schisantherinol A is absorbed quickly after oral administration in

[continuation of SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI-HSUEH-PAO Vol 8, No 4, Dec 76 pp 333-340]

mice. It is transformed from lipid-soluble to water-soluble metabolites in the liver, and excreted mainly by the kidney.

The transaminase of rat liver was purified and immunized to rabbits. By means of antigen-antibody reactions, lowering of the activity of serum GPT was found to be due to inhibition of the activity of the liver enzyme by the drug.

Received 29 May 1976

AUTHOR: None

ORG: Laboratory of Cell Physiology, Shanghai Institute of Plant Physiology

TITLE: "On The Properties of Cellulase 'EA₃-867'"

SOURCE: Shanghai SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI-HSUEH-PAO [ACTA BIO-CHEMICA et BIOPHYSICA] in Chinese Vol 8, No 4, Dec 76 pp 341-349

TEXT OF ENGLISH ABSTRACT:

Cellulase "EA₃-867" is an enzyme complex prepared from a *Trichoderma viride* EA₃-867 mutant, isolated in this institute in 1972.

The present cellulase preparation is light brown in appearance. It consists of C₁ and C₂ factors, β -glucosidases, pectinase, hemicellulase and traces of other minor components, and exhibits remarkable activity in decomposing cellulose and pectins. A significant amount of intact protoplasts can be obtained from different tissues of various species of plants after incubating them with the cellulase "EA₃-867" solution. Protoplasts obtained from tobacco leaf and callus through incubation with such enzyme preparations have successfully given rise to whole plants at optimum cultural conditions. Our experimental results show that the cellulase "EA₃-867" is an ideal agent for the preparation of protoplasts for plant somatic hybridization and other

[continuation of SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI-HSUEH-PAO Vol 8, No 4, Dec 76 pp 341-349]

genetic studies and is apparently comparable to the cellulase "Onozuka" R-10 generally used in many laboratories.

Received 15 June 1976

AUTHOR: None

ORG: Snake Venom Research Group, Shanghai Institute of Physiology

TITLE: "Studies on Neurotoxic Components in the Venom of *Agkistrodon Halys* (Pallas) I. Action of the Venom on the Nervous System"

SOURCE: Shanghai SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI-HSUEH-PAO [ACTA BIO-CHEMICA et BIOPHYSICA] in Chinese Vol 8, No 4, Dec 76 pp 351-355

TEXT OF ENGLISH ABSTRACT:

In rats and rabbits, the crude venom of *A. halys* in dosages of 1 mg/kg or more given intramuscularly or intravenously caused death from respiratory failure. It was found that when the respiratory movement of the diaphragm had disappeared, the phrenic nerve still showed respiratory discharges. Intraventricular injection of the venom in rather large doses, e. g. 30~50 μ g/kg, into rabbits did not cause any respiratory distress. On the isolated rat phrenic-diaphragm preparation, the venom at a concentration of 300 μ g/ml was found to block the neuromuscular transmission irreversibly.

These observations suggested that the respiratory failure caused by the venom of

[continuation of SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI-HSUEH-PAO Vol 8, No 4, Dec 76 pp 351-355]

A. halys is due to neuromuscular block.

Received 13 July 1976

AUTHOR: None

ORG: Snake Venom Research Group, Shanghai Institute of Physiology

TITLE: "Studies on Neurotoxic Components in the Venom of *Agkistrodon Halys* (Palls) II. Isolation of Neurotoxins from the Venom"

SOURCE: Shanghai SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI-HSUEH-PAO [ACTA BIO-CHEMICA et BIOPHYSICA] in Chinese Vol 8, No 4, Dec 76 pp 357-360

TEXT OF ENGLISH ABSTRACT:

By means of DEAE-cellulose column chromatography, the crude venom of *A. halys* was separated into four fractions, three of them being hemorrhage-producing and one neurotoxic. The latter was further fractionated on Sephadex G 50, yielding a component ("peak b"), which was shown to be more toxic than the crude venom.

Received 13 July 1976

AUTHOR: None

ORG: Group for Research on the Cadaver of Ma-wang-tui, Shanghai Institute of Experimental Biology

TITLE: "Studies on the Preservation of Cells and Nucleic Acid of an Ancient Cadaver of Ma-wang-tui Tomb No. 1"

SOURCE: Shanghai SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI-HSUEH-PAO [ACTA BIO-CHEMICA et BIOPHYSICA] in Chinese Vol 8, No 4, Dec 76 pp 362-378

TEXT OF ENGLISH ABSTRACT:

A multi-methodological study was performed on the preservation of cellular and subcellular structures and nucleic acid of an ancient cadaver of Mawangtui Tomb No. I. It was found by microscopy that chondrocytes of the cadaver were the most perfectly preserved cells. Some of them showed nearly normal morphology, their cytoplasm appeared homogeneous or vacuolated, with a distinct nucleus of loose architecture. However, under electron-microscopy, the intracellular ultrastructures were found to be mostly destroyed, leaving only a few structures which resembled residual endoplasmic reticulum and nuclear membrane fragments. By the methods of the histochemical Feulgen reaction and cytochemical photometry and, in addition, biochemical extrac-

tion, several lines of evidence were obtained indicating that macromolecular nucleic acids were present in these chondrocytes, including both deoxyribo- and ribonucleic acids. Apparent degradation of these nucleic acids was also evident.

Accompanying the preserved cells numerous bacterial spores with very perfect structure were seen in the tissues of the cadaver.

In light of the above observations, the preservation of cell structure was discussed. It was concluded that the state of preservation of the cadaver was fairly good at the cellular level, especially in the case of chondrocytes; but even in these cells, nothing typical of normal cellular fine ultrastructures were present.

Received 27 July 1976

9129

CSO: 4009

JOURNAL OF BOTANY

AUTHOR: NONE

ORG: Corn Research Station, Chuang-Tsu Autonomous Region, Kwangsi,
Experiment Station, Tung-Pei-Wang Commune, Peking and
Peking Institute of Botany, Chinese Academy of Sciences

TITLE: "New Developments in Anther Culther of Corn"

SOURCE: Peking CHIH-WU TSA-CHIH [JOURNAL OF BOTANY] No 3, Jun 1977 pp 4-5

ABSTRACT: The method of anther culture has been used to speed up the hybridization of corn. In 1976, more than 200 cultured anther plantlets of corn were obtained from approximately 1000 pieces of callus. After transplantation, some of the plantlets grew normally. Heading was observed in some plants. This represented a breakthrough in haploid corn breeding. The problem of selecting anthers for maximum frequency of induction of plantlets is discussed. The composition of the culture medium developed for the experiment is described. Experiences in transplanting haploid corn plantlets are reported.

AUTHORS: SUN Ching-san [1327 2417 0005]
CHU Chih-ching [2612 5267 3237]
WANG Ching-chu [3769 2417 7467]

ORG: All of Peking Institute of Botany, Chinese Academy of Sciences

TITLE: "Introducing a Simplified Culture Medium--Corn Broth"

SOURCE: Peking CHIH-WU TSA-CHIH [JOURNAL OF BOTANY] No 3, Jun 77 pp 6-7

ABSTRACT: Corn broth has been used experimentally as a culture medium for haploid breeding. A recipe for preparing corn broth from corns in the milky stage is presented. Experimental results showed that for the haploid rice, corn broth was almost as good a culture medium as the standard N_6 culture medium for inducing calli. However, the differentiation efficiency of calli cultured in the corn broth was found to be lower than that of calli cultured in the N_6 medium. When a mixture of corn broth and ferrous salts was used as a culture medium, approximately 11 percent of the anthers inoculated produced plantlets.

AUTHOR: NONE

ORG: Microbiology Experiment Station, Red Flag Commune, Tien-Tai County, Chekiang

TITLE: "The Effect of 'Tsu-Mai-Huang' in Hastening the Maturity of Barley and Wheat"

SOURCE: Peking CHIH-WU TSA-CHIH [JOURNAL OF BOTANY] No 3, Jun 77 p 10, 5

ABSTRACT: Tsu-Mai-Huang ($C_2H_5OCSSNa$) was applied experimentally to both barley and wheat to study its effects on hastening the ripening process. In the case of the barley experiment, when a concentration of 0.5-0.8 percent was applied at the late milky stage or roughly 13 days before the yellow maturing stage, the ripening process was shortened by 3-5 days. For wheat, with a spray of a concentration of 0.5-0.75 percent at the same growth stage, the ripening process was shortened by 4-5 days. The effect of the spray on the weight of the grains was found to be insignificant when the abovementioned concentrations were employed.

AUTHOR: NONE

ORG: Institute of Plant Protection, Academy of Forestry and Agricultural Sciences, Tsinghai and Hormone Section, Institute of Crop Research, Chekiang Academy of Agricultural Sciences

TITLE: "The Principle and Preparation of the Wheat Maturity-Hastening Chemical 'Tsu-Mai-Huang'"

SOURCE: Peking CHIH-WU TSA-CHIH [JOURNAL OF BOTANY] No 3, Jun 77 pp 11-12

ABSTRACT: Tsu-Mai-Huang ($C_2H_5OCSSNa$) can be used to hasten the maturity of barley and wheat by 5-6 days. The principle of the maturity-hastening process was investigated by means of ^{14}C tracers. It was concluded from the experimental investigation that Tsu-Mai-Huang accelerated the transformation of substances stored in the stem and the leaves into transportable sugars which could be moved to and stored in the grains. The preparation process involves two steps:

(1) $NaOH + C_2H_5OH \rightarrow C_2H_5ONa + H_2O$ and

(2) $C_2H_5ONa + CS_2 \rightarrow C_2H_5OCSSNa$.

The advantages and shortcomings of this agricultural chemical are briefly discussed.

AUTHOR: NONE

ORG: Tung-Hu Farm, Shao-Hsing County, Chekiang

TITLE: "The Effect of ETHREL on Hastening the Maturity of Early Rice"

SOURCE: Peking CHIH-WU TSA-CHIH [JOURNAL OF BOTANY] No 3, Jun 77 p 13

ABSTRACT: Some encouraging preliminary results on applying ETHREL to hasten the maturity of the early rice are described. The optimum concentration for this purpose was found to be 1000-1200 ppm. Good results were obtained when the weather remained sunny and hot after spraying. ETHREL does not increase the rice yield; however, by hastening the maturity, it reduces the number of green grains at a given harvest date and therefore produces the effect of increased yield.

AUTHOR: NONE

ORG: Ethylene Section, Department of Hormone, Shanghai Institute of Plant Physiology

TITLE: "The Physiological Basis of Hastening the Maturity of Cotton by Means of ETHREL"

SOURCE: Peking CHIH-WU TSA-CHIH [JOURNAL OF BOTANY] No 3, Jun 77 pp 14-16

ABSTRACT: The application of ETHREL to cotton plants can hasten the maturity of cotton bolls by 7-15 days. Many ineffective cotton bolls can be converted to effective ones. Increased yield of cotton can be obtained by means of this process. Experimental results showed that the ethylene released by ETHREL is the key factor in regulating the maturity of the cotton bolls. The effects of ETHREL on other parts of the cotton plant such as the leaves are discussed. The decomposition of ETHREL into ethylene in the cotton plant is explained. The transportation and distribution of ETHREL in the plant are also discussed. Finally the proper concentrations of ETHREL for cotton of different growth types are presented.

AUTHOR: WANG Shih-chih [3769 0013 0037]

ORG: Peking Institute of Botany, Chinese Academy of Sciences

TITLE: "Growth Stages and Yield of Wheat"

SOURCE: Peking CHIH-WU TSA-CHIH [JOURNAL OF BOTANY] No 3, Jun 77 pp 33-36

ABSTRACT: The three stages of growth of wheat are: (1) the seedling stage, (2) the organ formation stage, and (3) the grain formation stage. Procedures for providing proper care such as cultivation or inter-tillage, irrigation and drainage for these stages are discussed. Comparisons of each stage of growth of wheat in 13 typical regions in China covering Kwangtung in the south to Tsinghai in the northwest are presented. It is concluded that in order to have high yields, special care must be employed to compensate for the variations in the length of each growth stage.

AUTHOR: NONE

ORG: Scientific Technology Station, Shang-Chuang Commune, Peking and
Rice Section, North China Agricultural University

TITLE: "On Diagnosing the Nitrogen Nutrient of Rice--1. Rapid Determination of Starch--The Iodine Method"

SOURCE: Peking CHIH-WU TSA-CHIH [JOURNAL OF BOTANY] No 3, Jun 77 pp 40-41, 16

ABSTRACT: The starch content of the leaf sheath is inversely proportional to the nitrogen nutrient in a rice plant. Iodine indicator solution composed of 5 g of KI and 1 g of I dissolved in 1000 ml of distilled water can be used to determine rapidly whether the rice plant suffers from lacking of nitrogen nutrients. The percentage of leaf sheaths containing starch provides a numerical indicator to decide the amount of nitrogen fertilizer needed, if any. The additional nitrogen fertilizer is usually applied at the tillering stage and the heading stage. An increase of yield of over 50 percent can be obtained by applying the appropriate amount of fertilizer. Discussions on how to apply this method to different varieties of rice are included.

AUTHOR: LI Yeh-po [2621 5102 3134]

ORG: NONE

TITLE: "Status on Research on the Utilization of Light Energy by Wheat Colonis"

SOURCE: Peking CHIH-WU TSA-CHIH [JOURNAL OF BOTANY] No 3, Jun 77 pp 45-46

ABSTRACT: This article reports on some recent foreign research and development efforts on the understanding of the utilization of light energy by wheat. The reflectivity of wheat fields has been measured to be 15-35 percent, although the reflectivity might be related to the utilization of light energy by plants, the present state of the art in this research is still in the measurement stage. Another area of interest, in a similar stage of development, is the measurement of light energy distribution over the height of the plant in a wheat field. In a third area of research and development, considerable progress has been made in the understanding of the photosynthesis process.

3057

CSO: 4009

GENETICS AND BREEDING

AUTHOR: None

ORG: Grain Crops Research Office, Kiangsu Provincial Institute of Agriculture

TITLE: "Induction and Selection of Favorable Mutants in Wheat"

SOURCE: Peking I-CH'UAN YU YU-CHUNG [GENETICS AND BREEDING] in Chinese No 2, Mar 77 pp 7-9

ABSTRACT: In 1960 the Grain Crops Research Office began to use x-ray, gamma rays, and fast neutrons to treat wheat seeds and pollens to obtain mutants with short stalks, superior quality of kernals, early maturing, good rust resistance, and mild red mold susceptible properties. Of these mutants, several new varieties have been bred out through selection. One of these, Ning-mai-3 is especially fertilizer tolerant and lodging resistant. Its yield increase potential is obviously greater than Yang-mai-1 which is currently being extended. Since 1974, Ning-mai-3 has been extended in high-yield regions, producing close to 1000 chin/mou in some cases. The process of artificial induction of favorable mutation and the method of selection to obtain this group are described.

AUTHOR: None

ORG: 402 Team, Institute of Genetics, Chinese Academy of Sciences

TITLE: "Genetic Study on the Lysine Property of Hybrid Kaoliang"

SOURCE: Peking I-CH'UAN YU YU-CHUNG [GENETICS AND BREEDING] in Chinese No 2, Mar 77 pp 10-11

ABSTRACT: Lysine is one of the major components of amino acids required by men. An average adult needs 1 g/day/kg of body weight of good quality protein, while his daily requirement of lysine is about 1.6 g/kg of body weight, with an absolute minimum of 0.4-0.8 g. The endosperm of kaoliang [grain sorghum] contains more than 60 percent of glutenin in its total protein content, while the lysine content is only 0.14-0.38 g/100 g of the alcohol soluble protein of the average grain of kaoliang. For this reason, improving the lysine content of hybrid kaoliang was made one of the important goals of quality improvement. In 1975-1976, from various groupings, the team produced 50 hybrids for the purpose of studying the genetic factors affecting the lysine content. The lysine contents of parent pairs and the hybrid offsprings and the preliminary conclusions regarding to the hereditary principles of lysine content are reported.

AUTHOR: LIU Tso-ch'ang [0491 4373 2490]
IAI Shih-teng [6351 0013 4098]
YU Yen-po [0151 1750 3134]

ORG: All of Institute of Genetics, Chinese Academy of Sciences

TITLE: "Preliminary Study on Photo-Effect Breeding of Corn"

SOURCE: Peking I-CH'UAN YU YU-CHUNG [GENETICS AND BREEDING] in Chinese No 2,
Mar 77 pp 17-18

ABSTRACT: Through selective breeding from low photo-respiration varieties of corn and determination and analyses of such physiological indices as photosynthesis activity, photo-respiration, and compensation point, the authors hope to clarify the hereditary principle of photo-effect and to breed out high photo-effect varieties of corn with high photosynthesis ability and low photo-respiration. The deviation in photo-respiration in different varieties of corn studied was found to be small, while the deviation in photosynthesis ability was found to be great. The utilization of low density CO₂ and weak light was studied. Preliminary observations of the hereditary principle of photo-effect during various stages of growth and development are reported.

AUTHOR: IAI Shih-teng [6351 0013 4098]
LIU Tso-ch'ang [0491 4373 2490]

ORG: Both of Institute of Genetics, Chinese Academy of Sciences

TITLE: "Application of Infrared Gaseous Analyzer in High Photo-Effect Breeding"

SOURCE: Peking I-CH'UAN YU YU-CHUNG [GENETICS AND BREEDING] in Chinese No 2,
Mar 77 pp 19-20, 40

ABSTRACT: This paper explains the technique of using an infrared gaseous analyzer to determine the intensity of photosynthesis activity, the intensity of photo-respiration, the CO₂ compensation point, the photo-saturation point and the photo-compensation point, and the CO₂ density during low photo-respiration selection breeding. The technique of installing an infrared gaseous analyzer is also given.

AUTHOR: CHU Ch'eng-lieh [2612 2110 3525]

ORG: None

TITLE: "Viewpoints Concerning Several Technical Problems of Wheat Pollen Breeding"

SOURCE: Peking I-CH'UAN YU YU-CHUNG [GENETICS AND BREEDING] in Chinese No 2, Mar 77 pp 21-22, 39

ABSTRACT: Since the first pollen culture wheat plant was successfully produced in China in 1971, several new varieties of wheat, including Hua-p'ei No 1, Lung-hua No 1, and Mu-fen No 1, etc. have been successfully bred out with this technique. Callus tissues and green sprouts can now be induced from complex combinations of spring or winter wheat, and from experiences of the process, a complete set of methods have been formulated. There remain a number of problems in technique and in theory with regard to pollen culture of wheat to be resolved and/or to be improved before this technique can be better utilized, however. The author proposes in the paper solutions to the following: (1) the variation of induction rate among different hybrid combinations; (2) improving the rate of callus tissue and green sprout production; (3) problem of inducing embryo-like body; (4) problems of over-summering and vernalization; (5) problem of chromosome multiplication.

AUTHOR: WANG Ching-chu [3769 2417 7467]
CHU Chih-ch'ing [2612 5267 3237]
SUN Ching-san [1327 2417 0005]

ORG: All of Peking Institute of Botany, Chinese Academy of Sciences

TITLE: "Low Temperature Over-Summering of Pollen Callus Tissues of Wheat and Triticale"

SOURCE: Peking I-CH'UAN YU YU-CHUNG [GENETICS AND BREEDING] in Chinese No 2, Mar 77 p 23

ABSTRACT: When *in vitro* pollen induction technique is used for haploid breeding of wheat or triticale, the pollen inoculation time in most regions of China is late spring - early summer. When the pollen callus tissue evolves from the anther sac and transforms into sprout, the temperature is usually very high. To transplant the pollen plant under the high temperature condition or to let the plant grow in the test tube until the fall is often very difficult. The survival rate is low and those that do survive do not grow very well. Growing the plants in ice boxes with lighting was tried and the result was far from ideal. Recently, the authors preserved the callus tissues in low temperature of 5 degrees C through the summer. The results were highly satisfactory. When the callus tissues were transferred onto three different types of media for cold storage for 2 months, there were no unfavorable effects.

AUTHOR: None

ORG: Polyploid Team, Crops Research Institute, Peking Municipal Academy of Agriculture

TITLE: "Preliminary Experiment of Triticale Pollen in Vitro Culture"

SOURCE: Peking I-CH'UAN YU YU-CHUNG [GENETICS AND BREEDING] in Chinese No 2, Mar 77 p 24

ABSTRACT: With the assistance of the Institute of Botany, Chinese Academy of Sciences, the team began in 1976 to investigate the application of anther culture technique in triticale hybridization work. The N₆ culture medium was adopted with a cane sugar density of 8 percent, and 2,4D of 2 mg/l. There were 44 combinations of F₁ and 19 combinations of F₂. Twenty days after indoor inoculation, callus tissues appeared gradually. On 15 July and 15 August, sprouts were placed in 0-4 degrees C cold storage with no light until 11 September. Sprouts quickly turned from yellow to green within one week after being taken out of cold storage. Early in October, 7-8 tillers appeared on most plants. The 131 sprouts were thus successfully divided into 288 plants and chromosome multiplication treatment was applied 2 weeks later. After being cleaned and transplanted in low temperature (0-10 degrees C) and high humidity greenhouse, the sprouts recovered and continued to grow one month later. Detailed data of this experiment are reported.

AUTHOR: None

ORG: Li-ch'uan County Institute of Agriculture, Kiangsi

TITLE: "Preliminary Report of Anther Culture of Hybrid Paddy Rice"

SOURCE: Peking I-CH'UAN YU YU-CHUNG [GENETICS AND BREEDING] in Chinese No 2, Mar 77 p 25

ABSTRACT: The yield of hybrid rice is obviously higher, but the seeds can be used for one generation only and must, therefore, be produced separately every year. In 1976, the institute used 4 combinations of F₁ of the hybrid Shan-yu No 2 for haploid breeding for the purpose of stabilizing heterosis. For the culture medium, yeast, hydrolyzed lactoprotein, coconut milk, etc. were added to N₆. Callus tissues gradually appeared in 20 days and were transferred when they were about 0.2 mm in height. The temperature was maintained at 20-32 degrees C. The light source was a 40 W fluorescent bulb. The rate of callus production varied from 0.65 to 4.5 percent among the 4 combinations. A total of 35 sprouts were obtained late in November, 1976. These seedlings expressed heterosis of hybrid rice. They appeared to be stronger and grew faster.

AUTHOR: IO Chien-lung [5012 6015 7893]

ORG: K'o-hsueh Ch'u-pan She [Science Publications], Chinese Academy of Sciences

TITLE: "Discussion on Genetic Engineering"

SOURCE: Peking I-CH'UAN YU YU-CHUNG [GENETICS AND BREEDING] in Chinese No 2, Mar 77 pp 26, 30

ABSTRACT: This paper defines genetic engineering as extracorporeal replication of the genetic material DNA of one cell and introduced it into another cell to reconstruct its genetic structure. The history of genetic engineering starting in early 1970's with Escherichia coli is recounted. The possibility of transferring nitrogen fixing ability of root tuber bacteria to cells of crop plants such as rice, wheat, cotton, and corn and the possible application of this technique to cure human victims of melanuresis are used as examples of beneficial aspects. Potential dangers of this technique, discussed at international conferences held in the United States and by establishment scientists of the Soviet Union are considered to be preparations for monopolizing the technique by capitalist and revisionist countries. In a socialist country, the author claims, the purpose of developing genetic engineering is clearly for the service of the people.

AUTHOR: T'IEN Po [3944 3134]

ORG: Institute of Microbiology, Chinese Academy of Sciences

TITLE: "Theory and Application of Antiserum of Plant Virus"

SOURCE: Peking I-CH'UAN YU YU-CHUNG [GENETICS AND BREEDING] in Chinese No 2, Mar 77 pp 27-28

ABSTRACT: This paper discusses the nature of antigen and antibody of plant virus, and the production of antiserum of plant virus in many animals, especially domestic rabbits. Currently, antisera of about 100 types of plant virus, 1/3 of total plant virus, have been successfully made. These antisera may be used for qualitative and quantitative determination of plant virus diseases. With improvements, antiserum can also be made for virus, transmissible by insects only. For example, the ordinary rice stunt virus transmitted by cicada and the wheat yellow stunt virus transmitted by aphid are among those the antisera of which have been successfully produced in China. These antisera are useful not only for identification and diagnosis of plant virus diseases, but also for forecasting incidence of such diseases by determining the virus carrying rate of the insect vectors.

AUTHOR: CHANG T'ai-hsun [1728 1132 8113]

ORG: I-an County Science and Technology Committee, Heilungkiang Province

TITLE: "How to Prepare Potato X Virus Antiserum"

SOURCE: Peking I-CH'UAN YU YU-CHUNG [GENETICS AND BREEDING] in Chinese No 2, Mar 77 pp 29-30

ABSTRACT: At present, more than 10 types of virus have been discovered to be capable of infecting potatoes. In I-an County, the x virus, causing the mosaic disease, is among the two that are more damaging than the others. Plants infected by the x virus often have no obvious symptoms. This fact creates a problem for seed selection. Starting in 1973, the author and colleagues have successfully prepared x virus antiserum with domestic rabbits. Good results have been obtained by using the antiserum in selecting x virus free seed potatoes. The method of preparing the antiserum and the method of applying the antiserum are described.

AUTHOR: None

ORG: BASIC KNOWLEDGE OF GENETICS AND PLANT BREEDING Compiling and Writing Team, Hua-pei University of Agriculture

TITLE: "Cotton Artificial Self-Crossing Technique"

SOURCE: Peking I-CH'UAN YU YU-CHUNG [GENETICS AND BREEDING] in Chinese No 2, Mar 77 p 32

ABSTRACT: Cotton is a cross pollinated crop. The rate of natural hybridization is about 5 percent on the average, but sometimes, it may reach above 20-50 percent. In order to preserve the superior properties of the original materials and the breeding materials, it is necessary to adopt effective measures of isolation and artificial self-pollination. This paper describes three techniques of using a paper clip, or a string, or paint to prevent the corolla from opening. The easiest way is to fill a used toothpaste tube with yellow or blue paint and to squirt a little bit of paint on the tip of the corolla the day before it is to open.

AUTHOR: None

ORG: Correspondent for I-CH'UAN YU YU-CHUNG

TITLE: "Successful Culture of Noctilucent Pearls"

SOURCE: Peking I-CH'UAN YU YU-CHUNG [GENETICS AND BREEDING] in Chinese No 2, Mar 77 p 40

ABSTRACT: The 5·7 Staff School of I-yang District, Hunan Province conducted an experiment for culturing noctilucent pearls with radiochemical and nuclear physical techniques. Preliminary successes have been obtained. They used zinc sulfide as the luminous body, radioactive isotope Pm^{147} for light excitation, and a polymerized high molecular compound for a protective layer to make the luminescent nucleus. After a cell is properly treated with bivalent metal ion and low temperature, it is transplanted simultaneously with the luminescent nucleus into the connective tissue of an oyster surgically. The pearls thus cultured glow like an ordinary pearl during the day; at night they emit a blue colored fluorescence. The pearls have a smooth and fine body, which is oval shaped, with diameters varying from 6.5 to 7.5 mm.

6168

CSO: 4009

ACTA HYDROBIOLOGICA SINICA

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ORG: All of Fish Ecology Section, 4th Laboratory, Institute of Hydrobiology, Hupei Province

TITLE: "Study on Fish Yield of Lake Tung-hu, Wu-ch'ang, With Comments on the Subject of Rational Stocking"

SOURCE: Peking SHUI-SHENG SHENG-WU-HSUEH CHI-K'AN [ACTA HYDROBIOLOGICA SINICA] in Chinese Vol 6 No 1, Dec 1976 pp 16-26

TRANSLATION OF CHINESE ABSTRACT: This paper studies the fish yield condition of Tung-hu [2639 3275], Wu-ch'ang [2976 2490] and discusses several problems concerning rational stocking of Tung-hu from the viewpoint of fish ecology. Tung-hu is a lake for fish culture. When feed was not provided, the yearly yield rose from the 365,000 chin of 1971 to the 810,000 chin of 1975, amounting to 36.8 chin/mou. Of the yield, 88-96 percent were domesticated and stocked species, chiefly *Hypophthalmichthys molitrix* (C. & V.) and *Aristichthys nobilis* (Richardson) and secondary *Ctenopharyngodon idellus*

[continuation of SHUI-SHENG SHENG-WU-HSUEH CHI-K'AN Vol 6 No 1, 1976 pp 16-26]

(C. & V.). The proportion of wild and miscellaneous fish species was very small. Through analyses of the rate of growth and the rate of catch of fish species of various specifications it is apparent that the greater the specifications, the higher the rate of catch, and the faster the speed of growth. Based upon the analytical data of the fish yield of the 3 years, this paper discusses, finally, the production potential of Tung-hu fishery and proposes adjustments to the existing structure of the fish colony.

This paper was received for production on 12 July 1976.

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ORG: Third Laboratory, Institute of Hydrobiology, Hupei Province

TITLE: "Studies on the White Head-Mouth Disease of the Grass Carp (Ctenopharyngodon idellus)"

SOURCE: Peking SHUI-SHENG SHENG-WU-HSUEH CHI-K'AN [ACTA HYDROBIOLOGICA SINICA] in Chinese Vol 6 No 1, Dec 1976 pp 53-62

TRANSLATION OF CHINESE ABSTRACT: White head-mouth disease is one of the serious diseases of summer spawning fish species. This paper studies the pathogenesis, the pathology, and the prevention and control methods of white head-mouth diseases in grass carp. Artificial infestation experiments with 90 strains of the pathogen isolated from diseased fish proved that the pathogen of this disease is a species of Myxococcus. Through pathological observation of tissues, it was learned that obvious disorders occur in the epidermic tissues of the external body, the mouth, the eyes, and the gills, and additionally, various degrees of disorders occur to the cartilage tissues and the striated muscle fibers as well as to cause these tissues to lose their physiological function. Treatment experiments with many types of drugs indicate that the effects of 1.5 ppm arsenic formate are the best. With regard to feeding management,

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measures of reasonable density (150,000/mou) and timely separation (about 20 days of feeding) during the first stage fingerling period can also produce a definite preventive action.

This paper was received for publication on 1 March 1976.

AUTHOR: None

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TITLE: "Studies on Treatment of Mercury-Containing Wastewater With Filamentous Green Algae"

SOURCE: Peking SHUI-SHENG SHENG-WU-HSUEH CHI-K'AN [ACTA HYDROBIOLOGICA SINICA] in Chinese Vol 6 No 1, Dec 1976 pp 67-73

TRANSLATION OF CHINESE ABSTRACT: With filamentous green algae of the Cladophora family as the material, an experiment of mercury-containing (HgCl_2) wastewater treatment with algae was conducted. Densities of Hg^{++} is 0.5, 1.0, 2.0, 5.0, and 10.0 mg/l. The ratio of fresh algae and wastewater is 1:100 in weight. Within 4 hours, the mercury elimination rate is 70 percent. Ability of algae in continuous mercury elimination was determined. Ten g of fresh algae was added to four mercury-containing wastewater specimens (average quantity of water was 1 liter, the average density of Hg^{++} was 3.61 mg/l) and was left in each of the water specimens for 6 hours. The resultant mercury elimination rate was 76.8, 78.4, 61.8, 53.1 percent respectively; the average was 67.5 percent. The density of mercury content in the algae reached 970 ppm, computed by fresh weight. Algae was used for four-stage serial treatment of wastewater

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with a mercury content of 4.0 mg/l. The total algae retention time was 24 hours and the total elimination rate reached 94 percent. Judging from the experimental results, the elimination of mercury by algae is mainly through surface adhesion and cell accumulation and is not related to the photosynthesis action of algae. Water of 0.0-10 mg/l of mercury content obviously suppresses photosynthesis release of oxygen in algae, however. This suppression action manifests itself after the algae has been in contact with mercury for 4 hours.

This paper was received for publication on 20 April 1976.

AUTHOR: None

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TITLE: "Use of Fish Brain Acetylcholinesterase Activity as a Monitor for Phosphorous Insecticide Pollution of Water Bodies"

SOURCE: Peking SHUI-SHENG SHENG-WU-HSUEH CHI-K'AN [ACTA HYDROBIOLOGICA SINICA] in Chinese Vol 6 No 1, Dec 1976 pp 75-88

TRANSLATION OF CHINESE ABSTRACT: This paper reports acute lethal poison experiments with six types of organophosphate pesticides (malathion, DDVP, parathion, diph-terex, chlorothion, and trithion) and six types of non-organophosphate pesticides (CBP, mercury chloride, 666, trinitromethylbenzene, and phenyl hydroxide) in several Chinese fresh water domestic carps to determine the brain acetylcholinesterase activity of carps of different types, ages, and in different bodies of water. These experiments proved that organophosphate pesticides can specifically suppress fish brain acetylcholinesterase activity. The extent of the suppression action is related to the density of the pesticide. Following separate chronic toxicity tests of organophosphate pesticides on the same species, it was found

[continuation of SHUI-SHENG SHENG-WU-HSUEH CHI-K'AN Vol 6 No 1, 1976 pp 75-88]

that the density of the organophosphate pesticides in the water and the water temperature both influence the recovery of fish brain acetylcholinesterase activity and the speed of release of residual poison from the fish bodies. The effects of combined poisoning with 666 and parathion on fish brain acetylcholinesterase activity are also preliminarily investigated. This paper was received for publication on 6 July 1976.

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TITLE: "Studies on the Feeding Capacity and Rate of Assimilation of Fingerling Silver Carp Fed on Anabaena Spiroides"

SOURCE: Peking SHUI-SHENG SHENG-WU-HSUEH CHI-K'AN [ACTA HYDROBIOLOGICA SINICA] in Chinese Vol 6 No 1, Dec 1976 pp 89-94

TRANSLATION OF CHINESE ABSTRACT: Through tracing experiments, it has been confirmed that silver carp [*Hypophthalmichthys molitrix* (C. et V.)] can digest and utilize algae of the species *Anabaena spiroides*. The authors continued to conduct trace experiments with radioactive phosphorus³² to determine the feeding capacity and the rate of assimilation of *Anabaena spiroides* in silver carp. Fish body automatic scanning was carried out at the same time. Through the above studies, it was proved that *Anabaena spiroides* is a good feed for silver carp, being easily fetched and assimilated, to serve as the major material basis for speedy growth of silver carp fingerlings.

This paper was received for publication on 22 April 1976.

AUTHOR: None

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TITLE: "A Preliminary Study on the Phylogenetic Relationships Between *Cyprinus carpio*, *Ctenopharyngodon idellus*, and *Aristichthys nobilis* by Means of Precipitation Reaction"

SOURCE: Peking SHUI-SHENG SHENG-WU-HSUEH CHI-K'AN [ACTA HYDROBIOLOGICA SINICA] in Chinese Vol 6 No 1, Dec 1976 pp 97-107

TRANSLATION OF CHINESE ABSTRACT: This paper reports the use of precipitation reaction to study the phylogenetic relationship among the three subfamilies of *Cyprinus carpio*, *Ctenopharyngodon idellus*, and *Aristichthys nobilis*. The experimental results indicate that the relation between the first and the second is the closest, the relation between the first and the last is relatively more distant, and the relation between the second and the last is the most distant. Based upon these results, the authors believe that in the work of interspecific hybridization of different subfamilies, the possibility of success for crossing the first and the second is greater than the possibility of successful crossing of the first and the last, or the second and the last.

This paper was received for publication on 19 February 1976.

AUTHOR: None

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TITLE: "Physical and Chemical Induction of Triploidy and Tetraploidy in
Grass Carp and the Hybrid of Grass Carp (♀) and Round-head Bream (♂)"

SOURCE: Peking SHUI-SHENG SHENG-WU-HSUEH CHI-K'AN [ACTA HYDROBIOLOGICA SINICA]
in Chinese Vol 6 No 1, Dec 1976 pp 111-112

ABSTRACT: The grass carp, *Ctenopharyngodon idellus*, is a fast growing domestic fresh water fish favorite in China. Being herbivorous is its advantage. Its disease resistance is low and its fatality rate during the fingerling stage is generally about 60 percent. For the purpose of resolving this problem, a hybridization experiment was carried out in 1966 and a disease resistance test of the hybrids was carried out in 1968. These experiments indicated that hybrids of grass carp (♀) x round-head bream, *Megalobrama amblycephala* Yih., (♂) are highly disease resistant, having the advantage of being herbivorous, and fast growing. Observations of the past several years revealed, however, that the summer spawned fingerlings have a very low survival rate and the sex glands of adults (5-6 age) are not well developed. Starting in 1973, for the purpose of resolving these problems, an experiment was conducted

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to induce triploidy and tetraploidy in these hybrids; an identical experiment was conducted with grass carp also. With low temperature induction of the hybrids triploidy appeared in all age groups. In the 5'-20' group, the triploidy rate was 57 percent, with 14 percent tetraploidy as well. Low temperature induction of grass carp produced triploidy in the 5'20' group (30 percent) only, while tetraploidy appeared in the 3'-15' group. Under colchicine induction (2 groups of 20 minutes treatment in solutions of 50 and 100 ppm) triploidy and tetraploidy also appeared in rates varying from 2 to 5 percent. All the polyploids obtained from the above experiments are being raised in separate ponds at present. Photos of diploids, diploid hybrids, triploids and tetraploids of low temperature induction, and tetraploids of colchicine induction are included in the paper. This paper was received for publication on 19 June 1976.

SCIENTIA SILVAE SINICA

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ORG: Airplane Seed Broadcasting Command, Yu-Lin Desert Region

TITLE: "New Developments in Experimental Seeding of Forests by Airplane for Control of Desert"

SOURCE: Peking CHUNG-KUO LIN-YEH K'O-HSUEH [SCIENTIA SILVAE SINICA] in Chinese No 2, Jul 1977 pp 26-29

ABSTRACT: Improved techniques of seed broadcasting by airplane in 1974 produced significant increases in seed germination. One year after seeding, seedlings of two shrubs, *Hedysarum scoparium* Fisch. and *H. mongolicum* Tarcz., were found growing on 14.2 percent and 17.6 percent of the total acreage seeded respectively, representing an increase of 2-3 times. The essential step for this success is the application of a clay coating to the seeds to minimize the seed drifting problem after broadcasting. Time and method of broadcasting are also important. In general, the results indicate that broadcasting from 50 meters in mid-May is optimum. The rate of broadcasting of seed is 3-4 chin/mou for *H. scoparium* Fisch. and 2 chin/mou for *H. mongolicum* Tarcz.

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TITLE: "Research on Increasing the Rooting Percentage of Cuttings of *Populus tomentosa* Carr."

SOURCE: Peking CHUNG-KUO LIN-YEH K'O-HSUEH [SCIENTIA SILVAE SINICA] in Chinese No 2, Jul 1977 pp 37-42

ABSTRACT: Since 1972, research has been carried out on techniques to increase the rooting percentage of *Populus tomentosa* Carr. One of the problems identified is the relatively small number of primordial roots generally found on cuttings of this plant. Growth regulators which cause an acceleration of rooting and result in larger, more vigorous roots have been applied since 1975. The most successful procedure so far discovered for rooting of cuttings of *Populus tomentosa* Carr. involves two steps: (1) application of the growth regulator naphthalenebutyric acid to hasten the rooting of the woody cuttings, and (2) storage of the treated cuttings in a deep cellar in the winter months. An increase of the rooting percentage in the order of 50 percent was obtained experimentally.

AUTHOR: NONE

ORG: 13 Southern Provinces Joint Scientific Technology Section on Control of *Dendrolimus punctatus* Walk.

TITLE: "On Comprehensive Control of *Dendrolimus punctatus* Walk."

SOURCE: Peking CHUNG-KUO LIN-YEH K'O-HSUEH [*SCIENTIA SILVAE SINICA*] in Chinese No 2, Jul 1977 pp 49-53

ABSTRACT: The insect pest *Dendrolimus punctatus* Walk. has developed to injurious proportions in many pine forests in the southern provinces in China. In recent years, this insect has grown to be resistant to insecticides such as DDT and BHC. Experiments on the development of a comprehensive strategy for the control of this insect have been carried out in an experimental forest since 1974. Some recommended measures are: (1) introduction of broad-leaf trees in pine forests, (2) early forecast of the development of the insect, (3) extensive use of bacteria *Beareria bassiana*, wasp *Trichogramma dendrolimi* and several species of birds such as *Oriolus chinensis diffusus* and *Cuculus canorus fallax* in the biological control of this insect, and (4) use of black lights and appropriate containment policies.

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