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## SCIENCE BULLETIN

National Science Council

2 Canton Street

Taipei, Taiwan, Republic of China

# CCNAA and AIT Agree on Activities Under ROC/US Cooperative Science Program

The Coordination Council for North American Affairs and the American Institute in Taiwan met in Taipei on Oct. 2-3 for a Cooperative Science Program Review and Planning Session. Officials of the National Science Council and the U.S. National Science Foundation attended the meeting in advisory capacity. The following agreement was reached on the program development activities:

**Short-Term Visiting Scientists.** The National Science Council regularly provides additional support to scientists travelling from Taiwan to international meetings to enable them to visit colleagues in the United States for the purpose of, among other things, exploring the possibilities of cooperative research. It was agreed that in the future NSC will provide NSF with information on these visitors where the prospects are good for subsequent cooperation. NSC will provide this information on a timely basis and NSF will communicate with the United States counterpart scientists to provide them with information on support for international cooperation made possible by the Program in order to facilitate the development of joint research projects.

**Seminars.** Dr. C.S. Ho, of the Geological Survey and the National Science Council, described plans for the seminar on Plate Tectonics and Metamorphic Geology for which he and Professor W.G. Ernst of UCLA are coordinators. The seminar will consist of a three day technical session, January 5-7, 1981, to be followed by a field excursion. More than 30 papers are expected, with more than 100 participants, including geoscientists from France, Japan and Korea. Plans were discussed for a second seminar on Plant Growth Regulators to be held in the United States in June 1981. Coordinators appointed for this seminar are Dr. Joe

Key, University of Georgia, and Dr. C.Y. Lin, National Taiwan University. The coordinators met in Athens, Georgia in August 1980, to complete plans for that seminar.

After discussion of several proposals for seminars to be held in fiscal year 1982, it was agreed that a seminar on Homogeneous Catalysis and Coordination Chemistry would be held in the United States in the period of October - December, 1981 and a seminar on Biochemical Interactions of Species Mediated by Allelochemicals would be held in Taiwan in the spring of 1982. NSF and NSC will designate coordinators for these meetings as soon as possible so that planning meetings of the coordinators in the host country can be held as soon as possible.

A discussion of all the possible objectives of joint seminars was held. It was decided that NSF and NSC would, in working with the respective scientific communities, define in precise terms the objectives, in priority sequence, of each proposed seminar.

These objectives might include exchange of scientific information, advice and recommendations to the implementing agencies, advance of the state of the art in a scientific field, formative of international cooperative research groups, gaining familiarity with unique scientific resources and environments, or other contributions to basic and applied research and development. New directions which might allow new groups of investigators to participate in the Program were discussed. It was decided that, in addition to those seminars selected by the implementing agencies, other seminar proposals for consideration through the regular review mechanisms of NSF and NSC would be accepted. It was noted that the proposal from Dr. Tetsuo Koyama for a workshop conference on Little Known Food Plants in Eastern Asia was already well defined. NSF and NSC may consider that proposal and others in appropriate areas, through regular review procedures if the coordinators



Cooperative Science Program Review and Planning Session was held at the CCNAA Office in Taipei on Oct. 2-3 under the joint chairmanship of CCNAA Director Dr. Tsai Weip-ping, third from right, and William Thomas, second from left, deputy director of AIT. Dr. S. S. Shu, chairman of the National Science Council, is seen sitting to the right of Dr. Tsai.



wish to submit proposals in the required format.

Suggestions for seminar topics for selection in or after fiscal year 1982 which might open up new areas for cooperation in the program were considered. Intensive agricultural operations and ethnobotany were two areas discussed. Suggestions for state of the art meeting in important problem areas for future reference included corrosion problems and energy storage.

Possibilities for a seminar on Scientific Management for Innovation were discussed. It was agreed that the arrangements for the character, time, and place for this meeting would continue to be explored by the implementing agencies.

#### *Cooperative Research*

Projects completed, on-going, and initiated in FY 1980 were reviewed (Appendix V). The completion of a major study, the compilation of the *Flora of Taiwan*, was acknowledged and the major scientific contribution of this collaborative effort noted. It was agreed that NSF and NSC would express commendation through an appropriate communication to the principal investigators for their leadership in this project. The outstanding

work, over an extended period of time, of Professor W. C. Snyder of the University of California, Berkeley, in contributing to the understanding and control of *Fusarium* plant discovered in Taiwan was noted. Dr. Snyder remained active in this work, in collaborative with Dr. S. K. Sun of National Chungshin University, until his death this year. It was agreed that NSF and NSC will send an appropriate message to Dr. Snyder's widow expressing sympathy and appreciation for the great contribution of his work under this Program.

#### *Joint Venture in R & D*

It was noted that previous joint venture have now moved to various stages of implementation in cooperative research activities and other avenues of collaborations. It was decided that cooperations in earthquake engineering and insect fauna studies should proceed through research proposals. The new Program will not include Joint Venture Projects; but aspects of these activities may be defined and presented as seminars, short or long-term visits, or cooperative researches.

#### *New Types of Cooperative Activities*

It was agreed that the Program will

encourage creative and innovative approaches which will link the research communities of the United States and Taiwan in productive and mutually beneficial cooperation. Specific, well-defined objectives in each activity will be sought to allow the best decisions to be made on the support, organization and execution of these activities. Careful delineation of the objectives of each activity will allow the agencies to evaluate the success of these activities and provide useful information for Program management. The agencies will search for ways to provide broader participation in the Program by as many individuals and institutions as possible. The agencies will share information or avenues outside the regular purview of the Program which involve other areas of scientific cooperation.

NSC plans to provide information to NSF by January 1981 and the objective of a study period at NSF by two NSC science administrators for a period of 4 to 8 weeks each during calendar year 1981. Where mutually agreeable, a plan for the time and arrangements for this visit will be made.

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## Orthophoto Mapping and Other Photogrammetric Activities in Taiwan, Republic of China

*(Continued from last issue)*

tolerance of  $\pm 250$  meters for photos of 1:17,000 scale as well as  $\pm 500$  meters for photos of 1:34,000 scale.

f. Weather for photography: The ideal weather for aerial photography is sunshiny, clear air, free from clouds and haze, the wind velocity and air turbulence at the flight altitude are at a minimum. Experience shows only about 20 days a year in Taiwan where the weather is suitable for photography.

g. Altitude of sun for photography: To avoid the presence of long shadow on the photographs, the duration of the day selected for photography is above 30 degrees of the altitude of sun for flat regions as well as 40 degrees for the mountains and cities.

In addition to existing triangulation points which are placed with targets prior to aerial photography, more horizontal and vertical photo control points required for aerial triangulation are surveyed with the field survey method after the aerial photography. The horizontal control

surveys are mainly performed by the traverse survey method with T-2 theodolites and electron-optical distance measurement equipment. The accuracy of horizontal control is comparable to that of third order triangulation. The vertical control surveys are performed by second order leveling for the flat areas and trigonometric elevation survey for the mountains. The controls are tied to the existing 1st, 2nd or 3rd order basic triangulation stations or 1st order bench marks. An attempt has been made to select the location of the control points where the feature images are clear and distinct on the photographs. All control points are pin pricked and ink circled on the face of photographs and a large scale detailed sketch for each point is drawn on the reverse side.

The density and distribution of the ground control points are determined according to the requirements of aerial triangulation. The use of the block adjustment method in aerial triangulation has greatly reduced the volume of ground control survey work. The

density and distribution of the horizontal ground controls established is one point per 2-airbase along the perimeter of the aerial triangulation block. The vertical ground control bands are distributed at a density of 5-airbase distance apart in the interior of the block.

Aerial triangulation with block adjustment by independent models is carried out for establishment of the supplementary horizontal and vertical controls required for photo mapping through the geometric relationship of the adjacent aerial photographs. The relating geometry of one photograph to an adjacent photograph is accomplished analytically. Six control points per stereoscopic model are established. They are tied to the ground controls mentioned above. The Zeiss PSK-2 Stereocomparator is used for measuring image coordinates of the control points on the film diapositives. The computing program of PAT-M is used for block adjustment by CDC computer. The size of the triangulation block is 200 to 500 models (100 to 250 map sheets) per block.

Four Zeiss D-2 Planimat plotters, each equipped with a SG-1 Storage Unit, are used for profile scanning and recording. A Zeiss GZ-1 Orthoprojector equipped with LG-1 Profile Reading Unit is used for orthophoto production. The two stereomodels (three photos) which covering the complete map sheets are selected and successively oriented in the D-2 planimat for determination of vertical profiles. The orthophotos are produced in the GZ-1 Orthoprojector, following the same pattern as during the scanning of the stereomodels,

by continuous stripwise exposure combined with simultaneous differential variation of magnification. The connection of the second model in the D-2 Planimat plotter usually does not produce visible separation. In mountainous terrain, pronounced slope perpendicular to the direction of the profile gives rise to small step-shaped mismatches. However the mismatches are largely avoided by using a small exposure slit.

The scale ratios between aerial photo, model, orthophoto and map are as follows:

	Aerial photo	Model	Profile storage	Ortho-photo	Photo map
Scale 1:	17,000	10,000	50,000	5,000	5,000
Scale 1:	34,000	20,000	100,000	10,000	10,000

To facilitate one photo for one map technique employed in the off-line mode by means of jointless model connection, the numerical orientation method is used for transferring the orientation of the photo to be projected from the D-2 Planimat to the GZ-1 Orthoprojector. The orientation of the models in the D-2 Planimat is made in accordance with the geographic coordinates to allow the safety margin required in addition to the necessary net area to be reduced to a minimum. The orientations of the D-2 Planimat are transferred to the GZ-1 Orthoprojector by scribing checks on the storage plates. Orientations in the GZ-1 are checked by setting the nominal coordinates.

The orthophotos are produced in the following procedure:

a. Selection and preparation of aerial photos:

Aerial photographs actually used for orthophoto mapping are selected with the aid of contact prints of all the photos taken:

(a) Select central photographs which cover the complete map sheets. Mark the approximate map sheet limits on the photographs selected.

(b) Select the additional stereo photographs for profile storage.

(c) Produce the film diapositives to be used in the stereoplotters.

(d) Produce the film diapositives, by Log-E Mark IV Contact printer, of the central photos to be used for orthoprojection.

b. Profile storage with D-2 Planimat and SG-1 Storage Unit:

Insert film diapositives and orient them in D-2 Planimat. To do this, the common diapositive of the first model is always located in the right hand photocarrier. The relative orientation

is obtained by bridging. Absolute orientation is extended by suitable rotation of the models in accordance with geographic coordinates. Then determine the check points and plotting ranges. Couple the SG-1. Scribe the profiles of the first model. Bridge and scribe the second model.

c. Orthophotos are produced in the form of negative with the GZ-1 Orthoprojector by the one photo-one map technique.

(a) Position and orient the central photo in the GZ-1 orthoprojector.

(b) Make numerical check on orientation of the photograph.

(c) Determine working limits and position of the film in the GZ-1.

(d) Perform automatic profile run for orthophotographic exposure and contour plotting simultaneously with HLZ Electronic Contourliner.

The orthophotograph is the ideal base for field classification before map compilation. However, in order to speed up map production, the normal aerial photo prints, enlarged to the map scale prior to the orthophoto projection, are taken to the field for classification. The photo prints and their transparency overlays are used as the bases for recording the information collected.

Items to be classified in the field are roads, drainages, vegetation, building uses, mines, power and pipe lines, place names, administrative boundaries, etc.

All road networks are field checked. Trails not mapworthy are not checked. All roads are classified according to the specified standards. National, provincial, and county routes are labeled. Road surfaces, widths, bridges, stations, tunnels are noted or symbolized.

The stream courses are delineated where they are obscured on the photographs as in timbered or shadowed areas. The direction of current is indicated with the symbol of arrow.

Landmark buildings such as schools, factories, temples, churches, post offices, government offices, public buildings, etc. are symbolized or named.

Administrative boundaries of the provinces, counties, townships are mapped mainly from those shown on existing land maps.

Names of places and map features are collected. All available sources of name information are consulted — reference works of various kinds, published maps of the area, official records, and especially local residents.

Linear features such as powerlines and pipelines are shown for their landmark character. Large transmission lines assume such landmark importance that individual steel towers are located and shown.

Orthophotos serve as the base for the production of Taiwan base map series. Therefore they are transformed into photo maps by adding the information of contours, spot heights, place names, feature symbols or designations, grids, marginal data, etc.

Two types of photo base maps are reproduced for the users. One is the temporary sheets in small quantity reproduced by contact printer with photographic paper in monochrome (black and white), while the other is the final publication sheets in large quantity printed by offset printing press with ordinary map paper in three colors.

On the monochrome photo maps, roads and drainages are shown in white and legible. Information such as contours, place names, symbols, etc. is overprinted in black on the photo images in order not to distract the map user.

When photo maps are printed in colors, the photo images, contours, spot heights, place names, symbols, grids, marginal data are shown in black, roads in red, and water surface in blue.

In some cases, 1 photo does not cover a complete map sheet, orthophoto mosaics are made by joining orthophoto prints into a complete map.

Agricultural and forestry resource inventories have been made and kept in Taiwan since 1954. The aerial photographs were first used as the main tool for inventory of the forestry resource and land use in Taiwan. New photographs have been taken in flight later every ten years for revision of

the previously resulted inventories. Since 1973, both black and white, and infrared photographs have been used for the following projects satisfactorily:

(1) Identification of the agricultural and forestry types.

(2) Detection of the agricultural and forestry disease.

(3) Prediction of rice, sugar, and other agricultural products.

(4) Detection of agricultural and forestry damage caused by natural disaster.

(5) Inventory of acreage of the cultivated lands.

The Chinese-Taipei Society of Photogrammetry is a non-governmental organization established in 1963 and reorganized in August 1978 at Taipei, Taiwan, Republic of China.

The Society is devoted to the development of photogrammetry and related technologies and their applications to land surveys and resource inventorying. By the end of July 1980, the Society has 328 members,

most of them are college graduates in photogrammetry or related fields. These also include personnel employed by various governmental and private survey and mapping agencies such as Agricultural and Forestry Aerial Survey Team, Topographic Map Service, Land Survey, Urban Survey, Road Survey, and related colleges and schools. We hope that the future will see further progress of photogrammetry in the Republic of China.

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## ROC-ROK Workshop Slated for Late Nov.

ROC-ROK Bilateral Workshop on Mineral Beneficiation, Hydrometallurgy and Environmental Controls will be held at Taipei from 24 to 29 November, 1980. The need for basic and applied researches in the mineral processing field becomes increasingly evident when more efficient processes are needed by industries to meet the challenge of economical production of raw materials in the face of rising energy and labour costs, environmental constraints and ever-decreasing ore grade. For economically rapidly developing countries, the need for improved utilization of their natural resources may be especially urgent. Based on this common understanding, the Republic of China and Republic of Korea organized a highly successful bilateral workshop in this field in Seoul from 12 to 22 April, 1979. In that meeting special emphasis was

laid on the technology of enrichment of low-grade ores. Following this line, the Fourteenth Sino-Korean Ministerial-Level Economic Cooperation Conference decided to organize another workshop in which other topics of related subjects will be discussed for exchange of technical information and research data achieved by the engineers and scientists of the both countries as a part of 1980 technical cooperation program. Under the sponsorship of National Science Council, ROC and the cooperation of Ministry of Science and Technology, ROC, the second bilateral workshop on mineral processing will take place in Taipei from 24 to 29 November, 1980, with Mining Research & Service Organization, ROC and Korea Research Institute of Geoscience and Mineral Resources, ROK as co-organizers.

Fifteen papers submitted by

scientists and engineers of the two countries will be presented for discussion in the two-day meeting. A four-day industrial trip to several mineral and metal production factories in Taiwan has been planned for some of the participants as the post-seminar activity of the workshop. More than 60 participants from universities, research institutes and industries of the host country are expected to attend the workshop. The proceedings will be published and distributed to the participants on the opening session of the workshop. In view of the rapidly increasing rate of mineral consumption in the Republic of China and the Republic of Korea, this workshop will provide an ideal opportunity to exchange technical experiences on the present and future problems of mineral processing confronting the two countries.

## NSC-Supported Research Projects

### Biological, Agricultural, and Medical Sciences

Fang-yuh Lin

NSC-69B-0204-02(04)

Histophysiological studies on the reproductive organs of the Ayu

W. S. Tsai

NSC-69B-0409-04(17)

Studies on the individual relation for crop breeding

Zen-hong Shu

NSC-69B-0409-08(01)

Studies on the floral differentiation of mango trees in Taiwan

Rong-chi Chen

NSC-69B-0412-02(26)

Therapeutic effect of INH (Isoniazid) on experimental epilepsies

T. H. Yin

NSC-69B-0412-06(15)

Feeding and temperative regulation following topical application on 6-OHDA or 5,6-DHT on the wall of the hypothalamic

Yiu-fun Lai

NSC-69B-0412-15(09)

Diagnosis of deep vein thrombosis c I<sup>125</sup>

Ching-tse Lee

NSC-69B-0409-02(17)

Pheromonal and genetic effects on reproductive behavior

Nai-wen Yü

NSC-69B-0412-06(16)

Effect of ACTH and thyroxine on the development of  $\Delta^5$ -3 $\beta$ -HSD activity in tadpole interrenals

C. T. Tsai

NSC-69B-0412-06(17)

Effects of morphine on the inhibition of neural activity of dopamine neurons in substantia nigra compacta evoked by noxious stimuli

J. J. Chen

NSC-69B-0412-15(10)

Quantitative study of bile acid in gael bladder and liver stones

Yan-hwa Wu Lee

NSC-69B-0412-19(08)

Human milk reverse transcriptase and breast cancer

Shu-yu Wang

NSC-69B-0412-20(01)

Clinical application and animal experiment of pulse wave patterns in orthodox Chinese medicine