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SCIENCE BULLETIN

National Science Council
2 Canton Street
Taipei, Republic of China

Workshop on Land Use Planning To Be Held in Taipei Jan. 4-12

A large gathering of Chinese and U.S. scholars will gather in Taipei next month to attend the Sino-American Workshop on Land Use Planning scheduled for January 4 through 12. In land-hungry Taiwan, the topic is most pertinent. With an area of only 35,854 square miles, the island has to support a population approaching 17 million. The fact that three fourths of the island is mountainous and unfit for habitation or agricultural cultivation only makes the situation worse. According to the latest survey, there are about 1,800 people living in every square kilometer of cultivated land, a population density unmatched elsewhere in the world. The situation is getting worse as industrial plants and housing projects gradually encroach upon the shrinking farmland. Under the circumstances how to make the best use of the available land has become a critically important subject of study. The forthcoming workshop is expected to provide some, if not all, the answers to the problem.

The workshop is sponsored by the National Academy of Sciences on the U.S. side and by the National Science Council, Academia Sinica, Council for Economic Planning & Development and Joint Commission on Rural Reconstruction. Attending the workshop will be 31 Chinese delegates and 14 American delegates in addition to 19 observers.

There are 14 papers on the various aspects of land use written by Chinese delegates to be presented at the workshop. Two papers are prepared by U.S. delegates. Altogether six sessions will be held and site visits are scheduled in-between. The following is a tentative agenda for the upcoming workshop.

AGENDA

January 4, Wednesday

1800-2000—Pre-workshop consultation meeting.

January 5, Thursday

8030-0900—Registration

0900-0915—Opening remark by Dr. Shien-siu Shu, Chairman of National Science Council.

1000-1020—Intermission.

Session I—Background Briefings

Chairman: Mr. Wang Chang-ching, Vice Cahirman, Council for Economic Planning & Development.

1020-1100—T.S. Chang and Sun Chen. Land Use Planning in Taiwan, ROC.

1100-1140—Sen-Dou Chang and Tang Foh-Tsrang Urbanization and environmental problems in Taiwan. Discussants: Wang Chiu-Yuan—ROC. Roland J. Fuchs—US.

1140-1220—Chen Wu-cheng. Taiwan's Land Transportation Systems. Discussants: Wang Chuan-fan—ROC. Chang-i Hua—U.S.

1230-1330—Lunch.

Session II—Geoinformation Base For Land Use Planning

Chairman: Dr. Yien-si Tsiang, Commissioner, JCRR.

1400-1440—Chin-chao Koh. Agricultural land use survery and planning in Taiwan the Republic of China. Discussants: Huang Ta-chou—ROC.—John M. Street—U.S.

1440-1520—Anming A. Fu. Large scaled topographic maps of Taiawn. Discussants: Wang Shin—ROC S.D. Chang—U.S.

1520-1540—Intermission.

1540-1620—Yuan H. Djang and L. J. Wen. Water resources development in Taiwan.

Discussants: Hsu Hong-hsi—ROC. Sterling Brubaker—U.S.

1730-1900—Reception.

January 6, Friday (Site Visits)

Early a.m.—Fly to Kaohsiung and then drive to Pintung.

Late a.m.—Visit field facility of JCRR for agricultural land use planning in Pintung.

p.m.—Drive to Kenting and Olangpi.
RON—Kenting Guest House.

January 7, Saturday

a.m.—Tour Kengting Tropical Botanic Garden and drive to Nantou.

p.m.—Visit regional land development site in Chushan, Nantou.

RON—NTU Forset Resort at Chitou.

January 8, Sunday

a.m.—Sightseeing in Chitou and vicinity.

p.m.—Drie back to Taipei by chartered bus.

January 9, Monday (Plenary Session)

Session III—Institutional Framwork And Decision-Making Process For Land Use Planning

Chairman: Dr. Chang-I Hua.

0900-0950—Albert C. Tsao. Data resources on land use planning in the Republic of China.
Discussants: Lee Teng-hui—ROC. Willard Tim Chow—U.S.

0945-1040—Lui Fei-lung. Introduction to institutional format and current practices in Taiwan, ROC.
Discussants: Su Chih-chao—ROC. Bruce Billings—U.S.

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3 Contract Research Projects Carried Out by Institute of Oceanography, NTU

Oceanographic Investigation in the Vicinity of Nanwan

By N. K. Liang

The third nuclear power plant will be installed Nanwan in the southern Taiwan. The state-run Taiwan Power Company has contracted the Institute of Oceanography, National Taiwan University to study the physical oceanographic environment in the vicinity of Nanwan. The work began in July, 1976 and will be completed by March, 1978.

The investigations include the following items:

1. Bathymetry
2. One year current and temperature measurement at 5 stations
3. Wave measurement at station B
4. Longshore current measurement
5. Sediments analysis
6. Bottom profile investigation
7. Dye study (fluorescence sodium)
8. Drouges (26 hours)

The oceanographic data collected in the present project will provide important information in choosing the location for the discharge of the cooling water used in the nuclear power plant.

Tidal Currents in the Offshore Area of Suao in Relation to Tides of the Land Station Along the East of Taiwan

By T. Y. Chu

Current measurements were carried out in the offshore area of Suao along the East Coast of Taiwan. A current meter of Aanderaa Model 4 was placed at a depth of 65 meters for a period of about two months from October 25 to December 23, 1975. The current data are analyzed with rotary component method to obtain the clockwise and anticlockwise rotary spectra and estimate the principal periodical components of the tidal current. The long and short axes of the principal tidal ellipses, the mean orientation, stability and rotary coefficient are also calculated. The tide gauge data are taken from a land station in the Suao Harbor. These data are also treated with rotary component method to obtain the principal partial tides. The coherence between tides and tidal currents and their phase difference are also calculated.

On the other hand, both tides and tidal currents data are calculated with Least Square method according to harmonic analyzing theory to get the amplitude and phase lag for several important components. These values are used to compare with those obtained with rotary component method.

The results are summarized as follows:

1. By tide gauge data analysis we know that the principal partial tides in Suao are $O_1 P_1$ & M_2, the semiduirnal tides are stronger than the duirnal tides. From the current data analysis we get that the principal partial current are also $O_1 P_1$ & M_2 and the seminduirnal tidal currents are stronger than the duirnal tidal current.

2. Excepting some tidal ellipses on the frequency band having anticlockwise rotating motion, most ellipses have clockwise rotations. It appears on the frequency band that the clockwise rotation component is stronger than the anticlockwise rotating component. Duirnal and semiduirnal tidal ellipses are all stable ellipses. The mean orientation of the long axis is pointing to the direction between 160° to 170°.

3. From the analysis of cross-spectrum of semiduirnal tides and tidal current, we find there is a good correlation between them. But for duirnal tides and currents they are not. This is perhaps caused by the influence of topography, it needs to make further studies in theoretical analysis. The amplitude of positive and negative components of tides and tidal currents of the seven partial tides O_1 P_1 K_1 N_2 M_2 S_2 K_2 have been calculated by harmonic method.

Some useful values are listed in following tables.

Table 1. Amplitude of component of tides and tidal current

	O_1	K_1	M_2
Amplitude of anticlockwise component of tidal current (cm/sec)	8.78	8.53	17.21
Amplitude of clockwise component of tidal current (cm/sec)	10.89	11.28	18.35
Amplitude of anticlockwise component of tides (cm)	9.93	8.99	17.46
Amplitude of clockwise component of tides (cm)	9.93	8.99	17.16

Table 2. Amplitude of harmonic components

	O_1	P_1	K_1	N_2	M_2	S_2	K_2
Anticlockwise component of tidal current (cm/sec)	5.60	1.16	8.15	5.13	17.17	6.46	1.52
Clockwise component of tidal current (cm/sec)	6.65	4.81	7.27	4.70	18.81	8.56	4.18
Anticlockwise component of tides (cm)	6.51	4.21	7.92	3.04	16.72	12.46	7.65
Clockwise component of tides (cm)	6.51	4.21	7.92	3.04	16.72	12.46	7.65

Table 3. Phase lags of tidal currents (for aniclockwise and clockwish) and tides

	O_1	P_1	K_1	N_2	M_2	S_2	K_2
Ka	287°	92°	336°	156°	199°	219°	101°
Kc	164°	252°	195°	24°	45°	71°	44°
K	292°	316°	0°	307°	29°	93°	75°

Table 4. Ellipse coefficient of tidal current

	O_1	P_1	K_1	N_2	M_2	S_2	K_2
Half long axis (cm/sec)	12.3	6.0	15.4	9.8	36.0	15.0	5.7
Half short axis (cm/sec)	1.1	3.7	0.9	0.4	1.6	2.1	2.7
Mean direction of long axis	150°	190°	161°	156°	167°	164°	119°

Measuring Tides and Waves at Ba Chyy Men

By W. C. Chen

Under the support of Keelung Harbor Bureau, a series tides and waves measuring at Ba Chyy Men water area has been carried out by the Institute of Oceanography of National Taiwan Unviersity.

Ba Chyy Men is located at Lat. 25°10'N and Long. 121°45'E on the northern coast of Taiwan.

During recent years, the volume of imports and exports of Keelung Harbor has been increasing tremendously due to the impact of rapid economic development. There is no more space for further development. In realizing such a situation, the authorities decided to construct the Keelung Second Harbor covering the area of Keelung Fishery Harbor, Ho Ping (Peace) Bridge and the Ba Chyy Men water area. The main work for this project is to construct a 1,000 meter long breakwater, 120 meter wide 12 meter deep enchance channel and 12 water wharves. The construction cost will amount to NT$5,000,000,000 (US$-125,000,000) The construction work will be underway in January 1978 and will be finished by early 1978.

According to the data, the significant wave height at Ba Chyy Men water area is so high as 15 meters when the strong typhoon Vera hit northern Taiwan with 120 mile per hour winds on July 31, 1977. Of course, all the data of waves and tides will give invaluable information for the planning and design of the breakwaters at Ba Chyy Men.

Workshop on Land Use Planning to Be Held in Taipei Jan. 4-12

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1040-1100—Intermission.

1100-1150—Wang Hung-kai. On conceptual and institutional problems of urban land use planning in Republic of China.

Discussants': Lin Yi-hou—ROC. Archibald Woodruff—U.S.

1200-1300—Lunch.

Session IV—American Experience In Land Use Planning Decision-Making

Chairman: Dr. Willard Tim Chow.

1400-1450—Shelley M. Mark. Current Status of Federal and States Land Use Planning.

Discussants: Chang Lung-sheng—ROC. James S. Wershow—U.S.

1450-1540—John R. Borchert. Experience with the Minnersota Land Management Information System.

Discussants: Albert C. Tsao—ROC. Dorothy L. Bomberger—U.S.

1900-2030—Dinner hosted by Mr. K.H. Yu, Chairman, Council for Economic Planning and Development.

January 10, Tuesday (Plenary Session)

Session V—Land Use Policy Issues And Alternatives

Chairman: Dr. Sterling Branbaker.

0900-0950—Paul K.C. Liu. Effect of population policies on land use and regional development: Animultaneous model for Taiwan.

Discussants: Yu Tzong-shian—ROC. George J. Demoko—U.S.

0950-1040—Mao Yu-kang. A study on the policies of the rural land use conversion in Taiwan, ROC.

Discussants: Shih Thi-tzeng—ROC. Richard L. Barrows—U.S.

1040-1100—Intermission.

1100-1150—Tang Foh-tsrang and Chang Sen-dou. Future alternatives of rural land: the urban dimension.

Discussants: Lee Rei-lin—ROC. Chang-I Hua—U.S.

1130-1300—Lunch.

Session VI—Environment And Land Use

Chairman: Dr. T.H. Shen, Advisor, JCRR.

1400-1450—Shiang-tyan Shyu. Environmental problems inherent in ROC's land use planning.

Discussants: Li Wen-lang—ROC. Norton S. Ginsburg—U.S.

1450-1540—Carson Kung-hsien Wu. Development of ROC's marginal lands, with special reference to mountain slopes and tidal lands.

Discussants: Hsi Lien-chi—ROC. John M. Street—U.S.

1900-2030—Dinner hosted by Dr. Shih-liang Chien, President of the Academia Sinica.

January 11, Wednesday (Group Discussions)

0900-1200

Group I—Institutional framework and decision-making.

ROC Moderator: Wang Hung-kai

U.S. Moderator: Archibald Woodruff

Group II—Geo-information data base.

ROC Moderator: Koh Ching-chao

U.S. Moderator: John R. Borchert

Group III—Major policy issues in land use planning

ROC Moderator: T. S. Chang

U.S. Moderator: Sterling Brubaker

1200-1300—Lunch.

1400-1630—The panels draft recommendations in their respective sphere of competence.

1900-2030—Farewell dinner hosted by Dr. Shien-siu Shu, Chairman of National Science Council.

January 12, Thursday (Plenary Session)

Chairman: Sun Chen, Roland J. Fuchs

0900-0930—Group I—Report of recommendations.

0930-1000—Group II—Report of recommendations.

1000-1030—Group III—Report of recommendations.

1030-1100—Intermission.

1100-1130—Discussion and adoption of recommendations.

1130-1200—Concluding remarks.

1200-1300—Lunch.

1400-1700—Visit National Palace Museum.

Technical Report

US-ROC Seminar on Solid State Physics

Taipei, Republic of China

April 7-13, 1977

(The report, which is exerpted for publication, is prepared by Dr. Robert J. Maurer, the U.S. coordinator.—Ed.)

The primary topics of the Seminar were Semiconductor Physics and Magnetic Materials. These choices were made because of their relevance to the Chinese electronics industry and the interests of the university research programs.

The choice of subject matter for the Seminar resulted in an admirably focused and coherent program. The American papers were superbly done and exhibited the high quality of current U.S. research. Since the American participants came from institutions diverse in geographic location and size, and included both men wiht established international reputations and younger scientists, the strength of the U.S. science effort was most impressive.

The Chinese papers were more varied in quality and interest. The best papers were excellent, all presented competent research, but some concentrated on highly specialized problems whose scientific or applied relevance was not obvious. The Taiwanese solid state research community has a majority of young, bright, talented men who have been well trained in U.S., Canadian, and European universities. The array of talent is most impressive. They work with facilities that are, in general, inadequate by American standards. The Center for Semiconductor Research at Hsinchu is, however, well instrumented with good facilities. Equipment and facilities at Tsing Hua and Chiao Tung Universities at Hsinchu are only fairly good, but those at National Taiwan University are clearly inadequate. The younger scientists frequently appear to lack mature leadership in scientific matters so that their research efforts appear fragmented and unrelated. There appears to be an understandable effort on the part of the young men, returning from graduate study abroad, to attempt to continue the pattern of their graduate thesis research with inadequate attention to the development of coherent programs within which indiidual efforts will be mutually helpful and related. The inadeuacy of facilities and isolation from the major centers of research undoubtedly accentuate the problem. Despite these comments, the potential for major advances exists. The Chinese scientists are well trained, vigorous, practical. In interactions with U.S. scientists, the opportunities for mutual benefits are real.

The personal contact of the Chinese with the American physicists was mutually stimulating. The Chinese valued highly the opportunity to obtain at first hand the judgment of the Americans concerning the relative significance and probable future impact of current and proposed research programs. A large amount of straightforward factual information was exchanged to everyone's benefit. Even a small, brief seminar is important in this respect within the context of the prevailing isolation of the Taiwanese physicists. It should be emphasized that the Chinese contribution to this exchange was significant.

Since a prime purpose of the Seminar was to improve future communication and cooperation between U.S. and ROC solid state physicists, these topics were the subject of lively discussion at luncheons, coffee breaks and during social events. These discussions culminated in a formal half-day examination of the problems which, because of the extensive previous consideration, was well focused and productive. It was considered that a principal barrier to establishing cooperative arrangements was the inadequacy of techniques for establishing sufficiently intimate contacts between potential collaborators. A variety of useful suggestions for mitigating this problem were advanced and are contained in the Recommendations of the Seminar which are Appendix 2 of this report.

Included in the recommendations are a list of areas of solid state research that the seminar participants found favorable for cooperatie research programs. They are:

1. Characteristics of Doped Amorphous Seminconductors and Exploration of Device Possibilities with Emphasis on Solar Energy Applications and including Amorphous Silicon Grating Solar Cell Research.

2. Optical Properties of Semiconductors.

3. Ion Implantation Research.

4. Back Scattering Analysis with the 3 MEV Accelerator at Hsinchu.

5. Relaxation Phenomena in Magnetic Materials.

6. Magnetic Bubble Materials and Deices.

7. Computer Simulation Techniques.

Several of the American participants discovered attractive possibilities for specific cooperative arrangements. Professor Lynch found common interests in optical properties of semiconductors sufficient to warrant discussion of a joint program. Professor Humphrey explored the possibility of a young Taiwanese physicist joining his group at Cal Tech. Professor Maurer made preliminary arrangements for Professor C.S. Hsue to begin work with the theoretical group at Illinois in September 1977.

Computer Symposium Held in Taipei

An International Computer Symposium was held at the National Taiwan University Dec. 27-30. More than 400 scholars and specialists in related fields from Canada, Hongkong, Japan, the United States and host Republic of China attended the meeting.

A total of 70 papers and three special lectures were delivered during the three-day session in addition to panel discussions.

Dr. Yen Chen-hsing, president of NTU, said the symposium was designed to promote interflow of computer technology and theories between nations. He also expressed the hope that the gathering would stimulate computer R&D activities in this country.