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# SCIENCE BULLETIN

National Science Council  
214 Roosevelt Road, Section III  
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## Three Seminars to Be Held Here

In the next several months a series of three seminars will be held in Taiwan under the joint sponsorship of the National Science Council and the National Science Foundation as part of the China-U.S. Cooperative Science Program.

The three seminars are about Urban Problems, Seismology, and Fisheries Biology. The topics are all of mutual interest to scientists of both sides. The Seminar on Urban Problems will be the first to take place, for which detailed plans have already been mapped out. The two other seminars will be held in next spring and summer, and details are being arranged by the Chinese and American coordinators.

The Seminar on Urban Problems is scheduled to take place in Taipei

### Visiting Scientist Takes Up Assignment

Dr. Leon R. L. Wang, associate professor of the Machines & Structures Division, Rensselaer Polytechnic Institute at Troy, New York, and his family have arrived in Taiwan. They will stay here for the coming year as Dr. Wang will be doing some research at the National Chengkung University during the period as a long-term visiting scientist under the China-US Cooperative Science Program.

Dr. Wang's research activities will be in three main areas: (a) Behavior of Fiber Reinforced Light Weight Concrete, (b) Development of Damping Capacity of Structures and (c) Computer-aided Design of Structures.

Besides, Dr. Wang will also teach one course at the graduate level. The course will be about "Matrix Analysis of Structures" which will include introduction of finite element methods in the first term and "Advanced Structural Dynamics", which will include mechanical vibrations in the second term.

on October 30 through November 7. The U.S. contingent will be headed by Dr. J.E. Gibson, dean of the School of Engineering, Oakland University, who is also the U.S. coordinator. The Chinese delegation will be led by Mr. T. S. Chang, director of the Urban Development Department, Council for International Economic Cooperation and Development, who is coordinator on the Chinese side.

Two days are set apart for the delegates to take a field trip to central and southern Taiwan and do some sightseeing. Subjects to be discussed during the seminar period will be wide-ranging, including comprehensive and regional development planning, environmental problems such as air and water pollution, transportation, etc.

For the Seminar on Seismology the U.S. coordinator is Professor Clarence Allen of the Seismological Laboratory, California Institute of Technology. His Chinese counterpart is Dr. S. K. Yiu, director of the Chinese Earthquake Research Center.

This seminar is of particular interest in Taiwan as the island is located

along a segment of the most active earthquake zone on the earth and is most vulnerable to heavy quake damage. Because of this, the country is embarking on a long-range earthquake research program under the sponsorship of NSC. A working group was organized last year and was transformed into the Chinese Earthquake Research Center this year.

The principal purpose of the Seismology Seminar is to bring an international group of experts up to date on the latest developments in a specific area of earthquake research, to analyze the significance of these developments, to provoke suggestions and to stimulate the cooperative seismic research between Chinese and American scientists.

The Seminar on Fisheries Biology, the last to take place, is also of great interest in Taiwan as it has a large fishing fleet operating in international waters worldwide. Dr. James Joseph, IATTC, La Jolla is the U.S. organizer of the seminar. His Chinese counterpart is Dr. T. P. Chen, director of the Fisheries Division of the Joint Commission on Rural Reconstruction.

## Tree Bark Is an Excellent Fertilizer, Says Scientist

A Chinese agriculturist has discovered that the bark of trees is a very good fertilizer.

It was proved in an experiment conducted by Fang Shen-shen, instructor of the National Chung-Hsing University, at a farm in central Taiwan under the sponsorship of the Joint Commission on Rural Reconstruction.

Fang started his experiment with 40 metric tons of bark in 1971. He mixed the bark with three to six per cent of water and dregs of chickens and heaped it for three weeks. The temperature of the mixture must be kept

at around 60 degrees Fahrenheit for two more months. Then the fertilizer is ready.

Fang said sawdust can also be used to replace bark. But the water and chicken dregs must be increased to about nine per cent and it will take three months to develop.

Bark is the most inexpensive material to make fertilizer with. Many timber yards just gave it away or dumped it somewhere, Fang observed.

JCCR is planning to use this kind of cheap fertilizer on the farmlands on Kinmen (Quemoy) and later introduce it to the farmers in Taiwan.



# Establishment of Photogrammetric Development Center Here Suggested

By Dr. Louis A. Woodward

*(This article consists of the principal portion of a written recommendation submitted to the Chinese government by Dr. Louis A. Woodward, who was invited here jointly by Asia Foundation and the National Science Council last summer for a month-long familiarization trip. The recommendation, entitled "Utilization of Aerial Photography and Photogrammetry in Taiwan", was prepared as a result of a review of previous studies and investigations regarding aerial photography, an inspection of existing facilities, discussions with representatives of several government agencies and comments made by many government representatives at a meeting held on July 21.—Ed.)*

"An analysis shows that the present surveying and mapping status of Taiwan is insufficient to solve some of the country's most urgent problems, such as an efficient use of all available resources (including natural resources, industry, etc.) in general and to further improve the agricultural potential ... This situation is serious and according to international experience, it can be assumed that the Chinese National Economy is yearly affected by losses of several hundred million N.T. dollars due to an inadequate survey and mapping status."—Dr. A.J. Brandeberger, Special Chair Professor, National Cheng Kung University.

"Now is the time to take appropriate action. I do not believe Taiwan can afford to wait until tomorrow."—the Author.

## Recommendations

### Program:

A qualified individual or possibly a small group of individuals should be established in the Ministry or Department of the government responsible for the financial approval of programs. Assuming that the government of the Republic of China operates in a fashion similar to other governments, it is necessary for the various ministries to submit a budget, with

appropriate justification, for funds for future operations. The budget request from the Ministries of Interior, Forestry, Agriculture and others should designate areas and request funds for aerial photography, photogrammetry mapping and related data. The areas required should be delineated on a transparent map, indicating priority and other pertinent information. Upon receipt of transparencies from all Ministries and Departments, the Ministry of Finance, Budget Bureau or similar organization can register the transparencies one over the other, comparing priorities, scales, contour intervals etc. and determine areas of highest priority to most Ministries and consider this in the allocation of funds and the designation of areas to be photographed, mapped or other data developed. The central organization for the development of aerial photographic, photogrammetric and map data as described below should assist the various ministries in estimating the cost and time required to produce the desired data and also act as a consultant to the Minister of Finance, Budget Bureau or other office in formulating the program. It is expected that the combined requests for aerial photographic, photogrammetric, map and related data will generally exceed funds available for this purpose and also the capacity of the production facilities available. Accordingly priorities must be considered. A point system may be appropriate for guidance. Many items must be considered in program development in addition to priority. All non-military funds appropriated for aerial photography, photogrammetry, mapping and related data, should be available to the new Photogrammetric Development Center along with the responsibility for accuracy and completeness of all work. It should be the responsibility of the new center to carry out the program with their own facilities, subcontract to other facilities or to private enterprise. Accuracy and completeness testing of all work should be the responsibility of the new center.

## The Photogrammetric Development Center

### 1. Relation with military

The Center should be responsible for all civil requirements and separate from the military, although it is necessary that these organizations work together in the accomplishment of the required aerial photography and in map printing. The excellent film processing and map printing facilities of the military agencies should not be duplicated for at least the foreseeable time. Some of the capabilities of these two organizations will be similar. When the military facilities are not fully required for military purposes and civil work is available, it would be contracted to the military on the basis of definite specifications. Should a national emergency arise, all but the most critical civil work should be postponed and the civil organization support the military to the extent necessary.

### 2. The Aerial Survey Team

The photogrammetric facilities of the Aerial Survey Team of the Agricultural and Forestry Department should be transferred to the new Center. However the function of forestry and agricultural photographic interpretation should remain as a separate organization or be transferred to the Forestry Bureau or other appropriate organization.

### 3. Cheng Kung University

If possible, some arrangement should be made to transfer all or a portion of the excellent but small capacity at Cheng Kung University to the new Center and the University restrict its activities to education and training. If major items of equipment are transferred to the Center, it may be desirable to replace them with adequate but more modest equipment in order that the excellent educational program can continue.

### 4. Aircraft

In order to obtain maximum use of existing civilian photographic aircraft, they should be transferred or assigned to the new Center for op-

eration. The minimum amount of photographic weather which normally occurs in Taiwan as related to aerial photographic requirements makes it desirable to utilize all days when atmospheric conditions are suitable. With a well planned program, including the requirements of all organizations, aircraft operating from a central location can effectively take advantage of all suitable weather at any location in Taiwan.

#### 5. Administration

Since the new Center will be performing work for most Ministries and Department,s it does not appear desirable for it to be administratively under the direction of any one Ministry or Department. One possibility would be for the Center to be a part of the Council for International Economical Cooperation and Development—another possibility would be an independent organization under the direction of representatives of several Ministries and Departments.

#### 6. Location

The new Center should eventually be located as close as possible to the offices of various agencies having need for its services. This appears to be Taichung. It is important for the personnel of the various agencies to become familiar with the services and products available thru photogrammetry in order that such services and products may be most effectively used. One of the Center's responsibilities should be to give talks, lectures and demonstrations in the use of aerial photographs, photogrammetric data, maps, etc.

#### 7. Key Personnel

Extreme care must be exercised in the selection of key personnel of the new Center. The General Manager should have good general knowledge of photogrammetry and what can be accomplished by photogrammetric methods. However it is more important that he should have administrative ability and a thorough knowledge of the programs of the various Ministries and Departments. The Assistant Manager and Operations Manager should be professionals and have a broad background of experience.

#### 8. Consultants

A consultant or advisor should be retained as soon as a decision is reached to establish the Center to

assist in ordering equipment, establishing methods and procedures, developing programs etc. This consultant should have a background with private industry where efficiency, minimum cost and maximum production are paramount. However this consultant should completely disassociate himself from all other organizations prior to accepting an assignment with the new Center. Other consultants and experts to assist in training and development of techniques can be called when required.

#### 9. Security

A complete review of present security regulations must be made and some way found to permit aerial photographs and large scale maps to be freely used by personnel of all government organizations in connection with authorized programs. In addition it is most desirable that the new or modified security regulations permit government representatives to use aerial photographs and maps at meetings with land owner and tenant associations. With appropriate aerial photographs and maps, revised land use, new agricultural practice, irrigation systems, plans etc. are more easily explained to, and understood by land owners and tenants. Once a proposed program is clearly explained and completely understood it is better accepted and more effectively practiced.

#### 10. Aerial Photography

The present immediate need for up-to-date agricultural and other information as related to the time required to produce the desired maps is similar to the problem which faced the U.S. Soil Conservation Service in 1933-34. Agricultural and erosion condition was so critical in the United States in 1933-34 that immediate action was required. Time was not available for map making. Accordingly, aerial photography was accepted as a map substitute and it was found that for a considerable part of the agricultural program all requirements were fulfilled by the photographs. Since that time the agricultural areas of the United States have been rephotographed at about 5 year intervals and the forest areas at about 10 year intervals. The aerial photographic negative scale adopted was 1:20,000. Since this photography was intended for only photointerpretation, the camera focal length selected was 210 mm. Photographic enlargements to

a scale of about 1:16,000 are used by soil scientists, planners, those concerned with land capacity, etc. Photographic enlargements at a scale of about 1:8,000 are used for preparing individual farm plans. Two copies of the photographs at the 1:8,000 scale are given to each land owner or tenant; on one photograph soil types and land capability are delineated and on the other, the agreed upon land use practice (crops, crop rotation, irrigation, drainage etc.)

With little instruction almost anyone can interpret the major features which appear on aerial photographs. A person trained in Forestry or Agriculture for example with a reasonable amount of instruction, training and field examination can soon identify timber types, soil types, crops, land use and other pertinent data.

Much of the necessary information regarding land slides can be obtained directly from aerial photographs. Periodic aerial photography will indicate change in existing slides as well as show new slide areas.

Aerial photographs taken at the peak of floods clearly show the extent of the area flooded and also flood damage. Photographs taken after the water subsides show damage to stream banks, levees, revetements and bridge thus enabling engineers to immediately prepare effective plans for repair or replacement.

Current aerial photographs clearly show the effectiveness and deficiencies of existing irrigation systems, existing land use conditions and enable planners, agriculturists, foresters and engineers to plan improved land use practice. Major crops, such as rice, can easily be identified on aerial photographs. The total area planted in rice and other crops can be determined at any given time from current aerial photographs and this area related to production statistics will give a reasonably accurate forecast of total production long before the harvest.

The list of uses of aerial photographs alone is almost never ending. However in most cases their value is greatly enhanced when used with accurate maps. In many cases photographs are not an adequate substitute for maps. A few of the other uses of photographs are:

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## Photogrammetric Development Center

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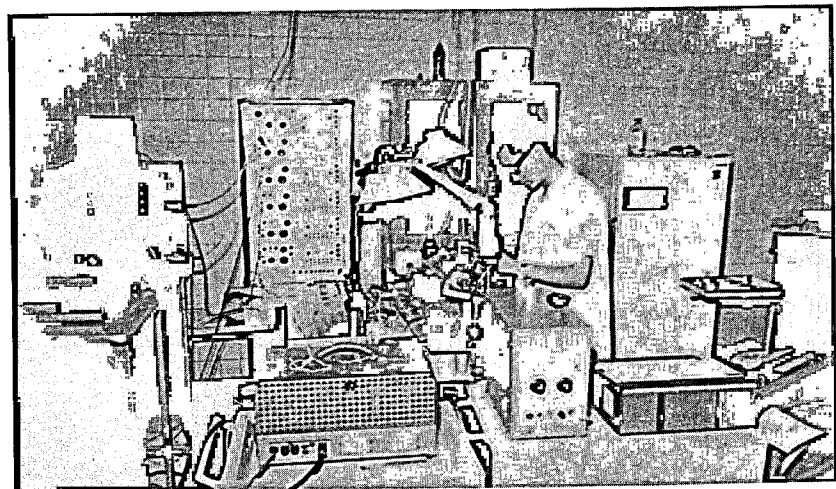
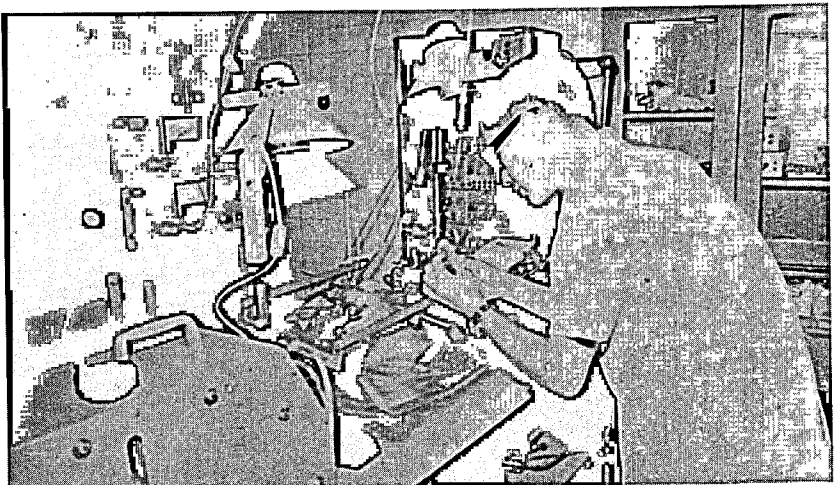
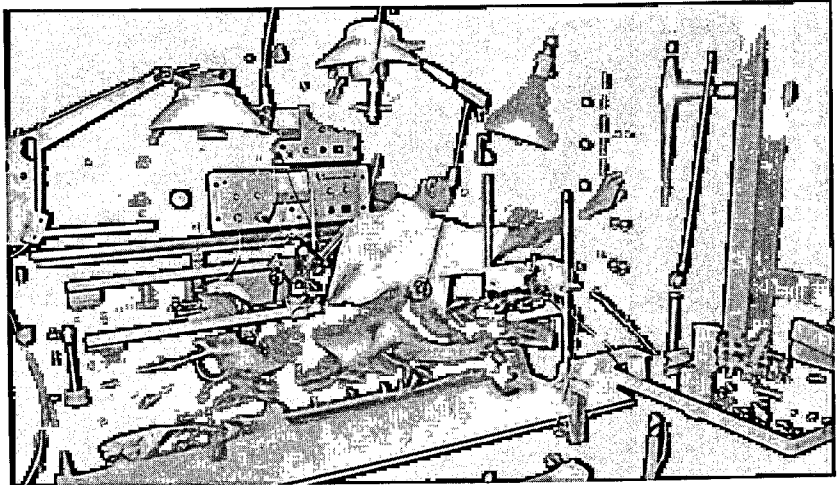
- Harbor Development and Extension
- Site Selection for residential and industrial development
- Mineral Exploration and Development
- Water Conservation
- Check Dams, Iajor Multiple-purpose Dams (Flood Control-Irrigation, Hydro Electric) and Reservoir Investigations
- Electrical and water distribution
- Industrial, Commercial and Rural Electrification Investigations
- Transportation, Route selection for highways, roads, streets and railroads
- Community Development and Redevelopment
- Public Health and Sanitation
- Parks and Recreation
- This list could go on and on.

The use of aerial photographs as outlined above and the savings of countless man days required to otherwise develop less accurate and incomplete information, depends largely upon an appropriate modification of existing security regulations. With the numerous present orbiting photographic satellites and others scheduled to be placed in orbit in the near future, photographs of all parts of the world are being obtained daily. Therefore it appears unwise and uneconomical to prevent the civil government agencies from using aerial photographs.

With the present high resolution lense and photographic emulsions coated on film and paper, it is normal to retain high quality imagery even with enlargement factors up to 8 or 10 times mangnification. Thus much of the relatively small scale photographs obtained from topographic mapping and other purposes can be used for making enlargements at the scales desired for other purpose.

Consideration should be give to the establishment of a program of periodic aerial photography for photo interpretation purposes in addition to the photographs required for photogrammetric purposes.

(To be continued in next issue)



Monkeys are being used here in a study of coronary circulation. The research is directed by Dr. H. H. Wang of Columbia University and performed by Dr. H. I. Chen of the National Defense Medical Center in the Kohlberg Memorial Medical Research Laboratory at Shihpai on the outskirts of Taipei.

In monkeys, the blood pressure, cardiac output and coronary blood flow were measured before and after stimulation of different areas of the brain stem. The changes of peripheral and coronary resistances were analysed in order to study the central nervous control on the systemic and coronary hemodynamics. This study may also provide some information on the pathogenesis of 'angina pectoris' or myocardial ischemia of nervous origin. Photos here show Dr. Chen conducting the research in the laboratory.