GEOLOGICAL SOCIETY OF HONG KONG

香港地質學會

NEWSLETTER

通　訊

第七卷　第一期　　一九八九年三月

Vol. 7, Part 1, March 1989

GEOLOGICAL SOCIETY OF HONG KONG

NOTES FOR THE GUIDANCE OF CONTRIBUTORS TO THE NEWSLETTER

General: Typescripts, enquiries and all correspondence should be addressed to the Secretary, Geological Society of Hong Kong, C/o Dept. of Geography and Geology, University of Hong Kong. The Society does not assume copyright of material published in the Newsletter. Any other previous, current or expected future use of such material by the author must be stated at the time of submission.

Articles of a technical nature, as well as reports of interesting events, reviews and other topical items are welcome. Contributions must be short, although exceptions may be made at the discretion of the Society. Figures, tables, and half-tone plates must be kept to a minimum and must be all on separate sheets.

Typescripts must be accurate and in their final form. Two complete copies should be sent to the Secretary. Typescripts should be double-spaced, including references, on one side only of the paper only with a 2.5cm margin on each side. A4 paper is preferred. All pages should bear the author's name, and be numbered serially.

Send only photocopies of illustrations, retaining the originals until the Society asks for them. Originals should bear the author's name. Diagrams should be in black on tracing material or smooth white paper or board, with a line weight suitable for reduction. A metric scale should be included, and North Point (or where relevant, coordinates of latitude and longitude) on all maps. Avoid using fine proprietary symbols (e.g. Letratone) on figures that are likely to be reduced.

References: The author is responsible for ensuring that all references are correct. Unless the list of references is extensive, references should be given in full; where used, Journal abbreviations must comply with those in the List of Serial publications held in the Library of the Geological Society of London (Geological Society, 1978).

Offprints: The Society does not provide authors with free offprints of items published in the Newsletter, but will obtain quotations on behalf of authors of technical articles who may wish to purchase offprints from the printer.

CONTENTS

EDITORIAL

This first issue of volume 7 of the Newsletter is the first for several years to meet its deadline. This has been achieved by means of a change in editorial policy. From now on, the policy will be to produce a quarterly, and it will contain whatever there is of interest to members to put in it.

For the first five years the Newsletter did appear regularly, and a total of 27 issues was published. The list of short papers thus generated, and the breadth of topics covered, was impressive. Collectively, they constitute a substantial contribution to the geological literature of this part of the world. The volume of output proved, in fact, more than the society could sustain at the time. Cumulative delays arose as contributions were solicited, awaited and reviewed. For Volume 6 (1988), it was decided to issue a single number, still in press. Clearly, the Newsletter had ceased to be a Newsletter.

We still want to include a scientific content in the Newsletter. We will ensure that quality of publication will be commensurate with quality of content. We would like to revert to the format of Volumes 1 to 5, and include regular or occasional articles of substance contributed by you - the membership. So please don't say "pity about the Newsletter, I was going to send in such-and-such ..." Let the Editor have your contribution: papers, reviews, notices, news items. Ideas, too. Let us keep each other informed, through the pages of the Newsletter.

Cover photograph: Contributions are welcomed. They must be in the form of high-quality glossy prints or colour slides and should be accompanied either by a caption or an extended description.

PROGRAMME

MEETINGS

* Lecture by Dr D.V. Frost on karst in the N. New Territories
  Institution of Engineers (19 April)

* Talks given by Chinese palaeontologists
  Hong Kong Polytechnic (25 April)

* ANNUAL GENERAL MEETING
  Mariner's Club, Tsim Sha Tsui (16 May)

FIELD EXCURSIONS SCHEDULED OR PLANNED

*S.W. Lantau	23 April	leader: D. Workman
**Double Island/ Bluff Head	14 May	leader: K.W. Lai
Tap Mun/Kung Chau	July	
Mei Sha, Shenzhen	August	
Guangzhou and environs	26-28 August	leader: Geol. Dept., Zhongshan U.
NE side of Plover Cove Res.	October	
Sharp Peak	November	
East Guangdong	December	leader: C.M. Lee

* Further details on following pages.
** Booking slip inside back cover.

We shall abide by the dates given as far as possible. If any changes are necessary after booking slips have gone out, all those who book will be notified. If there is a major delay and places are still available, the trip will be re-advertised. Trips arranged at short notice will be advertised by circular. All others will be advertised only in the newsletter, with details and booking slips in the issue immediately preceding.

ARE YOU WILLING TO ORGANIZE A FIELD TRIP OR SITE VISIT?

If you are familiar with any places of geological interest, especially sites of engineering activities or other places only temporarily accessible, suitable for a Saturday or Sunday, half- or full-day excursion, for any size of group, please let any member of the General Committee know.

ANNOUNCEMENTS OF MEETINGS

*** THE BURIED GEOLOGY OF YUEN LONG ***

Lecture by

DR D.V. FROST

at Hong Kong Institution of Engineers,
9th Floor, Island Centre,
Great George Street, Causeway Bay

(Joint meeting with HKIE)

Wednesday 19 April 1989

5.30 for 5.45 p.m.

Dr Frost is in Hong Kong for two years acting as the Resident Consultant Geologist in the Geotechnical Control Office. He was seconded from the British Geological Survey where he was in charge of the Northern England District Office in Newcastle upon Tyne. His duties for the GCO are to supervise a small team of geologists investigating the Carboniferous marble and other rocks which underlie parts of the North West New Territories.

The basic priority of the study is to illustrate the stratigraphy and structure of the area by a series of geological maps at a scale of 1:5,000. In addition to an extensive search through existing data this process is aided by sinking some 30 geological survey-dedicated boreholes, each about 150 m deep.

The project is now at a halfway stage and a wealth of new information on the geology is presented. Comparisons will be made between the karst features of Britain with those of Yuen Long, Guilin and Yugoslavia.

*** PALAEOZOIC AND MESOZOIC FOSSILS OF HONG KONG ***

A bilingual talk and presentation

by

CHEN JIN HUA

HE GUO XIONG

WU SHUN QING

of the Nanjing Institute of Geology and Palaeontology

at Hong Kong Polytechnic

Tuesday 25 April 1989

6.00 p.m. in the Geology Laboratory, Room A702
(tea from 5.30 p.m.)

ANNUAL GENERAL MEETING, 1989

16 May 1989
at 6.00 p.m.

Seven Seas Lounge, 2/F, Mariner's Club, 11 Middle Road, Tsim Sha Tsui

Agenda

1. Minutes of the last meeting, 31 May 1988
2. Chairman's Opening Address and Report
3. Treasurer's Report
4. Editor's Report (in absentia)
5. Secretary's Report
6. Election of Committee for 1989-90
7. Any other business
8. Post-meeting Entertainment

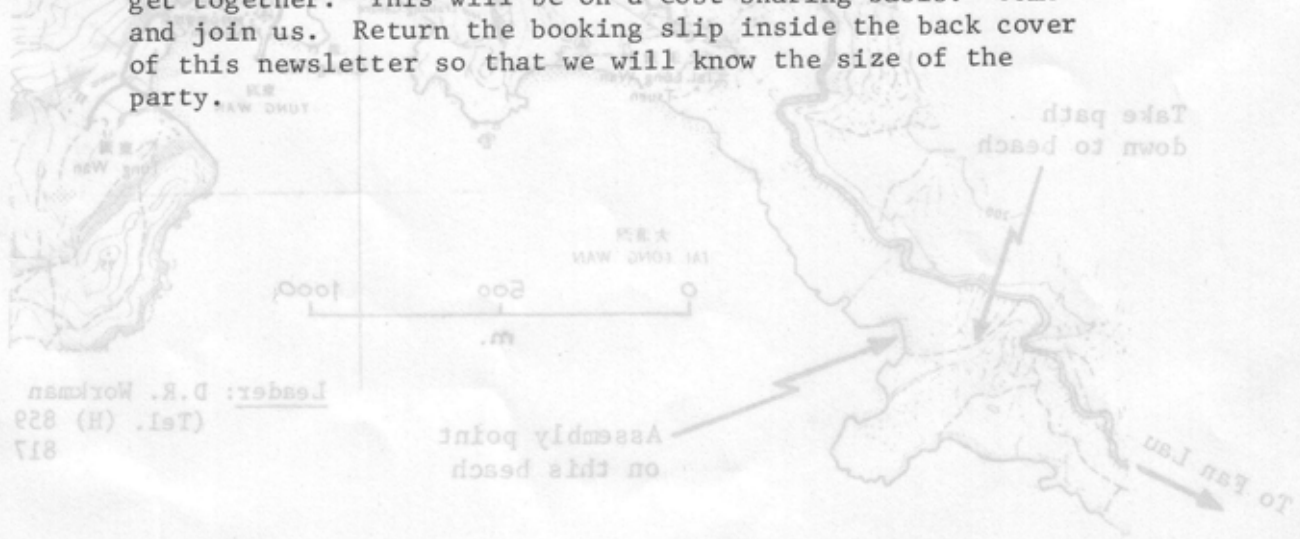
Brief presentations with slides on the latest geological developments in the Territory: newly discovered fossils, revised stratigraphy, interesting localities, etc. We would like to include slides from the last year's field excursions, and contributions are welcome; contact the Secretary on 3-667916.

Members who wish to propose any other items for inclusion on the agenda in advance should contact the Secretary in writing not later than May 2.

Note: The Mariner's Club has a cash bar which can be used before and during the meeting. Please make a special effort to turn up at this very comfortable location and support your Society.

PLEASE BRING THIS WITH YOU TO THE MEETING-
NO OTHER NOTICE WILL BE GIVEN

DINNER It is proposed to hold an informal dinner at a nearby Chinese restaurant after the AGM so that members and Committee can get together. This will be on a cost-sharing basis. Come and join us. Return the booking slip inside the back cover of this newsletter so that we will know the size of the party.



FIELD EXCURSION : SOUTHWEST LANTAU

SUNDAY 23 APRIL

We will visit an un-named location between Shek Pik and Fan Lau (see map). There may still be one or two members who can remember our previous trip there, in 1983.

The cliffs of the headland have excellent exposures of some very interesting sedimentary rocks of the Repulse Bay Group. There are also cliffs of layered volcanics (rhyolites/tuffs) and a large valley-fill colluvial debris-flow deposit.

** NO HIRED TRANSPORT OR ADVANCE BOOKING**

Take the 8.30 a.m. ferry to Mui Wo and join the group on the boat (rear of Second Class deck). We will take public transport to Shek Pik and assemble there at an agreed time.

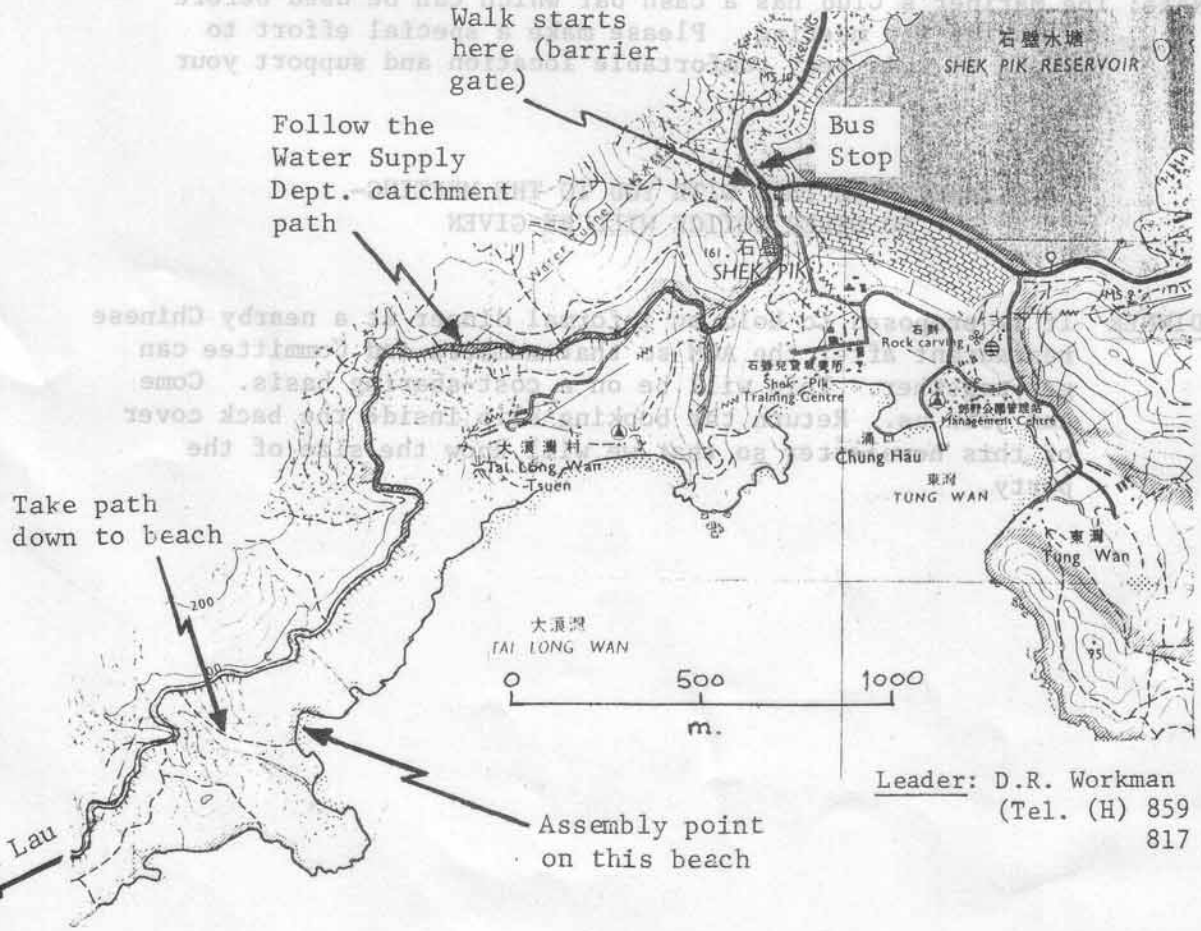
Or simply make your own way to the beach. It is easy to find.

There will be a group trip around the headland starting at 11.00.

The beach is excellent and the route is easy. This excursion is suitable for children able to walk about 3 km each way.

BRING LUNCH AND DRINK

Return departure about 4 p.m. or make own way.



Leader: D.R. Workman
(Tel. (H) 859 2831 off.
817 3616 home)

FIELD EXCURSION : DOUBLE ISLAND (WONG WAN CHAU)

SUNDAY 14 MAY

This trip by boat will leave Ma Liu Shui ferry pier, near the KCR University station, at 9.30 a.m., returning there about 5.00 p.m. We will look at further aspects of the geology of Double Island (previous trip: February 1988). Time and weather conditions permitting we will also land at Bluff Head, the headland at the end of the Tolo Channel.

COST $45 ($55 FOR NON-FAMILY GUESTS)

** BOOKING AND ADVANCE PAYMENT REQUIRED **
- Booking slip inside back cover of this newsletter -

Leader: K.W. Lai

NOMINATIONS FOR THE GENERAL COMMITTEE, 1989-90

At the closing date for nominations, the following was the complete list:-

Chairman	Mr M.J. Atherton (Hong Kong Polytechnic)
Vice-Chairman	Mr Lee Kwan Wing (Charles Haswell & Partners)
Secretary	Dr R.L. Langford (Geotechnical Control Office)
Treasurer	Mr Lee Cho Min (Hong Kong Polytechnic)
Editor	Mr Edmund Chau Pong Yin (Binnie & Partners)
Members	Mr Chan Hing Sum (Maunsell Geotechnical Services Ltd)
	Mr Keung Hon Ming (Szeto Ho Secondary School)
	Mr Law Hing Lun (Education Department)
	Dr R. Shaw (Geotechnical Control Office)
	Mr Tan Chow Hu (MAA Engineering Consultants)
	Mr Wong Kwong Mei (Freeman Fox & Partners)
	Dr D.R. Workman (University of Hong Kong)

* Nominated by ordinary members under Constitution Article V

The following members nominated by the General Committee have withdrawn:

Mr A. Hansen, Mr S. Chan,
Mr S. Gilbert

As the number of nominees matches the number of positions on the General Committee, there will be no postal ballot this year. Assuming no further withdrawals, this will be the composition of the General Committee for the year commencing immediately after the 1989 Annual General Meeting.

MEMBERSHIP NEWS

The total membership of the society on 31 December 1988 (honorary and paid-up subscribing members) was 290, made up as follows:-

Honorary members	10 (9)
Members (resident)	261 (259)
Members (non-resident)	13 (13)
Student members	6 (9)

Membership numbers at 31.12.87 given in brackets.

The society welcomes the following new members in 1989 (to 5 March, Mr. except as indicated):

Cheng Lai Fai; Chau Kwok Ping; Chu Pui Kwan, Reuben; Chung Kai Wa, Ken; Kong Yick Cheong; Lo Yiu Chung, Joseph; Manning, Jean-Marc; Shiu Yiu Kay, Herman; Smith, Martyn J.; Prof. Wang Zhong Qi; Wong Wing Hing, Oliver; Yau Sin Man, Simon; Yeung Chi Ling.

New Honorary Member

The Society warmly welcomes as an Honorary Member Professor Cheng Yuqi, current President of the Geological Society of China and an Honorary Fellow of the Geological Society of London.

Professor Cheng has held high office in the Ministry of Geology and Mineral Resources, is a member of Academica Sinica and is Chairman of the China National Committee for IGCP.

In 1988, Professor Cheng received a D.Sc. (honoris causa) from Liverpool University in Britain in recognition of his distinguished services to geology in the Chinese People's Republic - exactly fifty years after obtaining his Ph.D. from the same university.

SUBSCRIPTIONS FOR 1989 NOW DUE

If you have not already paid your subscription for 1989, please do so NOW. The subscription for Members, resident and non-resident, is HK$100, for Student Members $20.

All Members receive the Newsletter free of charge. There will be four issues in 1989.

This first issue for 1989 is mailed to all 1988 members, who will also soon receive the special issue for 1988, now in press, replacing the regular issues which did not appear for reasons given elsewhere.

THE NEWSLETTER FOR JUNE 1989 AND SUBSEQUENT ISSUES WILL ONLY BE SENT TO CURRENT PAID-UP MEMBERS.

Send your subscription to the Treasurer, Mr Lee Cho Min at either of these addresses:

Geological Society of Hong Kong
c/o Dept. of Geography & Geology
University of Hong Kong
Pokfulam Road
Hong Kong

Dept. of Civil & Structural Engineering
Hong Kong Polytechnic
Hunghom
Kowloon

Cheques should be made payable to "The Geological Society of Hong Kong, and crossed.

1988 IN RETROSPECT

The absence of a Newsletter for 1988 in 1988 has already been remarked. This might have given some members the impression that the society's level of activity had declined. This was emphatically not the case, as the number of meetings held was well up to the levels sustained in previous years. We were pleased to welcome a number of distinguished speakers from China, including Dr Zhang Bingxi of the Ministry of Geology in Beijing who gave a well-attended series of eight weekly lectures at the Museum of History and the Mariner's Club on modern developments in the understanding of the Geology of China. Also very welcome were Prof. Ding,Honorary Member, of the Guangdong Seismological Bureau and colleagues, and staff of the Chengdu Institute of Geology. Another highlight of the year was the lecture by distinguished visitor Professor Dennis Brunsden of King's College, London.

MEETINGS

LECTURES ON ENGINEERING GEOLOGY TOPICS
Staff of Chengdu Geological Institute
(January)

LECTURE SERIES (EIGHT LECTURES)
Geology of China
Dr Zhang Bingxi (March-April)

JOINT MEETING WITH THE GEOTECHNICAL DIVISION OF HKIE
FUTURE SEA-LEVEL RISE AND COASTAL DEVELOPMENT (April)

ANNUAL GENERAL MEETING (May)

LECTURE: ACTS OF GOD - NATURAL HAZARDS IN THE HUMAN LANDSCAPE
- Prof. D. Brunsden (September)

SEMINAR: Seismogeology Problems in Guangdong Province China and Current Situation of Seismogeology Research in China.
- Staff of Guangdong Seismological Bureau (November)

LECTURE: MATHEMATICAL MODELLING OF TIDAL PROCESSES (MARINE STUDIES GROUP)
- Dr J.G. Rodger (December)

FIELD EXCURSIONS

Brothers Islands (January)
Double Island (February)
Cheung Chau (March)
Xinfeng Reservoir and Dam, Guangdong (April)
Tai O, Lantau (May)
Port Island (July)
Ping Chau (August)
Daya Bay Nuclear Power Station (November)
Sha Tau Kok (December)
Northwest Guangdong (December)

FIELD EXCURSION TO THE NORTHWESTERN PART OF GUANGDONG PROVINCE 24-31 DECEMBER 1988

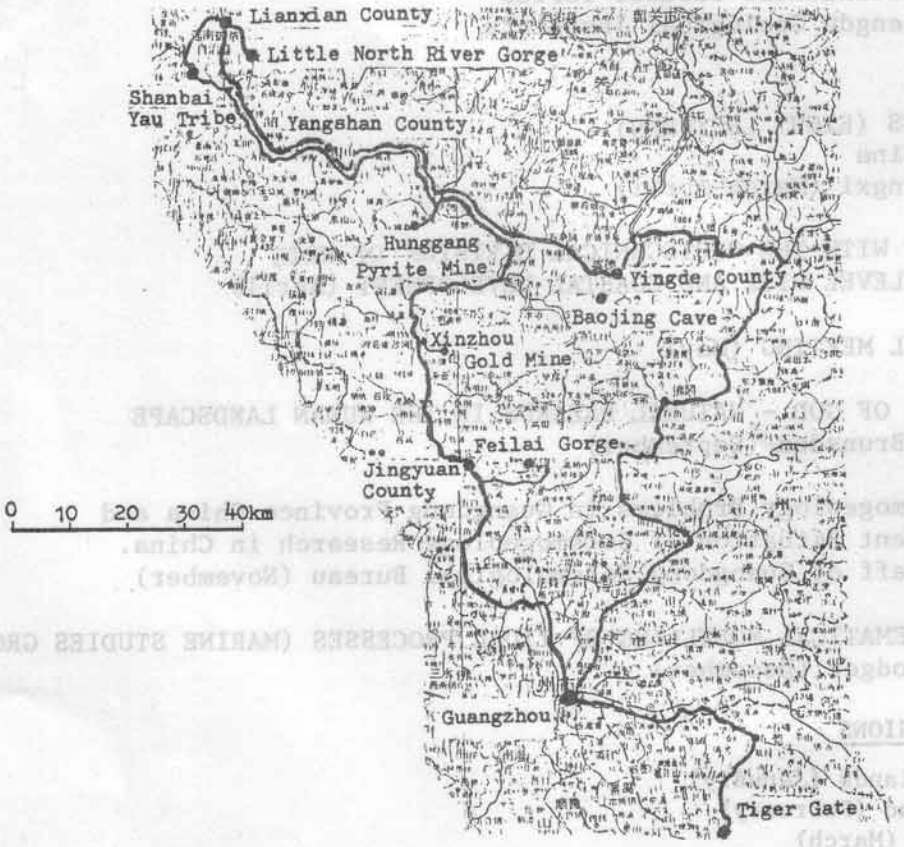
The day our group of 27 people left Hunghom Terminal for Guangzhou was a portent of the conditions we were to experience for

most of our week's travel - it was bright and sunny.

The three-hour journey on the direct express to Guangzhou was a pleasant and very civilised interlude - the advantages of pre-booked compartments and seats. After clearing immigration and customs we were met by members of the Geological Society of Guangdong Province and taken to our bus - hence to become our home-from-home during the daytime. A short ride and we arrived at the first Guest House of the trip, and our soon-to-become-familiar process of baggage off the bus - stow in the room - down to dinner. We were welcomed by a host of officials and wished well on our expedition. Feeling adventurous we then set out on the public bus in search of the evening delights of Guangzhou City.

Next day we were on the road by 8 a.m. Road? Now was the beginning of experiencing a decided lack of tarmacadam surface in most of the Province. Even the major routes are constructed manually of earth. We could also see that the predominant form of transport is manual power i.e. bicycles. Wherever we went there were bicycle jams. We reached our destination of Feilai Gorge and exchanged our mode of transport for a shallow draft boat for a trip down the beautiful North River.

飛來峽



新洲

Next day we travel further north until we reach the area of Xingchou, and a reception in the town hall. A short ride and we alight from our bus to begin a four kilometre walk to the local hills and a real gold mine. First impressions were of a shanty town - everywhere little shacks with rushmat roofs and sulphurous fumes exuding from various points. Again manual labour is extremely intensive in the production process of this highly-prized of metals. After lunch at the town hall we were back on the road again, and saw the first glimpse of the spectacular Karst landforms. In one town the motorised carts were so numerous that our passage was blocked for a long time; our enterprising members set to work and manhandled the offending vehicles out of the bus's path. Further on, and stuck in a long line of vehicles waiting to board the river ferry, we learned of the power of officials with documents; as we were permitted to "jump" the queue since we were an "official" society. On arrival at the entrance to

紅崗 the Honggang Pyrite Mine Complex our bus met with defeat - the road was impassable. Alternative transportation was summoned from the village and the journey was completed with yet another river crossing. After dinner (advised yet again not to ask what I'm eating), we were welcomed by the officials of the County and Mine. I learn that no other Westerner has ever visited this mine.

On the morning of 27 December we visit the mine itself, followed by another reception at which the local television station are in attendance. We leave with happy memories and board our bus, only to experience the first puncture of the week. We stop in a village for repairs and are able to see at first hand the poverty in which a lot of the people are living. Chickens and pigs roam freely in the streets, public lavatories are public in the true sense of the word - no private sanitation here - and a farming system that, at times, seems positively medieval. That day we are on/off the bus many times to allow it to proceed unhindered by the weight of passengers, along the poorest sections of road. Again our members are resourceful and where necessary, either fill in the potholes or remove debris along the route.

傜族 As twilight descends we arrive on the outskirts of a minor ethnic group village called the Yau Tribe. Here life definitely felt removed from the twentieth century - animals lived on the ground floor of the houses whilst the families lived on the first floor. Traditional costume was still worn by some of the people. Back to another town to find our hotel and the bliss of a hot shower to erase the day's dust and grime.

We are now at the northernmost part of our journey and the weather is appreciably colder, so warmly dressed we set out to visit the local gardens to see the reconstructed poet's tablet, smashed during the Cultural Revolution. Next we take another boat trip on the Little North River but unfortunately, even with our flat-bottomed craft we cannot negotiate much of the water as it is extremely shallow in the dry season. Still we do appreciate the beauty of the scenery in the section we can travel down. On boarding the bus again we notice that the rigours of the road conditions have had yet another effect on the bus - that the internal structure has buckled in several places. As darkness is falling we have yet another puncture!

On the morning of 29 December, group exercise seems to be the order of the day to banish the cold. A one-hour stop in another small town to repair the offending tyre. We reach our next hotel in the afternoon but after a fast turnaround of baggage off/baggage in we set out to see the beautiful limestone caves - famous in the area. After dinner that evening we have an impromptu firework display.

We awoke to rain this morning, the first bad weather of the week, but our spirits are not daunted and after a hearty breakfast we set out on the long journey back to Guangzhou. Lunch breaks the day of travelling, in the town hall of an area famous for its natural spring water. By early evening we are once again ensconced in the same Guest House we stayed in on the first night of the trip.

虎門 The last day, and we begin by visiting the Guangdong Geological Museum, at 8 a.m., I'm sure there are not many visitors normally at that hour. On then to see Tiger Gate, scene of the destruction of vast amounts of opium during the opium wars. For the first time we see evidence of souvenirs, and actually feel like tourists. The final leg of the journey is made hazardous by the now quagmire like conditions of some of the road. However we arrive safely in Shenzhen and face the one remaining hazard - the border crossing. After an interminable length of time we board the KCR for Hunghom - no luxury of a seat this time - we stand all the way, arriving home somewhat dishevelled extremely dusty but richer for the experience.

Carol A. Smith

GEOLOGICAL EDUCATION IN CHINA

An article in the April 1988 issue of Geotimes, published by the American Geological Institute, gives some information on geological eduation in China. The source is authoritative: a report prepared in 1986 by the Education Section of the Ministry of Geology and Mineral Resources, in Beijing.

Some facts from the article are given here, for information. It is interesting to note the size of some of the leading departments. Any reader who feels there is anything to correct, or has anything to add, is requested to do so in the form of a follow-up contribution to the Newsletter.

In 1986 there were 7 geological colleges in China and geological departments in more than 30 universities

The first geology department in China was established in 1909 at Peking Normal University, the predecessor of Peking University. From then until 1948 geology departments were established at 11 universities.

In the 1950s there were several important developments. In 1952, all geological departments from Peking University, Tsinghua University, Peiyang University, and Tangshan Railway Administration College were joined to form Peking Geological Institute. Also in 1952, the Northeast Geological School joined earth science departments at Shandong University and Northeast Engineering College to found the Changchun Geological Institute. In 1956, the Chengdu Geological Institute was founded, based on the geology department of Chongqing University.

Since 1950, about 90,000 graduates and about 1,800 post-graduates have come from geological departments at colleges and universities. The number of enrolments (especially the number of postgraduate students) has increased rapidly. Some 25,000 college students and 2,000 post-graduates are now enrolled (these figures appear to refer in the original article to 7 geological colleges and 13 universities, said to be the total number of geology degree - awarding institutions in China).

To give an idea of the size and scope of the major institutions, the China University of Geosciences has a total enrolment of 5,350, including 800 postgraduate students. There are two campuses, one in Wuhan (formerly the Wuhan College of Geology, founded in 1952), the other in Beijing, known as the Beijing Graduate School and, obviously, specializing in postgraduate work.

Changchun College of Geology, a doctorate-granting technical college, has 4,000 students; 10% are postgraduates and foreign students; 25% are correspondence students. There are 840 teachers; 30% of whom are professors and associate professors.

Chengdu College of Geology (student enrolment about 5,000) now offers B.Sc., M.Sc., and Ph.D. degrees. The college has 13 departments, with 113 professors and over 400 lecturers. The Ph.D. is now offered in petroleum geology, engineering geology, petrology, uranium geology, and applied geophysics (information from a letter in Geotimes, December 1988).

The department of geology at Nanjing University is also large. Its predecessor was the Southeast University founded in 1921. The department of geology was established in 1924. It has a teaching staff of about 200; a third are professors and associate professors.

From Geotimes, April 1988

The following institutions are among more than 30 in China that offer training in geology: 1) China University of Geosciences, Wuhan; 2) Changchun College of Geology; 3) Chengdu College of Geology; 4) Xian College of Geology and Northwest University; 5) Nanjing University; 6) Tongji University; 7) Lanzhou University; 8) Zhejiang University; 9) Zhongshan University; 10) Beijing College of Iron and Steel Technology, Beijing University, China University of Geosciences, Beijing Graduate School; 11) East China Petroleum College; 12) China College of Mining Industry; 13) Central South Polytechnical University; 14) Hefei University of Technology; 15) Northeast Institute of Technology; 16) Kunming Institute of Technology; 17) Guizhou Institute of Technology; 18) Xinjiang Institute of Technology; 19) East China College of Geology; 20) Hebei College of Geology; 21) Guilin College of Metallurgy & Geology; 22) Fuzhou University; 23) Shandong Marine College. (From Cheng Yiexun, Ministry of Geology & Mineral Resources, Beijing, China)

Institutions that offer geology degrees in China 1/

College or university	Year established	Students in 1986
China University of Geosciences, Wuhan	1952	5,350
Changchun College of Geology	1952	4,105
Chengdu College of Geology	1956	4,947
Xian College of Geology	1978	1,566
Nanjing University Geology Department	1924	750
China University of Geosciences, Beijing Graduate School	1909, 1956	495
Tongzi University Geology Department	1958	548
Northwest University Geology Department	1939	246
East China Petroleum College Geology Department	1953	unreported
China Mining Industry College Geology Department	1953	691
Central South Polytechnical University Geology Department	1952	640
Hefui University of Technology Geology Department	1956	533
Northeast Engineering College Geology Department	1984	90

(From Cheng Yiexun, Ministry of Geology & Mineral Resources, Beijing, China)

1/ This heading suggests that this is a complete list; however, it is not.

HOW 'SAFE' IS DAYA BAY?

M. J. Atherton

In July 1986, the Chinese Language magazine Pai Shing reported that the French company involved in the Daya Bay Nuclear Power Station project had proposed to the Chinese Government that the Power Station be built 400 km away from Daya Bay as the site was a potential earthquake zone and asked for the top secret seismic study report to be released. It wasn't.

In August 1986 part of the 5 volume feasibility report on Daya Bay was released to the H.K. Government by China Light and Power. The two volumes containing the seismic risk studies were missing.

In a lecture to the Hong Kong Institution of Engineers on 3 December 1987 by a representative of the Guangdong Nuclear Power Joint Venture Company (GNPJVC), the seismic risk of an earthquake equal to or exceeding the design strength of the power plant was given as one having a return period of 600 years, the power plant being designed to withstand a ground acceleration of 0.2 g, corresponding to an earthquake of intensity VIII on the modified Mercalli scale. This means that if the power plant is operational for 40 years, the chances of an earthquake damaging the plant are about 1 in 15 during it's working life.

In the GNPJVC safety document the station is said to be designed "against earthquakes at grade VIII". This is grade VIII of the Mercalli scale. According to my copy of the Mercalli scale the top of grade VIII is 2.5 m/s^2, that is 0.255 g or 25.5% greater than the design value of 0.2 g for the station structure and foundations. Since the upper limit of grade VII is 1.000 m/s^2 and the upper limit of grade VIII is 2.5 m/s^2 the design is only to a point two thirds of the way through grade VIII on the Mercalli scale.

The site of the power station has already suffered an earthquake of intensity VII on 13 February 1918, when a quake devastated Swatow, 300 kilometres east of Hong Kong.

In 1986, Professor Zheng Jiandong of the State Seismological Bureau of China, stated that an active fault exists 7 kms from the power station site, but it is safe at that distance.

The 1985 map of active fault systems by the South China Sea Institute of Oceanology, Figure 1, clearly shows the fault as very weakly active, 7 kms from the power station site and the accompanying paper estimates its movement at less than 0.001 cm/year and suggests that important structures should not be built on the fault zone. In addition the map shows 2 small earthquakes, one as recently as 1981 near the fault zone, suggesting that seismic activity is still going on. The activity of the Shuitou-Xichong fault is given as "Fault-scarp, Dynamic metamorphic zone, earthquake' The Data source is given as the Guangdong Geological Bureau.

The 1986 Lithosphere Dynamics map of China shows an uncertain active fault 7 kms from the power station, owing to the small scale of this map, its author joined together 3 small faults to give what was apparently a new fault line.

In February 1989 the Guangdong Nuclear Power Joint Venture Company insisted that there is no active fault within 8 km of the plant site and the closest fault to Daya Bay is 20 kms away.

U.S. regulations state that no power plant should be built within 8 kms of a capable fault.

On 25 February this year, Professor Ding Yuang Zhang of the Guangdong Bureau of Seismology gave a press interview. Reports in the English press confuse the Richter with the Mercalli scale and magnitude with intensity. Likewise I never used the term seismic fault in my interviews with reporters. In the Chinese press it was stated that the fault 7 kms from the power station is not active and that no earthquakes of intensity VII or higher are expected on the power station site in the next 100 years. The probability of an earthquake of magnitude 6 or greater within 300 kms of the power station site during the next 600 years is 63%.

To clear up the question of seismic risk. If the site is so 'safe' why cannot the seismic risk survey, which must have been done, be published, so that we can all see what the risk is?

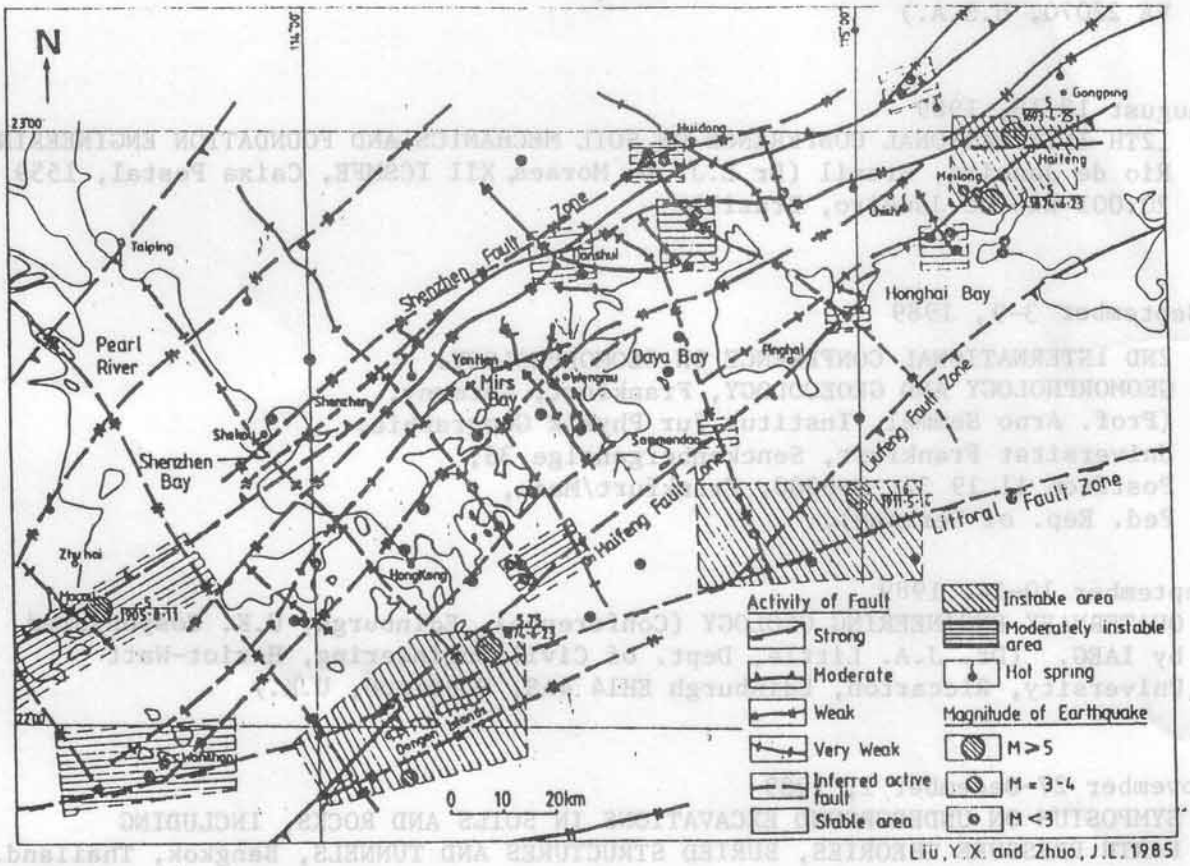


Figure 1 - The Active Fault System from the Pearl River Mouth to Honghai Bay

References

1. South China Morning Post 25/7/86
2. Hong Kong Standard 25/7/86, 15/8/86
3. Nuclear Engineering Division meeting HKIE 3/12/87
4. Active Faults along the coast from Pearl River Mouth to Hong Hai Bay by Liu Yixuan, South China Sea Institute of Oceanology, Academia Sinica.

CALENDAR OF INTERNATIONAL MEETINGS

April 17-20, 1989
THE CAUSES AND CONSEQUENCES OF LONG-TERM SEA LEVEL CHANGE (AGU Chapman Conference), Snowbird, Utah, U.S.A. (AGU Meetings, 2000 Florida Avenue NW, Washington, DC 20009, U.S.A.)

May 8-12, 1989
ENGINEERING GEOLOGY PROBLEMS IN RESIDUAL SOILS (International Symposium), Abidjan-Yamassoukro, Ivory Coast, Languages: French and English. (Ing. Dr. Gerard Cougny, Laboratoire du Batiment et des Travaux Publics, 04 BP 3 Abidjan 04, Ivory Coast)

June 26-29, 1989
ENGINEERING GEOLOGY IN TROPICAL TERRAINS (International Conference), Selangor Darul Ehsan, Malaysia. Co-sponsored by IAEG. (Dept. Geology, Universiti Kebangsaan, 43600 Bangi, Selangor Darul Ehsan, Malaysia)

July 9-19, 1989
INTERNATIONAL GEOLOGICAL CONGRESS (28th), Washington, D.C., U.S.A. (International Geological Congress, P.O. Box 1001, Herndon, VA 22070, U.S.A.)

August 13-18, 1989
12TH INTERNATIONAL CONFERENCE ON SOIL MECHANICS AND FOUNDATION ENGINEERING, Rio de Janeiro, Brazil (Dr L.J. De Moraes, XII ICSMFE, Caixa Postal, 1559 20.001 Rio de Janeiro, Brazil)

September 3-9, 1989
2ND INTERNATIONAL CONFERENCE ON GEOMORPHOLOGY: GEOMORPHOLOGY AND GEOECOLOGY, Frankfurt, Germany. (Prof. Arno Semmel, Institut fur Physik Geographie, Universitat Frankfurt, Senckenberganalge 36, Postfach 11 19 32, D-6000, Frankfurt/Main, Fed. Rep. of Germany).

September 10-14, 1989
QUATERNARY ENGINEERING GEOLOGY (Conference), Edinburgh, U.K. Cosponsored by IAEG. (Dr. J.A. Little, Dept. of Civil Engineering, Heriot-Watt University, Riccarton, Edinburgh EH14 4AS, Scotland, U.K.)

November 27-December 1, 1989
SYMPOSIUM ON UNDERGROUND EXCAVATIONS IN SOILS AND ROCKS, INCLUDING EARTH PRESSURE THEORIES, BURIED STRUCTURES AND TUNNELS, Bangkok, Thailand. (Prof. A.S. Balasubramaniam, Geotechnical and Transportation Engineering Division, Asian Institute of Technology, GPO Box 2754, Bangkok 10501 Thailand)

16-20 April, 1990
TENTH SOUTH EAST ASIAN CONFERENCE ON GEOTECHNICAL ENGINEERING. Taipei, Taiwan (Dr C.D. Ou, Secretary-General, Organising Committee, 10th SEAGC c/o Ret-Ser Engineering Agency, 11th Floor, No. 207, Sung-Chiang Rd. Taipei, Taiwan).

May 14-18, 1990
WORLD MINING (14th Congress), Beijing, P.R. China. (China organizing Committee, 14th World Mining Congress, 54 Sanlihe Road, Beijing, People's Republic of China)

August 6-10, 1990
IAEG (6th International Congress), Amsterdam, The Netherlands. (Dr L. Primel, L.C.P.C., 58 Boulevard Lefebvre, 75732 Paris Cedex 15, France)

BOOK REVIEW AND NOTICES

From a review in Geology Today by J.H.McD. Whittaker

Physical Geology by B.J. Skinner & S.C. Porter. Wiley, 1987. ISBN 0 471 05668 5 (hardback) £34.80; ISBN 0 471 85784 X (paperback) £15.95. 764 pp.

If you are looking for a general introduction to geology but are spoiled for choice by the large number of mainly American offerings for first-year college students, here's one that will stop you in your tracks - and not cost you the Earth..... In these days of punitive and increasing book prices, everyone who professes a general interest in today's geology but needs a suitable text, or wishes to convert an offspring or friend to geology, should rush out and buy this one without delay.

Recent notices in Geotimes

Tides, surges and mean sea-level: a hand-book for engineers and scientists by D.T. Pugh. Wiley (1987). 472 p. $101. Understanding of tidal processes has advanced significantly over the last 20 years, largely because of advanced instrument design and computer science. This book presents modern tidal ideas for scientists interested in beach and marine sedimentation processes. Among chapters: observations and data reduction; forces; tidal dynamics; storm surges; shallow water dynamics; tidal engineering; and geological processes.

Sea-level fluctuation and coastal evolution edited by Dag Nummedal, Orrin H. Pilkey & James D. Howard. Special Publication 41, Society of Economic Paleontologists & Mineralogists (1987). 267 p. $40. This volume is based on a symposium honoring W. Armstrong Price held in 1984. Among topics: changes in sea level through history and environmental and engineering concerns about current sea-level rise.

Use and abuse of statistical methods in the earth sciences edited by William B. Size. Oxford University Press (1987). 169 p. $29.95. This book discusses assumptions about sample data used with statistical methods. The focus is on use of statistical measures of association, correlation, and regression with relatively uncontrolled and extremely variable natural data.

RECENT PUBLICATIONS ON HONG KONG GEOLOGY

The following papers have recently appeared in overseas journals or conference proceedings:

Burnett, A.D., 1988. Geological and terrain mapping in Hong Kong. United Nations Economic and Social Commission for Asia and the Pacific: Geology and Urban Development - Atlas of Urban Geology, vol. 1, pp. 85-97.

Greenway, D.R., Powell, G.E. and Irfan, T.Y., 1987. A case history of slope design in complex weathered lowgrade metamorphic rock. Southeast Asian Geotechnical Society: Southeast Asian Geotechnical Society: Geotechnical Engineering, vol. 18, pp. 145-166.

Grigg, K.V. and Wong, K.M., 1987. Stabilization of boulders at a hillslope site in Hong Kong. Geol. Soc. London: O.J. Engineering Geology, vol. 20, pp. 5-14.

Pascall, D., 1987. Cavernous ground in Yuen Long, Hong Kong. Southeast Asian Geotechnical Society: Geotechnical Engineering, vol. 18, pp. 205-221.

The Society has copies of these, which may be borrowed by written request to the Society or telephone request to David Workman H859-2831.

If you are the author of any such material published outside Hong Kong, or know of any overseas papers which refer to Hong Kong, please inform the Editor so that it may be given publicity through the Newsletter. If you have any spare separates, please supply one for the Society Library.

CONGLOMERATE

An accumulation of fragments from various sources

DIFFERENCES IN USE OF THE TERM 'ACTIVE FAULT'

The term 'active fault' often appears in translations of Chinese papers and map legends. It can give rise to misunderstanding on the part of those accustomed to conventional (U.S. - derived) usage, unless the time scale within which the fault is deemed to be active is taken into account. The following passage (translated by K.W. Lai and P.S. Nau) illustrates the point.

"We have classified the active faults of South Coastal China since the Neogene Period into five categories, namely, very strong, strong, moderate, weak and very weak. The first three categories are equivalent to the term "capable fault" as used by the International Atomic Energy Agency (IAEA)."

活动断裂是区域稳定性评价的重要因素。过去我们曾将华南沿海晚第三纪以来的活动断裂分为烈活动、强活动、中等活动和弱活动、微活动五类[1]。其中前三类活动断裂相当于国际原子能机构(IAEA)所说的能动断裂(Capable Fault)，它对海岸和海底的稳定性有重要或较重要的影响；而后两类活动断裂一般危害性较小或没有直接危害。

This is from a paper by Liu Yixuan & Zhuo Jialun: "A discussion on the stability of geologic environments in terms of the neotectomic features of the Northern South China Sea" in Tropic Oceanology Vol. 3, No. 3, 1984, pp. 55-63.

The Glossary of Geology published by the American Geological Institute give the following definitions:-

capable fault A fault defined by the Nuclear Regulatory Commission as one that is "capable " of "near future" movement; in general, a fault on which there has been movement within the last 35,000 years. The definition was developed for use in the siting of unclear power plants.

active fault A fault along which there is recurrent movement, which is usually indicated by small, periodic displacements or seismic activity.

Thus in the U.S. terminology, now generally accepted internationally, some capable faults, but not all, are active faults; active faults are a certain class of capable faults. In the Chinese paper cited, some of the faults referred to as active faults, but not all, are capable faults; the capable faults are a certain class of the active faults.

EARTHQUAKE MAGNITUDE, EARTHQUAKE INTENSITY AND GROUND MOTION

As pointed out elsewhere in this issue, people often confuse earthquake magnitude and intensity. There also seems to be a tendency to believe that intensity is some kind of quantity, since it is measured on a numerical scale - actually a series of steps or grades with no dimensions. Again, attempts to correlate intensity with objectively measurable quantities such as ground acceleration have given a misleading impression to many people that intensity observations and predictions provide a sound basis for making earthquake measurements and seismic risk assessments, whereas in fact this approach is highly imperfect. It is merely the only approach there is at present in the vast majority of earthquake-prone areas.

The following is a brief review of the subject for those interested.

For the classification of the 'size' of an earthquake, various quantities are used, mostly the magnitude (M) and the macroseismic intensity at the epicentre (I_o).

Magnitude

The magnitude of an earthquake is an absolute measure of its size, which is related to the seismic energy released and is based on the largest recorded amplitudes of individual seismic waves. It is an instrumental measurement, largely independent of personal judgement. There are, in practice, a number of magnitude scales based upon the measurement of different wave types.

The concept of earthquake magnitude was first introduced by Richter to measure the size of shallow earthquakes in California. Richter's original (1935) magnitude scale is based on the maximum amplitude recorded at a distance of 100 km from an epicentre with specified instrument constants. This quantity is now known as the local magnitude, M_L, but has never been widely used outside California. The basic idea was later extended for use at greater distances from the epicentre (but still for shallow earthquakes) by defining the magnitude M_s which is based on the maximum amplitude of surface waves having a period of about twenty seconds. A third magnitude, m_b, known as the body wave magnitude, makes use of the amplitude of body waves at large distances from the epicentre and for events at any depth.

All the magnitude scales thus derived are logarithmic (base 10) scales. They have been related to each other by various equations of similar form based on empirically determined functions and constants.

Intensity

Before the concept of absolute magnitude was developed, the size of an earthquake was expressed in terms of a subjective quantity known as intensity, (at the epicentre, I_o), which is based on the observation of the direct effects of the earthquake at the surface. Magnitude and intensity scales assess quite different aspects of an earthquake, and the scales are thus independent. Even so, there seems to be a correlation between magnitude and maximum intensity I_o for shallow shocks which is

quite well represented by an empirical relationship:

$$M_s = aI_o + b \log h + c$$

where h = focal depth in km and a,b,c, are constants.

Intensity is a non-instrumental quantity assigned according to observed geological effects, damage to structures and the perception of shaking by individuals. Many factors determine the intensity at a particular point of the Earth's surface. These include the area and moment of the seismic source, the mechanism of the earthquake, the quantity and frequency spectrum of energy released, the crustal structure in the disturbed region, the distance of the point from the source, and elastic and other properties of the surficial rocks and soils adjacent to the point, and the local geological structure. It follows that intensity is not capable of simple quantitative definition. It is estimated by reference to intensity scales that describe the effects in qualitative terms. Intensity scales have been in use since 1811. Later Mercalli introduced his twelve-grade scale, a modified version of which (the Modified Mercalli Scale) is the scale generally used today.

Intensities are usually displayed in the form of isoseismal maps. If the ground were completely uniform and if the energy were radiated out uniformly in all directions, the isoseismal lines would be circles, although this is never the case in practice. Although the intensity is greatest near the epicentre and generally decreases outwards, there are irregularities depending upon crustal conditions. Sometimes one or more areas of equal intensity lie entirely inside one of different intensity. Moreover, the shape of isoseismal lines is also strongly dependent on the distribution of population in the area where the earthquake is likely to be felt; if there are no people, no shock can be felt.

In spite of the progress in instrumental seismology and the apparent lack of sophistication of intensity measures, the intensity scale continues to play an important role in assessing potential damage from renewed earthquakes and preparing seismic risk maps. All earthquakes prior to 1900 and a considerable number since then can be classified only by intensity. Intensity observations still provide the easiest way to determine the superficial distribution of earthquake effects in the absence of a dense network of strong-motion instruments, and intensity is still the quantity used in most zoning maps which are a part of official building codes.

Epicentres and focal depths

It is often thought that epicentral coordinates and focal depths can be pinpointed with a high degree of accuracy, thus providing reliable correlations with individual faults which, in turn, can be identified as 'active'. This is not generally the case, however, unless there is a unique and obvious fault within the limits of error of distance estimation. For many earthquakes, epicentres based on P-wave arrival times are accurate only to within 10-20 km, or often more. For many 20th Century and of course all earlier earthquakes, the epicentre is in any case simply the centre of the most heavily shaken area. The focal depth is determined with a lesser degree of accuracy than the epicentral coordinates.

It is also commonly assumed that the seismic energy is released from a point source (the focus). This is obviously incorrect. The

energy release may in fact extend horizontally and/or vertically over many kilometres, as much as 200 km or more for M=8. The focal coordinates determined correspond only to the point on the fault at which was generated the first longitudinal P-wave pulse to arrive at the stations.

Ground Motion

Attempts have been made to map earthquake ground motion parameters such as maximum acceleration and particle velocity. These quantities are preferred to intensity as a basis for zoning maps because they can be more easily and directly used in engineering design. However, in many parts of the world, actual values of acceleration, velocity, etc. have not as yet been recorded.

The great majority of instrumental strong motion data have been recorded in California and Japan. Consequently, zoning maps based on acceleration or velocity rely either on attenuation relationships extrapolated from data recorded principally in these two areas, or on acceleration and velocity attenuation curves obtained from intensity attenuation curves and from relationships between intensity and acceleration or velocity. Acceleration-intensity relationships are not very reliable (see below) but they are used widely to establish ground motion criteria for important installations.

Correlation of Earthquake Intensity and Ground Motion

Efforts have been made to associate the divisions in intensity scales with accelerations of the local ground shaking; but the intensity depends in a complicated way not only on ground accelerations but also on the periods and other features of the seismic waves. It is a fallacy to expect peak acceleration of the ground, whether horizontal or vertical, to bear a general and predictable relationship with a qualitative, mixed measure such as seismic intensity. Many attempts have nevertheless been made; all have failed to prove a simple relationship.

It remains true, however, that the intensity grade may be taken as a rough measure of the ground acceleration produced by the earthquake; and this correlation for all its uncertainties has come to play a central role in the forecasting of seismic intensities. A general relationship between the maximum intensity (I_o) on the Modified Mercalli Scale and the maximum acceleration may be written as:

$$I_o = p \log a_o + q$$

where a_o is the acceleration in cm s^{-2} and p and q are constants determined empirically. The precise values of p and q may be assumed to vary from region to region and various combinations have been used.

Fig. 1 shows examples of empirical intensity-peak acceleration relationships. The large scatter of the observational data introduces uncertainties in curve fitting and means also low accuracy.

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BULLEN K.E. and BOLT B., 1985. An Introducation to the Theory of Seismology, 4th edit., 499 p., Cambridge

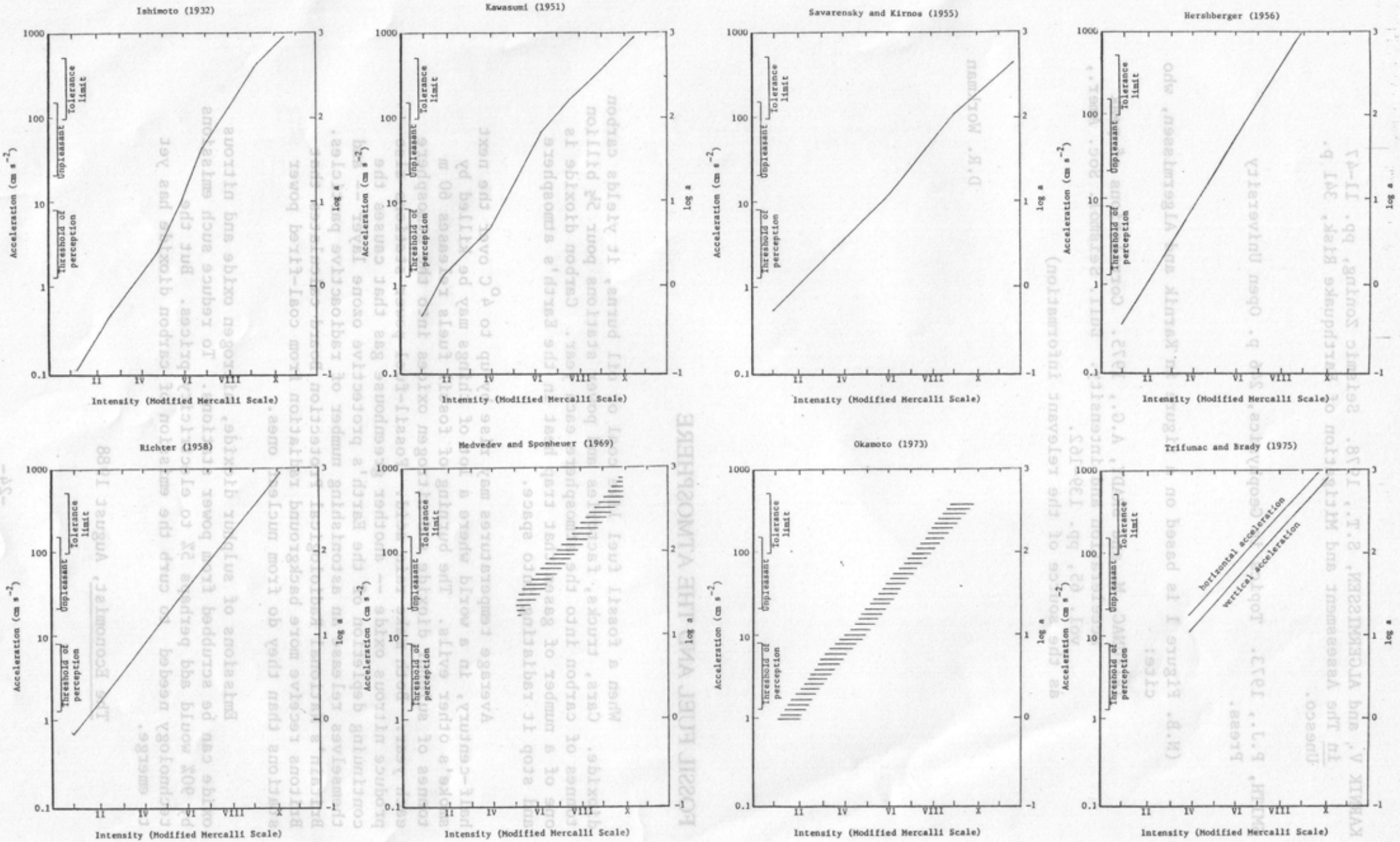

Figure 1. Empirical Relations between Earthquake Intensity and Peak Acceleration

KARNIK V. and ALGERMISSEN, S.T., 1978. Seismic Zoning, pp. 11-47 in The Assessment and Mitigation of Earthquake Risk, 341 p. Unesco.

SMITH, P.J., 1973. Topics in Geophysics, 246 p. Open University Press.

(N.B. Figure 1 is based on a figure in Karnik and Algermissen, who cite:

TRIFUNAC, M. and BRADY, A.G., 1975. Correlations of peak acceleration and intensity. Bull. Seismol. Soc. Amer., vol. 65, pp. 139-162.

as the source of the relevant information)

D.R. Workman

FOSSIL FUEL AND THE ATMOSPHERE

When a fossil fuel like coal or oil burns, it yields carbon dioxide. Cars, trucks, factories and power stations pour 5½ billion tonnes of carbon into the atmosphere each year. Carbon dioxide is one of a number of gases that trap heat in the Earth's atmosphere and stop it radiating into space.

Average temperatures may rise by up to 4°C over the next half-century, in a world where a lot of things may be killed by smoke's other evils. The burning of fossil fuels releases 60 m tonnes of sulphur dioxide and nitrogen oxides into the atmosphere each year. Both make rain acid. Fossil-fuel power stations also produce nitrous oxide -- another greenhouse gas that causes the continuing depletion of the Earth's protective ozone layer -- and themselves release an astonishing number of radioactive particles. Britain's National Radiological Protection Board calculates that Britons receive more background radiation from coal-fired power stations than they do from nuclear ones.

Emissions of sulphur dioxide, nitrogen oxide and nitrous oxide can be scrubbed from power stations. To reduce such emissions by 90% would add perhaps 5% to electricity prices. But the technology needed to curb the emission of carbon dioxide has yet to emerge.

The Economist, August 1988

WHAT THEY SAID

"Perhaps the experts on ancient plant and animal life didn't know much maths, but they knew their fossils, and the fossils told them Alvarez was wrong" - Robert Jastrow, former director of NASA's Goddard Institute of Space Studies.

"The physicists have pulled rank and even when they have ended up with egg on their face, they still somehow manage to make it look as if their way was the only proper way for science to proceed" - Beverly Halstead, palaeontologist (in the Guardian)

"I don't like to say bad things about paleontologists, but they're really not very good scientists. They're more like stamp collectors." - Luis Alvarez, physicist (in the New York Times)

(In case you are wondering what this is all about, the Nobel Laureate Luis Alvarez was responsible to a great extent for getting across the notion that the dinosaurs were wiped out as the consequence of an asteroid colliding with the Earth. That was an eye-catching idea that took hold so firmly that many people, scientists among them, speak of this event now as an established fact (Ed.)

"Classic academic programs in geology do not prepare students to face all of the critical problems of environmental protection, resource development, and safe and efficient use of the land, or to accept the professional responsibility and legal liability associated with those problems.... Most recent graduates can quote the rate at which the Island of Hawaii is drifting, but cannot recognize the landslide that their house is built on .... academic programms for engineering geology are where business and finance programs were in 1881" - Christopher C. Mathewson, Director, Centre for Engineering Geosciences, Texas A & M University, in a letter to Geotimes.

"They said they were aware of that, and I'm afraid it didn't raise the amount of interest that I would have expected." Dr R. Haworth, chief geophysicist of the British Geological Survey, quoted in The Guardian ("that" being the historical occurrence of at least five major earthquakes in southeast England, where the current Channel Tunnel is currently being driven and "they" being "various persons concerned with the development of the tunnel").

New calculations by scientifists at the Goddard Space Center and MIT indicate that global warming will be clearly identifiable by the 1990s. .... warming will be experienced first in low latitude oceans, China and interior parts of Asia, and polar oceans. Greater than average warming is indicated for the eastern U.S.A. and less for western U.S.A. and much of Europe. The temperature changes will have "major impacts" because of more frequent extreme temperatures, and "there may not be sufficient time for many biosystems to adapt to the rapid changes forecast for scenarios involving rapid growth of trace gases." - J. Hansen and his co-workers (Journal of Geophysical Research - Atmospheres, 20 August 1988).

And to round off, geology gets a mention (slightly inaccurate) in the list of what a well-educated person should know: "Our children should know about continental shift (sic) and quadratic equations, about Gothic architecture and the Gettysburg address, about who Shakespeare was and what he wrote ..." - William Bennett, U.S. Secretary of Education (in the Reagan Administration).

TIPS ON WRITING GEOLOGICAL PAPERS

Title. Be brief. A good example is the title of a paper in the Dec. 1982 Bulletin of the Seismological Society of America: "f max."

If you cannot be brief, then be all-embracing (no half measures). Model yourself on titles like "Violent vulcanism, stagnant oceans, and some inferences regarding petroleum, strata-bound ores and mass extinctions" (Geochimica et Cosmochimica Acta). You can then write about practically anything.

Content. Be clear. Avoid statements like "The greatest difference in response is between grainstone and wackestones, and the least different in response is between grainstone and wackestones ...." (Journal of Sedimentary Petrology, March 1981). They tend to cause confusion.

References. Be kind to yourself. Quote your own work as much as possible. A paper in Tectonophysics in 1980 contained 13 references, every one to a paper that the author had written himself. This is believed to be a world record, but records are made to be broken.

(Anon.)

GEOLOGICAL SOCIETY OF HONG KONG

PUBLICATIONS

BULLETIN No. 1 (1984), 177 p., Ed. W.W.-S. Yim. Geology of Surficial Deposits in Hong Kong - a collection of 17 papers presented at a symposium at the University of Hong Kong in September 1983, dealing with general geology of the deposits (colluvial, alluvial and marine), investigation and sampling methods, weathering and erosion, landslides and prehistoric coastal development.

BULLETIN No. 2 (1985), 236 p., Ed. I. McFeat-Smith. Geological Aspects of Site Investigation - proceedings of a conference at the University of Hong Kong in December 1984, 17 papers dealing with geological site investigations for new towns, reclamations and tunnels, rock strength testing, drilling, problems of soil erosion, debris flows, joint and fault systems, seismological measurements in Hong Kong, current offshore practice in Hong Kong.

BULLETIN No. 3 (1987), 600 p., Ed. P.G.D. Whiteside. The Role of Geology in Urban Development - proceedings of a conference at the University of Hong Kong in December 1986, 12 papers on Hong Kong and 35 papers from 11 other countries dealing with geological aspects of urban planning and construction, landslides and other hazards, environmental management and groundwater resources.

MARINE GEOLOGY OF HONG KONG AND THE PEARL RIVER MOUTH (1985), 96 p., Eds. P.G.D. Whiteside and R.S. Arthurton. A collection of 12 papers presented at a Marine Studies Group seminar at the University of Hong Kong in September 1985.

MARINE SAND AND GRAVEL RESOURCES OF HONG KONG (1988), 221 p., Eds. P.G.D. Whiteside and N. Wragge-Morley. Proceedings of a Marine Studies Group seminar on Marine Sources of Sand held in Hong Kong on 4 December 1987.

ABSTRACTS No. 1, 79 p. Abstracts of papers presented at the meeting on Geology of Surficial Deposits in Hong Kong, September 1983 - OUT OF PRINT.

ABSTRACTS No. 2, 50 p. Abstracts of papers presented at the conference on Geological Aspects of Site Investigations, December 1984.

ABSTRACTS No. 3, 51 p. Extended Abstracts of papers presented at a meeting on Sea-level Changes in Hong Kong During the Last 40 000 Years, held at the University of Hong Kong in May 1986.

ABSTRACTS No. 4, 65 p. Abstracts of papers presented at the conference on The Role of Geology in Urban Development, December 1986.

ABSTRACTS No. 5, 56 p. Abstracts/Extended Abstracts of six papers presented at a meeting on Future Sea-Level Rise and Coastal Development, held at the University of Hong Kong in April 1988, plus general information and bibliography.

NEWSLETTER Published regularly, bi-monthly from November 1982 to November 1985, quarterly from March 1986.
Vol. 1 (7 issues) 1982-3; Vol. 2 (6 issues), 1984; Vol. 3 (6 issues), 1985; Vol. 4 (4 issues), 1986; Vol. 5 (4 issues), 1987.

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-	Geotechnical Manual for Slopes (1984), 295 p.	HK$50	(US$9.50)
-	Mid-levels study : Report on Geology, Hydrology and Soil Properties (1982), 265 p. plus 54 drgs.	HK$200	(US$34)
Geoguide 1	Guide to Retaining Wall Design (1982), 154 p.	HK$25	(US$5)
Geoguide 2	Guide to Site Investigation (1987), 362 p.	HK$40	(US$9)
Geoguide 3	Guide to Rock and Soil Descriptions (1988), 189 p.	HK$40	(US$9)
1/84	Prediction of Soil Suction for Slopes in Hong Kong, by M.G. Anderson (1984), 243 p.	HK$50	(US$9)
3/84	Model Specification for Prestressed Ground Anchors, by K.C. Brian-Boys & D.J. Howells (1984), 127 p.	HK$36	(US$7)
4/84	Review of Superficial Deposits and Weathering in Hong Kong, by J.D. Bennett (1984), 51 p.	HK$40	(US$8)
5/84	Review of Hong Kong Stratigraphy, by J.D. Bennett (1984), 86 p.	HK$25	(US$5.50)
6/84	Review of Tectonic History, Structure and Metamorphism of Hong Kong, by J.D. Bennett (1984), 63 p.	HK$20	(US$5)
2/85	Groundwater Lowering by Horizontal Drains, by D.J. Craig & I. Gray (1985), 123 p.	HK$22	(US$5)
1/88	Bibliography on the Geology and Geotechnical Engineering of Hong Kong to December 1987, by E.W. Brand (1988), 151 p.	HK$35	(US$7)
GASP I	Geotechnical Area Studies Programme - Hong Kong and Kowloon (1987), 170 p. plus 4 maps.	HK$240	(US$40)
GASP II	Geotechnical Area Studies Programme - Central New Territories (1987), 165 p. plus 4 maps.	HK$150	(US$25)
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GASP V	Geotechnical Area Studies Programme - North New Territories (1988), 134 p. plus 3 maps.	HK$150	(US$25)
GASP VI	Geotechnical Area Studies Programme - North Lantau (1988), 124 p. plus 3 maps.	HK$150	(US$25)
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GASP IX	Geotechnical Area Studies Programme - East New Territories (1988), 141p. plus 4 maps.	HK$150	(US$25)
GASP X	Geotechnical Area Studies Programme - Islands (1988), 142p. plus 4 maps.	HK$150	(US$25)
GASP XI	Geotechnical Area Studies Programme - South Lantau (1988), 148p. plus 4 maps.	HK$150	(US$25)
Geological Memoir No. 1	Geology of Sha Tin, by R. Addison (1986), 85 p.	HK$50	(US$9)
Geological Memoir No. 2	Geology of Hong Kong Island and Kowloon, by P.J. Strange & R. Shaw (1986), 134 p.	HK$78	(US$12.50)
Map HGM 20, Sheet 7	Sha Tin : Solid and Superficial Geology (1:20 000 map) (1986), 1 map.	HK$20	(US$3.50)
Map HGM 20, Sheet 11	Hong Kong and Kowloon : Solid and Superficial Geology (1:20 000 map) (1986), 1 map.	HK$20	(US$3.50)
Map HGM 20, Sheet 15	Hong Kong South and Lamma Island : Solid and Superficial Geology (1:20 000 map) (1987), 1 map.	HK$20	(US$3.50)
Map HGM 20, Sheet 5	Tsing Shan (Castle Peak) : Solid and Superficial Geology (1:20 000 map) (1988), 1 map.	HK$20	(US$3.50)

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edited by F. G. Bell, M. G. Culshaw & J. C. Cripps, to be published late 1989

This volume includes papers given at the 24th Annual Conference at Sunderland, September 1988. Conference sessions included pressuremeter testing in soils; pressuremeter and dilatometer testing in rocks; penetration testing, the standard penetration test; penetration testing, static methods; load testing; vane and direct shear testing in soil and *in situ* stress measurements in rock; surface geophysical testing; down hole geophysical testing; permeability testing.

Volume 5: Engineering Geology of Underground Movements
edited by F. G. Bell, M. G. Culshaw & J. C. Cripps, 1988

This volume contains papers from the 23rd Annual Conference at Nottingham, September 1987. Sessions considered: ground movements due to tunnelling; ground movements due to deep excavation; ground movements and construction operations; ground movements due to abandoned mine workings; ground movements due to longwall mining; abandoned limestone mines in the West Midlands; investigation of ground movements; ground movements due to the abstraction or injection of fluids; induced seismicity.

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Volume 4: Planning and Engineering Geology
edited by M. G. Culshaw, F. G. Bell, J. C. Cripps & M. O'Hara, 1987

The proceedings of the 22nd Annual Conference at Plymouth, September 1986, comprises papers and discussions in sessions on: planning and engineering geology; opportunities for development and constraints on development; data acquisition; land evaluation and site assessment (mapping); land evaluation and site assessment (hazard and risk); development of resources; the infrastructure, its development and redevelopment; waste disposal and pollution control; conservation, restoration and protection of land; environmental impact and strategic planning; planning and engineering geology, opportunities and responsibilities; engineering geology and the legal aspects of planning.

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Volume 3: Groundwater in Engineering Geology
edited by J. C. Cripps, F. G. Bell & M. G. Culshaw, 1986

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edited by A. B. Hawkins, 1986

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Cover photograph: Rock slide at Ping Chau, Mirs Bay
(D.R. Workman)

Joint-controlled wedge-shaped rock slide in thin-bedded indurated mudstones and siltstones. The beds dip at a low angle. Note the wide wave-cut platform and overhanging portions of the upper cliff.

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