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The Vice-Chancellor’s Report

The four years after the publication of *The First Six Years 1963–69*, the first formal report of the Vice-Chancellor on the formative years of the University, have witnessed the emergence of The Chinese University. It may seem paradoxical to speak of the University as “emerging” after more than ten years of existence. The operational term is, of course, “university”; beyond its legal significance as a degree-granting institution, it is understood to mean a complex organization which includes not only appropriate organizational units for undergraduate instruction in the humanities and the sciences, but also appropriate organizational units for graduate and professional education, and for research and public service. It is in this substantive sense of “university” as a complex organization that the present report is conceived and presented. It is in this sense that the second phase of development can be characterized as “The Emerging University 1970–74”. This report is in effect a major document expounding educational ideals that have guided The Chinese University to its present stage of development and mapped out its course in the foreseeable future.

**Guiding Principles**

The fundamental guiding principles for the development of the University, as stated by the Vice-Chancellor, are: (1) to take the University as an organic organization, (2) to make the integration of Chinese and Western cultures the University’s distinctive educational objective.

The first guiding principle, the organic concept of organization and functions, enables the University to maximize the use of its total resources, and thus enrich and expand its educational programme.

The second guiding principle concerns the distinctive educational goal of The Chinese University of Hong Kong in the world system of higher education—the integration of two great cultural and intellectual traditions, Chinese and Western. This objective has been the shaping force in each of the University’s basic functions—instruction, research, and public service.

**An International University**

In bridging East and West the University endeavoured to be an international university in the fullest sense. The University maintains fruitful relations with government agencies and associations in various countries and conducts a wide range of cooperative projects with universities in many parts of the world. These diverse links with the international academic world have enriched and enhanced the University’s total programme significantly.

It is hoped that with the publication of this report the general public and friends of the University will have a better understanding of the basic philosophy behind the growth of CUHK and have a clearer picture of its development.
Under One Roof

Progress at Science Centre

Science Centre Building

The University Science Centre, opened in April 1972, is the largest building on the University campus, providing a net usable area of 206,200 sq.ft. It consists of two 5-storey parallel blocks with a circular lecture theatre complex of unusual design in between. The British Government contributed £250,000 (equal to about 4 million Hong Kong dollars) towards the total building cost of HK $16,500,000, and the Hong Kong Government paid the balance.

Upon the completion of the Science Centre, the Chemistry, Biology, Biochemistry, Physics and Electronics Departments moved in, but the Mathematics Departments remained at the three Colleges pending construction of the extension. This was commenced in April 1974 and completed in April 1975, at a cost of HK $7.5 million, which was borne entirely by the Hong Kong Government. The Mathematics Departments moved into the extension in July; so did the Electronics Department, which used to occupy laboratories and offices of the Physics Department. Now, all faculty members and students of the six Departments are working under the same roof and complete integration, which makes for better teaching and research, is possible.

New Equipment

The various laboratories and diverse equipment of the Centre enable the faculty members to maintain high standards of research competence and to contribute to the advancement of their respective fields. Two notable new pieces of equipment have been installed at the Science Centre recently.

Helium Liquefaction Plant

The installation and testing of a complete plant for the liquefaction of helium was completed at the University Science Centre recently. The plant, which was donated by the Volkswagenwerk Foundation, is now producing liquid helium for use in a number of research projects in the Physics and Electronics Departments of the University.

Helium is a rare gas which has the lowest condensation temperature among all the elements: it is only 4.2°C above the absolute zero degree or 269°C below the freezing-point of water. At such a low temperature the thermal agitation of atoms and molecules
Helium Liquefaction Plant

has mostly died down, and it becomes possible to study many interesting properties of solids without interference from the thermal effects. It is for the study of these properties that liquid helium is so much in demand for use as a coolant in laboratories all over the world.

The liquefaction of helium is a rather complicated process: the helium gas must first be cooled by liquid nitrogen (produced by a separate machine) to about \(-200^\circ\text{C}\), then further cooled by expansion under negative pressure to about \(-240^\circ\text{C}\) before it is allowed to undergo a throttling process which reduces the temperature of part of the gas yet further for liquefaction to take place. The machine can produce about 3 litres of liquid helium per hour in this manner. Since helium is a rather expensive commodity, the plant also provides a gas bag and a large compressor, which allow the recovery of the vaporized gas from the experimental stations where liquid helium is used.

A Ge(Li) Gamma-ray Spectrometer System for the Neutron Generator Laboratory

The International Atomic Energy Agency, which provided the University with a 14-MeV neutron generator under its Regular Programme of Technical Assistance 1972, has agreed to render technical assistance under its 1975 Programme, which includes the provision of an expert for a period of six months and a complete set of high-resolution Ge(Li) (Lithium-drifted Germanium detector) gamma-ray spectrometer system costing US $25,000.

Owing to substantial improvement in resolution, compared with other gamma-ray detectors, the Ge(Li) detector is becoming a very important and widely applicable research tool. Many nuclear energy levels which cannot even be seen with other detectors, are identified easily with Ge(Li) detectors.

With the installation of the high-resolution Ge(Li) gamma-ray spectrometer, work with the 14-MeV neutron generator can be extended to such projects as:

1. Activation analysis of ecological samples for pollution control,
2. Activation analysis of archaeological samples found in Hong Kong,
3. Activation analysis of biological and medical samples, and
4. Nuclear decay scheme study by means of beta-gamma coincidence measurements.

Revised Academic Programme

To make the science curricula more flexible to meet the different needs of the students, two patterns of combination of degree examination papers will be introduced for Science students in 1975: (a) strong major pattern—with six papers in the major subject and two papers in the minor subject, and (b) major and double-minor pattern—with four papers in the major subject and normally two papers each in two minor subjects. Each department will draw up the possible combinations of major and double-minor subjects for its major students, but the minor subjects are not confined to the Science Faculty.
Electronics—5-year Work-Study Programme

The electronics industry in Hong Kong may conveniently be divided into two categories: the service industry and the manufacturing industry. The manufacturing industry covers mainly three areas of electronics: semiconductor devices, consumer products, and sub-systems. Each of these areas requires rather special training pertaining to its own manufacturing process which differs markedly from one to another. In view of the highly diversified nature of the electronics industry in Hong Kong, the Department of Electronics has decided to embark on a new, 5-year programme which combines course work and industrial training.

The new programme was worked out with the cooperation of the Advisory Committee on Electronics of the University, which consists mainly of local prominent industrialists. The programme is primarily intended for students who wish to pursue a career in the electronics industry upon graduation.

Field work starts in December of the third academic year. Students who opt for this programme will proceed according to the schedule shown below.

<table>
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<th>Selection and Interviews</th>
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<td><strong>Third-year</strong></td>
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<td>Industry</td>
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The course work required for the 5-year programme is identical in all respects with that of the 4-year programme. The industrial training consists of two 9-month periods of work in industry during which the student receives a salary which is determined from time to time by the Advisory Committee on Electronics. The student's performance and progress are continuously monitored through the student's supervisors both in industry and University. A grade for this performance will be given in the student's transcript in consultation with the supervisor in industry. The programme will go a long way towards meeting the needs of the Hong Kong electronics industry.

There is no doubt that the major undergraduate programme is of internationally accepted standard. As for the requirements of learned institutions, the B.Sc. degree in Electronics of this University is now recognised by the Institution of Electrical Engineers (IEE) and the Council of Engineering Institutions (CEI) for complete and automatic exemption from their current educational requirements. This means that all our Electronics graduates, including the first batch who obtained their degrees in 1974, are eligible to join the IEE as Associate Members and can obtain the Chartered Engineer status after practising as an electrical engineer for an appropriate period of time.

Revision of the Mathematics Programme

The emphasis of the Mathematics curriculum used to be on Analysis, Algebra and Topology, which constitute the basic training in Pure Mathematics. However, there is, in recent years, a much greater demand for Applicable Mathematicians than for those trained in the Pure branches of the subject. The University therefore decided to develop also the applied branches and revise the Mathematics curriculum by introducing such courses as Methods of Operations Research, Statistical Methods, Control Theory and Analysis of Numerical Methods. Mathematics students are encouraged to minor in Computer Science, so that they will also be equipped for careers in commerce and industry.

Research on Chinese Medicine

This University has encouraged research in Chinese culture not only in the humanities and social sciences but also in the natural sciences. Within the last three years, science teachers have initiated various research projects on Chinese medicine. Traditional Chinese medicine has behind it long years of clinical application, and it befits members of The Chinese University to explore its depths and contribute to its development as part of the University's endeavour towards the enrichment of Chinese culture and the synthesis of Chinese and Western cultures.
Research on Chinese Medicinal Herbs

Science teachers who had been engaged in research projects on Chinese medicinal herbs for several years have recently come together to form a Research Group for the Investigation of Chinese Medicinal Material, which meets every fortnight to discuss problems of common interest. It is hoped that more staff members will be attracted to join the Group so that research efforts may be strengthened.

The research on Chinese medicinal herbs is a truly inter-disciplinary research programme, starting from the botanical identification of the authentic species, followed by chemical separation and characterization of the components, animal and physiological tests to identify the potent fraction, and finally the structure determination and chemical synthesis and modification of the new drugs. The Research Group therefore has as its members Dr. H.M. Chang, Dr. James C.N. Ma and Dr. W.P. Lay of the Chemistry Department, Dr. Y.C. Kong and Dr. H.W. Yeung of the Biochemistry Department and Dr. S.Y. Hu of the Biology Department, and as its advisers both overseas scientists and teachers of the Medical Faculty of the University of Hong Kong, who have always given valuable assistance, particularly in physiological studies.

Chinese scientists have a distinct advantage in the study of Chinese medicine in that they are better able to avail themselves of Chinese classical literature on materia medica. However, members of the Research Group are to some extent hampered in their research by the lack of sufficient funds. A grant of US$15,000 was received from The World Health Organization, Geneva, for the project on Leonurus artemisia, i.e. the Chinese herb I-mu Ts'ao, but there are other projects such as the research on huan lien, hypotensive components, haemostatic compounds and Abrus cantoniensis which are in urgent need of financial assistance. Other projects undertaken by the Research Group include the scientific documentation of Chinese medicinal material and the systematic collection and classification of herb samples.

It is also the hope of the Research Group to secure enough financial assistance to organize an international seminar on the research of Chinese medicinal herbs.

A close-up of several common medicinal plants in Hong Kong, showing Clerodendron cryptophyllum (大青), Phyllanthus urinaria (珍珠草), Cardiospermum halicacabum (倒地鈴), Hemerocallis fulva (金針菜), and Saururus chinensis (三白草).
**Study of I-mu Ts'ao**

*Leonurus artemisia* (Lour.) S.Y. Hu is a local medicinal herb. Together with a dozen or so closely related species spreading all over China and Southeast Asia, it is commonly called *I-mu Ts’ao* (literally motherwort). As its trivial name implies, decoction or even fresh juice from *I-mu Ts’ao* is generally tonic to the female reproductive function.

The selection of *I-mu Ts’ao* as the object of a comprehensive study in Chinese medicine is based on several reasons. *I-mu Ts’ao* is cheap and obtainable from unadulterated sources. It is even amenable to domestication on this campus. A meticulous survey, on the part of Dr. S.Y. Hu, assures that this is the correct plant conforming to all previous descriptions in Chinese medical classics. The physiological effect of *I-mu Ts’ao* is organ-specific; its potency can be qualitatively and quantitatively estimated by the induction of uterine contraction *in vitro*. Since the chemical structure of leonurine is known, it would be possible to identify leonurine, or one of its analogues, with the active uterotonic principle in the native plant. Subsequent to this step, it would be possible to produce more potent synthetic analogues. The scientific rationale of these premises can be considered as self-imposed criteria for the selection of suitable material in Chinese medicine research.

The objectives of *I-mu Ts’ao* study are 3-fold; they vary in immediacy, scope and social attribute. The prime objective is to identify the chemical nature of the active uterotonic principle and to confirm this by chemical synthesis. The second objective is to explain the action mechanism of leonurine-induced uterine contraction. Based on this knowledge, the uterotonic property of *I-mu Ts’ao* can be applied to achieve some practical social purpose, e.g. its use as a contraceptive agent. The third objective is purely academic. By studying comprehensively the different aspects of *I-mu Ts’ao* (ethnobotany, phytochemistry, physiology, pharmacology, organic chemistry), it might be possible to formulate a standard protocol by which one can proceed to study other worthwhile objects in Chinese medicine. The project is undertaken by Dr. Y.C. Kong and Dr. H.W. Yeung of the Biochemistry Department, Dr. S.Y. Hu of the Biology Department, and Dr. W.P. Lay of the Chemistry Department.

The study of *I-mu Ts’ao* as a contraceptive agent has gained the support of The World Health Organization (WHO) (Geneva), which provided a research grant of US $15,000 and sponsored the visits of two experts to advise on the project, Prof. M.C. Chang of the Worcester Foundation for Experimental Biology, and Dr. M.J.K. Harper of WHO (Geneva). Furthermore, Dr. H.W. Yeung was awarded a WHO Exchange of Research Workers Grant to visit research centres in the United States this summer to study plants as potential antifertility agents.
Evaluation of Chinese pulse diagnosis information

The vast number of pulse conditions and wealth of diagnostic information claimed obtainable with the traditional Chinese method of palpation (or pulse-taking) have always been viewed with amazement and disbelief. Past attempts to record the pulse waveform have not been very successful because of distortions, movement artefacts and non-repeatability. A recent investigation carried out by Mr. T.C. Choy of the Electronics Department jointly with Prof. F. Koide of the University of Hawaii, using an ordinary strain gauge physiological displacement transducer, produced some interesting results as shown in (a), which reproduces the radial pulse taken at the “Ts’un” position of a subject suffering from mild influenza. The waveform has the characteristics of a “Floating” and “Tense” pulse (see (b) and (c)).

Treatment of Drug Addicts by Acupuncture

The wide application of acupuncture has aroused the attention of scientists all over the world and extensive research on acupuncture has been conducted in recent years. This University has just received a grant of HK $40,000 from the Lee Foundation of Singapore for biochemical research on drug addicts treated by electro-acupuncture. This project will be in collaboration with Dr. H.L. Wen and will open up a new vista in drug addicts therapy. If concrete results can be achieved, it will be a boon not only to the unfortunate people in Hong Kong but will help to solve a world-wide 20th-century social dilemma. It is, of course, only a beginning but holds vast promises.

Other Research Projects

Staff and students of the Science Faculty are actively engaged in a large number of research projects. Though diverse in nature, they are all directed towards the advancement of knowledge and community service.

Interdepartmental Research

An interdepartmental research project has been launched through cooperation between members of the Physics and Biology Departments. The aim of the project is to determine the effect of laser on the vertebrate visual system. The project will include studies on (1) the changes of visual morphology and visual histochemistry after laser treatment, (2) the

A laser inated Retina showing displacement of nuclei
influence of laser on the developing visual system, and (3) the possible mechanism of laser in governing these changes. Participants include Dr. Y.W. Chan of the Physics Department, Dr. David Yew of the Biology Department and students of both Departments.

At this moment, the project appears to be promising and encouraging. Preliminary observations, for example, have indicated the presence of dislocated nuclei in the visual cell layer of the retina after laser treatment.

Biochemistry

Study of the Biological Activities of Human Chorionic Gonadotropin (HCG)

A study of the biological activities of Human Chorionic Gonadotropin (HCG) is carried out by members of the Biochemistry Department with the ultimate aim of discovering the reasons for such placental disorders as hydatidiform mole. Hydatidiform mole is relatively common in Asia, especially in Hong Kong where the incidence is 1:242 deliveries as compared with 1:2,000 in European countries.

HCG is a hormone characteristic of pregnancy. In cases of certain placental disorders such as hydatidiform mole, the level of tissue and urinary HCG is abnormally high. Comparative studies on HCG from the urine and chorionic tissues of pregnant women and molar patients on a molecular basis will be useful for the better understanding of placental disorders and the role of HCG in late pregnancy.

Urinary HCG has been extensively studied with respect to both purification and characterisation, largely owing to its easy availability; for HCG from other sources such as placenta, research efforts have mainly been confined to establishing methods of purification. Professor Ma Lin started the purification of HCG in hydatidiform mole three years ago. The purification of HCG in placenta was undertaken by Dr. C.Y. Lee. Dr. Lee first used the procedures for purification of urinary and molar HCG; even though the HCG sample obtained was 2–3 times better in terms of specific activity than the best attained till then, the extent of purification was still too low to permit further chemical and characterisation studies. The principal difficulty encountered was the low level of HCG in normal full-term placental tissue. Affinity chromatography, a more novel technique, was employed a year and a half ago. The highly specific character of the affinity column made it possible to increase the specific activity of HCG by 60–95-fold in a single chromatographic step. Dr. Lee, while continuing with the purification of HCG, has started research on the structure and biological activities of HCG such as the effect of HCG on the energy metabolism of ovarian tissues.

In the course of the work there has been constant support from various quarters. Prof. C.H. Li and Prof. Jerker Porath from overseas and Dr. C.C. Yu, Dr. S.U. Lok and Dr. Wai-Chee Lee in Hong Kong have given invaluable advice; Mr. Ko Fook-sun, Mr. Cheung Soo Yen and The World Health Foundation (H.K.) have given encouragement and generous financial support.

Biology

Research activities in Biology span a wide spectrum of fields, including cytology, fungal genetics and physiology, plant pathology, virology, endocrinology, and ecology. To name just a few of the projects, there are studies on: nutritional control of morphogenesis in colonial algae; biological and economic aspects of straw mushroom; phytchrome in fungi and disease development; the negative effect of multiplicity of infection on the synthesis of endolysin in lambda phage infected *Escherichia coli* cells; meiosis, embryo sac development and embryo formation in *Paspalum thumbergii*; Hong Kong flora; and environmental problems related to Hong Kong. Members of the Board of Studies accommodated in the Marine Science Laboratory, on the shore of Tolo Harbour, are undertaking a pollution monitoring programme and plankton/nutrient cycling programme; this programme will provide baseline information against which to assess the effects of discharges from Shatin New Town.

Chemistry

In addition to participation in interdisciplinary research, chemistry faculty members are conducting academic research in many fields, such as molecular structural studies using both theoretical and X-ray crystallographic methods, synthesis and mechanisms of several different types of organic molecules, chemical kinetic studies using differential thermal analysis, improving analytical methods by atomic absorption, etc. Members of the Chemistry faculty have published their findings in international journals.
Electronics

There are four general areas of research in the Department of Electronics. These are communications, circuits and instrumentations, systems and control, and solid-state electronics. Some of these areas overlap to a certain extent, and distinction is not always recognisable between them; neither is it possible to classify strictly some of the research projects under these areas.

Low-temperature and superconductivity

The low-temperature facility in the Department of Electronics provides for research on superconductive devices and study of electronic properties of materials. The facility consists of two cryostats, one of which houses a superconducting magnet with a maximum strength of 6 Tesla and a temperature controlled specimen insert, and the other is a magnetically shielded cryostat where a Squid system capable of measuring fields down to $10^{-6} \text{T}/\sqrt{\text{Hz}}$ and voltage to $10^{-13} \text{V}$ is incorporated. Currently, under the supervision of Dr. C.C. Chang, work on the studies of large-junction Josephson Effect is in progress, and radiation loss from superconducting microstrip is also being studied with the cooperation of Mr. J.S. Dahele. With members of the Physics Department, experiments on the enhancement of surface critical current and critical temperature of superconductors by high-energy laser pulses are also in progress.

Semiconductor-device research

Semiconductor-device research is undertaken by Drs. H. Kwok, York Liao and Y.W. Lam. The semiconductor-device fabrication facilities, which started as a joint venture between the Electrical Engineering Department of the University of Hong Kong and the Department of Electronics of this University, have been functioning for some time. It is now possible to fabricate both bipolar and MOS transistors with reasonable yields. A step-repeat camera for mask production is being developed and an epitaxy system for IC fabrication is being set up.

A cooperative programme was established between the Department and a local manufacturer of semiconductor devices, to experiment on the new spin-on diffusion technique. The technique is now successfully developed and is used by both the Department and the manufacturer for the fabrication of semiconductor devices.

Research on the properties of spin-on oxide has also been carried out. The oxide is deposited on a silicon wafer from an alcohol solution by first spinning the liquid on the wafer, which is then baked and densified at a higher temperature. The oxide film has been investigated by infrared spectroscopy, gravimetric analysis, etch-rate measurement, conduction measurement and CV-GV studies. Very promising results have been obtained, indicating that the oxide approaches the thermal oxide in quality and can be used as an active oxide in semiconductor devices.

Research is now directed towards the application of spin-on oxide to the fabrication of a charge-coupled device (CCD). A CCD consists of a chain of charge-storage elements along which charge packets are transferred. When fully developed it can result in television cameras as small as a packet of cigarettes, cheap computer memories which can fit inside a pocket calculator and analogue acoustic delay lines the size of a match head. For acceptable, high charge-transfer efficiency, however, spacing between neighbouring electrodes must be kept very small (typically the order of 1 $\mu$m). By the use of spin-on oxide on thermal oxide a technique is being developed in our laboratories which will enable any required spacing to be obtained. A two-phase seven-bit CCD is now being fabricated using this technique.

Other Projects

Projects in other areas which have just been completed or are being undertaken include: Pattern Recognition (supervised by Dr. H.T. Tsui), Solar Radio Astronomy (supervised by Drs. K.F. Lee and R.K.L. Poon), A Chinese Typewriter and Adaptive TV Ghost Suppression (supervised by Mr. T.C. Choy, Mr. J.G.N. Lee and Dr. R.K.L. Poon), Microwave
Circuits (supervised by Mr. J.S. Dahele), Liquid Crystals (supervised by Dr. York Liao), and Bioelectronics (supervised by Mr. T.C. Choy), Plasma Physics (supervised by Dr. K.F. Lee), and Digital Signal Processing in Avionic Instrumentation (supervised by Mr. J.G.N. Lee).

In the field of Algebra, research and publications are on ideals and radical theory in semigroups (Dr. K.P. Shum), Finite Group Theory (Dr. R.F. Turner-Smith), Lie Groups (Dr. S.T. Tsou), Group Representation Theory (Mr. L.O. Tse) and Number Theory (Mr. C.J. Chang).

In the field of Mathematical Statistics, problems of estimation for the parameters of a linear functional relation in which all variables are observed subject to error have been investigated by Dr. N.N. Chan. Dr. Chan has written a few papers on the best linear unbiased estimates based on selected order statistics from a location and scale family of probability distributions. Another faculty member who has published a number of papers on Applicable Mathematics is Dr. W.L. Chan, whose research interests are in the areas of optimal control, system theory and differential games.

In the theory of Geometry and Topology, Dr. T.C. Kuo’s research efforts have been on Topological Classification of Analytic Singularities. Mr. M.L. Chu has just succeeded in giving proof for the general case of “Covariant Differentiat on Formulae”.

Dr. E.J. Brody, whose field of interest is algebraic topology and probability theory, has translated mathematical research documents from Chinese into English, and published papers in Quantum Mechanics.

**Mathematics**

Members of the Mathematics Board have likewise been actively engaged in research and their numerous publications bear testimony to their achievements. Their research interests cover such fields as functional analysis, algebra, statistics, geometry, topology and applicable mathematics.

In 1973, Dr. Yau-Chuen Wong and Dr. Kung-Fu Ng jointly published a book on *Partially Ordered Topological Vector Spaces*. Continuing their research in the field, Dr. Ng is now working on Choquet Boundary Theory, and Dr. Wong Ordered Nuclear Spaces. Dr. Wong’s monograph on *The Topology of Uniform Convergence on Order-bounded Sets*, an account of the most recent developments in Nuclear Spaces, will be published shortly. Analysis is also done by Dr. H.L. Chow, Dr. P.K. Tam and Mr. K.W. Yip. A draft of a monograph on probability measures on compact semigroups written by Dr. H.L. Chow in collaboration with Dr. S.T.C. Choy of the University of Singapore has just been completed. Papers on C* and W*-Algebra and on measure theory have been published by Dr. P.K. Tam and Mr. K.W. Yip respectively. Research on classical analysis is done by Dr. C.H. Yong Chao, Mr. M.L. Chu and Miss H.Y. Wang. In 1974 Dr. C.H. Yong Chao published her findings in real Fourier Analysis in book form, *Asymptotic Behaviour of Trigonometric Series*.

In the theory of Geometry and Topology, Dr. C.H. Yong Chao’s research efforts have been on topological classification of analytic singularities. Mr. M.L. Chu has just succeeded in giving proof for the general case of “Covariant Differentiation Formulae”.

**Physics**

**Research in Polymer Physics**

Much effort at the Physics Department is being put into the study of solids made of high polymers. “Polymer” refers to substances consisting of giant molecules produced by stringing together thousands and even millions of simple organic molecules in a chain-like manner. Such substances can be cheaply produced in very large quantities from oil derivatives; their structures and properties can also be closely controlled and even “specified” through molecular engineering. Consequently, an ever-increasing variety of objects commonly encountered in modern life are made of polymeric substances, for example, plastic bags and containers, styrofoam mattresses, nylon stockings, terylene shirts and suits, and the many plastic parts found on a car, to name just a few. In fact, modern life would become rather difficult without polymers.
The polymer research work undertaken by a group of members of the Physics Department is concerned with a wide spectrum of the physical characteristics of polymers, so as to give a deeper understanding of their basic structures. For instance, polymer is widely used as insulating materials in electrical cables and appliances, so its dielectric response under the influence of a strong varying external electric field is of great industrial importance. Such behaviour is experimentally studied at one of the physics laboratories, at temperatures between -195 and 200°C and covering a wide frequency range. One of the aims is to determine the dipole moments in various structural regions of the polymers.

The thermal characteristics of a polymer is closely connected with its utility as fabric and construction materials. Its thermal properties, i.e. heat capacity and conductivity, are therefore also of much practical interest. They are a measure of the energy absorption and flow arising from the wiggling of the spaghetti-like giant molecules under thermal agitation, and hence provide a key to understanding the structures and interactions of such molecules. Considerable work has been done in the Department on the measurement of heat capacities down to liquid nitrogen temperature (-196°C), and this measurement is being extended down to liquid helium temperature (-269°C). Work on both the dynamic and static measurements of thermal conductivity of polymers over a wide temperature range has also been initiated.

Apart from electrical and thermal characteristics, the mechanical properties of polymers are also of much practical interest, not only because of one's natural concern with its strength and shock absorption capability as a commonly used material but also due to the recently revealed possibility that it could attain extremely high tensile strength (with an elastic modulus comparable to steel) by a drawing process. There are at present two separate experiments on the mechanical properties. One measures the strength and energy absorption of polymers under slowly varying tension, whereas the other studies the mechanical properties from the velocity and absorption of ultra-sound (that is, mechanical vibrations at frequencies of about 10 million cycles per second) transmitted through polymer samples. Work in the mechanical area will shortly be expanded by the addition of a programmable Intron tensile machine, which would make possible the measurement of the stress-strain relation at different rates of stretching.

Recent Advances in Holographic Fourier-Transform Spectroscopy

Since the first successful operation of lasers some fifteen years ago, physicists all over the world are exploring the many exciting experiments with lasers, and one example is holography. Within a few years the scope of holography grew larger and larger as many applications were found in various fields such as optical data processing, photography, vibration and stress analysis, and microscopy, etc. In 1965, G. Stroke pioneered a new branch: holographic fourier-transform spectroscopy (abbreviated HFTS). HFTS has a short history and its performance is still below that of grating spectroscopy. Stroke's result on Hg spectrum gave only the strongest lines, and among these the yellow doublet 5770, 5790Å was unresolved. Later experiments by Japanese groups did not resolve this doublet either.

Mr. L.K. Su started repeating Stroke's experiment in 1974, and discovered that he could obtain a resolved yellow doublet in the Hg spectrum, while the theory of Stroke predicted that this doublet would not be resolved under the experimental conditions of Su. Dr. S.Y. Feng later joined Mr. Su in the effort to find a satisfactory explanation. They discovered that Stroke's theory contained an error and they constructed a simple theoretical model which could explain the experimental result. However, their experimental result was a very marginal one; for example, a light touch on the bench, or a very slight misalignment of the spectrometer, would readily change the resolved doublet into an unresolved single line.

At this juncture, the progress and difficulty of HFTS drew the attention of Prof. S.T. Hsue of the University of Northern Iowa, who was then a visitor.
in the Optics Laboratory, and he too spent a part of his time on this project. By chance, Prof. Hsue once inserted a variable diaphragm during the reconstruction process, and, to his surprise, the result was a clearly resolved doublet, easy to obtain and repeatable. Although the mechanism of the diaphragm was not understood at that time, the major difficulty was solved.

At this stage, Dr. H.M. Lai became interested in the theoretical aspects of the project. He soon formulated a general theory and discussed the problem of resolution in greater detail, and was able to answer in a satisfactory manner the unsolved questions, such as the importance of diaphragm, the non-linear effects, etc. These expectations were verified in further experiments.

HFTS is still a very young and growing field, and it is a pleasure to see that the Physics staff have played a role in the pioneering work.

**Workshop/Training Courses**

Teachers of this University are all aware of the need for good coordination between the secondary schools and the University. Matriculation syllabuses are therefore kept under constant review and every effort has been made to help raise the teaching standard in the secondary schools.

**Workshop for Chemistry Teachers**

To keep abreast of modern developments, the Chemistry Matriculation Syllabus will be drastically revised with effect from the 1976 Matriculation Examination. The Chemistry Board, in this connection, held a two-day Workshop for Chemistry teachers on 28th-29th June, 1975. About a hundred teachers, including members of the Government Education Department and the Chemistry Department of the University of Hong Kong, participated and discussed the new syllabus and related problems.

The two-day programme included lectures on Bonding and Periodicity, Chemical Dynamics, Building Inexpensive Molecular Models, Oxidation-Reduction Reaction, and Carbon Compounds; group discussions, demonstrations of experiments, and display of audio-visual aids.

The success of the Workshop inspired the Chemistry Board to offer a course on "Modern Chemistry Teaching" in collaboration with the Department of Extramural Studies in September-November. The course, to be led by Prof. J.A. Campbell, Director of CHEM STUDY Project, U.S.A., a renowned expert in Chemistry Education, will introduce to Hong Kong's Chemistry teachers the modern teaching methods in Chemistry adopted by most secondary schools in the United States and other countries.

**Refresher Course in Biology**

A six-day refresher course with special reference to the new 1977 Matriculation Biology Syllabus was held on 11th-16th August, 1975 jointly by the Department of Biology and the Government Education Department. Topics covered included fungi, genetics, ecology and animal reproduction and development. The course was highly successful, and enabled University staff to make direct and prolonged contact with secondary school teachers. A similar course will be organized in 1976, and a series of short residential courses on specific topics will be arranged thereafter.

In summary, coming under one roof for the Science departments has facilitated the daily contact and mutual stimulation of teachers and students of the Science Faculty and the sharing of expensive equipment among the Departments. Such complete integration has not only made possible the streamlining of curriculum and improvement in teaching but also created the proper atmosphere for interdisciplinary research, international cooperation, the integration of Chinese and Western cultural traditions, and public service. The Science Centre is therefore the most eloquent illustration of an emerging organic university.
The University Science Centre is the largest and costliest building project of the University. It enhances significantly the eye-catching magnificence of the campus, the credit for which belongs primarily to the University Architect and the Campus Planning and Building Committee.

The University Campus Planning and Building Committee is appointed by the University Council, and chaired by Dr. R.C. Lee. It considers all the architectural plans of the various buildings and structures on campus and recommends to Council for approval all the plans for individual projects. Dr. Lee, as Chairman, works especially closely with the University Architect and such other consultants invited by the University as Dr. I.M. Pei.

In addition to serving as University Architect, he has also been responsible for designing the following projects on the campus: (1) Benjamin Franklin Centre, a gift of the citizens of the United States, (2) Institute of Chinese Studies, donated by the Lee Hysan Estate Co. Ltd., (3) Administration Building, (4) University Science Centre including extension, (5) the United College campus, (6) the Teaching Buildings of the New Asia College campus and (7) the Olympic-size swimming pool.

The Campus Planning and Building Committee and the University Architect play an important role in promoting the University's educational ideals. The University Science Centre provides an excellent example. As a result of ingenious planning and adoption of innovative construction methods, the University has been able to bring the six Departments of the Science Faculty together under one roof, whereby the pooling of the human and material resources of the Science Faculty throughout the campus becomes a reality.
Economy Drive

The Chinese University was informed by the Universities and Polytechnic Grants Committee that the funds available for the Recurrent Budget for the financial year 1975-76 would be considerably below the basic requirements and that the supplementary grant would not be sufficient to cover rising costs. It is not known how long the period of extreme financial stringency will last but the University has been advised to plan in terms of two or more years.

A Working Group on Economy was set up at the end of last year to examine various possibilities of economizing and to make recommendations thereon to the Vice-Chancellor. The Working Group was reconstituted and enlarged to form the Committee on Economy early this year so as to make an all-out effort in the drive for economy. Composition of this new Committee is as follows:

Chairman: Mr. T.C. Cheng
Members: Dr. H.M. Chang
Dr. John T.S. Chen
Mrs. E.J. Fehl
Dr. Ambrose King
Mr. Paul Lam
Mr. Lee Yim
Prof. H. Sutu
Mr. N.H. Young
(Secretary)
Dr. C.T. Yung
Dr. Y.S. Yü

To tide over the period of extremely grave financial stringency, all Boards of Studies, Administrative Departments and other units were urged to consider all possible reductions of expenditures without letting the major academic programmes suffer setbacks.

Acquisitions

Large vase with underglaze blue decoration of dragons, Ch'ing, Chien-lung
Presented by the B.Y. Lam Foundation
Of the twelve exhibitions held since the opening of the Art Gallery on 27th September, 1971, all except one were loan exhibitions. However, an art gallery must not rely solely on private loans but must make acquisitions of its own. To this end an Acquisition Fund Committee was set up in early 1973. Through the concerted efforts of its Chairman, the Chairman of the Management Committee and the Curator, enough funds were raised to take over the entire Jen Yu-wen collection of paintings and calligraphy by Kwangtung artists at a special price. The choice was a happy one, for the Jen collection is the most extensive of its kind and covers a field hitherto not fully explored. Not only is it within the research capability of the Art Gallery, but it also has a local context.

With Jen’s collection as the nucleus, an exhibition of “Landscape paintings by Kwangtung artists of the Ming and Ch’ing period” was held from June to August 1973. This was the first occasion the Art Gallery could exhibit its own acquisitions.

A few other purchases were made recently, including a circular silver box of the T’ang Dynasty, an extremely rare item, from London. These are made along the following guidelines: (1) The item should be supplementary to the existing collection if possible; (2) It must be rare and not available on loan from private collectors; (3) It must serve a purpose in either the teaching or research programme of the Art Gallery and the Fine Arts Department of the University. All purchases must be recommended by the Curator, endorsed by outside assessors and approved by the Management Committee.

Apart from donations in cash, donations in kind have also been regularly received. As early as August 1973, a very important collection was donated by the Lee family, consisting of about 300 seals, mostly dating from Han and Pre-Han periods, a rubbing of a long-lost Han Stele, the Hua-Shan Temple Stele, and several valuable paintings by the Yangchow Eccentrics of the Ch’ing Dynasty. Also worthy of special mention are one

Covered silver box with incised decoration, T'ang

A Sung rubbing of the Hua-Shan Temple Stele
Presented by the Lee Family
donation of ten pieces of porcelain and lacquer from the B.Y. Lam Foundation in January 1975 and another collection of four porcelain pieces from the Wah Kwong Collection in June 1975. Other valuable items of painting, calligraphy, porcelain, and antiquities from various private collectors are so numerous that they cannot be recorded and acknowledged individually here. In sum, the Art Gallery can only express its profound gratitude to all its friends for their kind help in building up a museum that can mount exhibitions of its own acquisitions and support its instructional programme.

Another important contribution to the Art Gallery is the donation of art books which give material assistance to the teaching programme. A whole set of 1,798 volumes of books on Chinese and Oriental Art donated by Mr. Cheng Chi and 447 volumes on Chinese Art from the National Palace Museum, Taipei, by Mr. Lin Po-shou were received in 1972. Mrs. Mae Fong Soong, on the other hand, has continuously donated books on Western Art.

With these donations, the art books at the University Library System, and the colour slides collected over the years at the Photographic Archive of the Art Gallery, an adequate art library can be built to support the graduate programme of the Fine Arts Department now already at the planning stage.

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Ching’tu Tsao-hsiang, one of the thousand rubbings from Lungmen caves, Northern Wei, Purchased by Art Gallery Acquisition Fund
Timely grants from international foundations have helped to promote the professional development of the academic and administrative staff of the University. The Staff Development Programme, initiated in 1965 with a grant from The Ford Foundation, enables our staff to pursue advanced study and to reacquaint themselves with scholars and academic development abroad, giving them new stimuli and vitality and widening their outlook.

One of the recent contributions to the Programme is a special grant from the John D. Rockefeller III Fund, which provided for a wide-ranging study tour for the Curator of the Art Gallery, Institute of Chinese Studies, in North America and Europe.

Mr. James Watt, Curator of the Art Gallery, and Senior Lecturer of the Fine Arts Department, has been interviewed by the Bulletin after his return, for a detailed account of his study tour.

The Curator of the Art Gallery, Mr. James Watt, last year went on a seven-month tour of North America and Europe on a grant from the John D. Rockefeller III Fund for the purpose of research work on Chinese jade carvings and export pottery, and survey of public and private collections of Chinese art in the United States and Europe. In the course of his travel he visited forty museums, most of which housed collections of Asian art, and about fifteen universities with departments of art history.

In his visits to museums he was able to gain an overall impression of the nature and extent of their collections and he was able to examine in detail those collections of special interest to his present research work. For jade carvings, the most important collections were those at Seattle Art Museum, the Asian Art Museum of San Francisco, the Field Museum of Natural History in Chicago, the Minneapolis Institute of Art, the Fogg Art Museum at Harvard University and the Sackler Collection housed in the Metropolitan Museum in New York. For Chinese export pottery, the most important single collection for study was that of the Museum of Anthropology at the University of Michigan.

While touring museums and universities, Mr. Watt also took every opportunity to visit conservation and research laboratories for art and archaeology and to talk with specialists in art conservation. The notes he took on such visits will be most useful in planning for conservation and research laboratory for the Art Gallery of this University.

Of the six months that he spent in North America, over three months were spent in Cambridge, Massachusetts, where he was able to make use of the facilities at the Fogg Art Museum and the Harvard-Yenching Library for his research work. At the Harvard-Yenching Library he was particularly happy to find an old colleague, Dr. Chiu K'ai-ming, formerly the University Librarian of The Chinese University of Hong Kong. Dr. Chiu, who is re-organising the rare books section of the Harvard-Yenching Library, was most helpful in giving advice and full access to early editions of important works of reference. During his stay in the Boston area, he was able to acquaint himself with the Far Eastern Department of the Boston Museum of Fine Arts which houses one of the most distinguished collections in Asian art in North America. Given such excellent facilities, Mr. Watt was able to collect substantial material for his forthcoming book on "The Chinese Pottery Trade in South-east Asia"
and for his work on Chinese ceramic technology.

On his way home, Mr. Watt visited museums in England and continental Europe. He thus had an opportunity to revisit the Ashmolean Museum and the Oxford Museum for Art and Archaeology where he previously studied.

In all his activities abroad, Mr. Watt was most ably advised and assisted by the staff of the John D. Rockefeller III Fund, and he was able to accomplish more in a shorter time than would otherwise have been possible.

Reflecting on his tour abroad, Mr. Watt is of the opinion that although the period of three months at Harvard was not long enough for serious academic work, the other three months of travelling were most useful in acquainting himself with art collections abroad and the technical aspect of museum administration. The knowledge gained on this tour would be most useful both for improving the services provided by the Art Gallery at the Institute of Chinese Studies and in planning for further development of the Art Gallery. Similarly, visits to departments of art history at other universities provided the opportunity for studying the organisation of teaching departments of other universities and the nature and structure of the courses offered.

Of all the university museums Mr. Watt visited, the one which he thought the most successfully run was the Fogg Museum of Harvard which integrates completely with the teaching department of the History of Art, while also serving as a popular public museum. The conservation department of the Fogg Museum also contributes major advance in the scientific study of works of art. Mr. Watt is of the opinion that with time and support of the public the Art Gallery of the Institute of Chinese Studies will play an increasingly important part in the cultural life of the University, as well as the community of Hong Kong.

The Social Research Centre was established in November 1969, for the purpose of understanding Chinese social life from a social scientific perspective. Originating and developed in Western countries, theories and methodologies of modern social science may have facilitated the understanding and improvement of social life in Western countries but may not be totally adequate when applied to Chinese societies. Through empirical research in Chinese societies, the Social Research Centre attempts to test and modify current theories and methods of social science. On the basis of such findings, the Social Research Centre hopes to make recommendations for the improvement of social life in Chinese communities.

The work of the Social Research Centre also attempts to complement teaching. Thus, both teachers and students have a role to play in the planning and implementation of Social Research Centre's various research programmes through which some concrete understanding of local social life may be obtained to supplement classroom teaching and learning.

Local and International Support

Assistance from various sources in the past five years have facilitated the smooth progress of Social Research Centre's various research activities. Intellectual assistance has been generously offered by such noted scholars as Professors C.K. Yang, Robert Chin, Ai-li Chin, Jiri Nehnevajsa, Burkart Holzner, and
Hiroshi Wagatsuma. Financial support has been given by such bodies as the Harvard-Yenching Institute, The Asia Foundation, the Government Lotteries Fund, the Hong Kong Methodist Church, the Rockefeller Foundation, The Ford Foundation and the Nuffield Foundation. Moreover, data collection in the various projects has been made possible through the cooperation and assistance of Government departments, voluntary agencies, and members of the public.

There have been 29 members of the University's social science faculty who have, at one time or another, taken part in Social Research Centre's work. Their disciplines include sociology (17 persons), geography (3 persons), anthropology (3 persons), psychology (2 persons), social work (2 persons), economics (1 person), and journalism (1 person). Some of them have engaged in a Social Research Centre project on an individual basis; others have done so on a team basis which incorporates different disciplinary approaches to the same problem.

**Research Projects**

As a result of the effort of Social Research Centre colleagues and support from various sources, a number of studies have already been completed. These include: the social and spatial-economic analysis of hawking activities in Hong Kong, study of higher Chinese civil servants, study of secondary school teacher education in Hong Kong, evaluation of Methodist social services and of Foster Parents' Plan in Hong Kong, Kwun Tong health survey, the impact of industrialization on fertility in Hong Kong (in cooperation with Hong Kong Family Planning Association), and Chinese University student residence project. In addition, several studies have also been completed in the large-scale Kwun-Tong Industrial Community Research Programme. They include: population and ecological growth, structural autonomy of the community, political values and participation, political implication of the City District Officer Scheme, internal and external elements of social welfare organizations, the role of religious organizations, organization and activities of a Chinese spirit-medium temple, family task-power differentiation, organization and management of factories, value system of Chinese small factories, problems and strategies of small factories for development, educational mobility and access, and life-quality survey.

Up to the end of February 1975, a total of 50 research reports and papers have been published by the Social Research Centre.

Projects currently in progress include the following: (1) the Kwun Tong Industrial Community Research Programme: the structural patterns of industrial bureaucracies, the role of small factory in economic development, urban religious behaviour, leadership in local community, and medical concepts and utilization; (2) psychological correlates of family planning behaviour among women in Hong Kong; (3) housing problems and urban neighbourhood in Hong Kong; (4) housing policy and internal movement of population in Hong Kong; (5) social causes of juvenile offenders in Hong Kong; (6) biosocial survey in Hong Kong (in cooperation with Australian National University); (7) the impact of community structures and family patterns on fertility behaviour in Hong Kong; (8) Chi-
nese and Western health services systems in Hong Kong; (9) revolutionary modern Peking opera in People’s Republic of China; (10) manpower utilization in the communes of People’s Republic of China; and (11) the emergence and development of Maoist sociology.

Looking Ahead

Most of the studies undertaken by the Social Research Centre have dealt with aspects of Chinese social life in Hong Kong. While this will continue to be a major emphasis in future research activities, the Social Research Centre hopes to expand its scope of concern to include other areas, especially Chinese societies in China and Southeast Asian countries.

Since its main thrust so far has been ground-breaking in research, the Social Research Centre has accumulated a rich amount and variety of data. In the coming one or two years, it is planned to carry out further analyses of the existing data and to utilize them more fully. By so doing, the Social Research Centre may be able to make a better contribution to the development of social science. In particular, it may be able to provide more effective recommendations for social policies and more relevant teaching material for the curriculum in Sociology.

Most of Social Research Centre’s reports and papers are written in English. Although this has been done to facilitate intellectual interchange on an international basis, the fact that they contain considerable specialized social science terminology does present difficulties for the ordinary Hong Kong citizen. From now on, the Social Research Centre intends to use Chinese more in writings to promote the use and maturation of social science in Chinese society. Where possible and appropriate, it also wishes to reduce the technical appearance of research publications so that through a simpler language intellectual ideas may be channelled into the society, to bring the University and the society closer together.

While the Social Research Centre has had a considerable sociological “touch” even as it has incorporated other disciplinary approaches, it is hoped that more opportunities of participating in Social Research Centre’s work would be made available to colleagues in the various social science departments. Moreover, it hopes to develop cooperative undertakings between colleagues in the social sciences and those in both the natural sciences and the humanities. It believes that as there is more interdisciplinary exchange of views and working together, the understanding of and hence contribution to Chinese society would be greater.

A page from The Story of West Pavilion
The reprint of rare classical Chinese books is one of the recent projects of the University's Publications Office. Not only does it complement the main thrust of the University in the field of Chinese studies spearheaded by the Institute of Chinese Studies, but it also represents a kind of special service to the academic world. It makes books otherwise inaccessible available to scholars and students interested in Chinese studies. The Classical Chinese Books Publication Committee has gone out of its way to search for appropriate titles for reprint purposes, making contacts with various private collectors to loan suitable titles for reproduction.

It was agreed that the end products should attempt to be the exact duplicate of the original so that the reader will find them both a useful text and a collector's delight. The first phase of this project consists of three titles: Poems of Li Ho, The Story of West Pavilion and Collection of Essays by Sun K'o-chih, the first two already published and the other still under preparation. Each title is limited to 200 copies only.

Of the three titles, Li Ho's Poems is very rare indeed. In fact, it may be the only copy in existence now, as most of the books on Li Ho do not even include it in their bibliographies.
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