GEOLOGICAL SOCIETY OF HONG KONG NEWSLETTER

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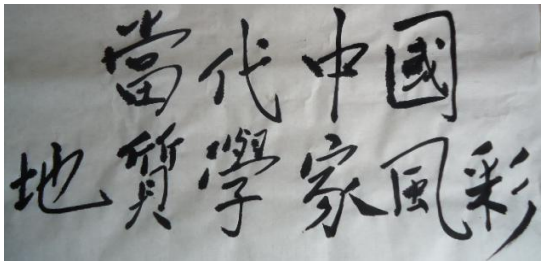
Message from Editor:

We are going to publish a series of articles under the topic-

"Contemporary Chinese Geoscientists" by George Tsang which is the biography of the geoscientists of China who are the academicians of either Chinese Academy of Sciences or Chinese Academy of Engineering.

The author will compile it into a book whenever the materials are enough to fit it. The author is pleased to thank the scientists who accept the interviews and provide the author the concerned information.

Through the interviews, we know how "the steel is produced" and follow the steps of the masters, we would explore our roads to success. Special thanks should give to Mr. DENG Jiang-hong（鄧江洪）who is the classmate of the author and PhD candidate of University of Science and Technology of China, Mr. Deng took the pictures and recorded the conversations of the following two interviews.



Contemporary Geoscientists of China
- CHANG Yin-fo (两院院士常印佛)
by George Tsang

Devote my body to my country,
Enjoy my life in the midst of mountains and waters. – CHANG Yin-fo--

Mr. Chang is an articulate and talkative elder. He displayed his excellent memory in recalling the names of his teachers, the years of the important events in his life which happened in more than half century. You can not imagine the man is already 81 years old.

Mr. Chang is an academician of both Chinese Academy of Sciences and Chinese Academy of Engineering which makes him the rarity among the academicians. There are about 30 academicians with this twin honors.

The interview took place in his residence. Mr. Chang started his conversation from his family during his youth schooling.

Interview in his residence

Early schooling

He was born in July 1931, just two months before the invasion of Japanese troops to North-east China in September 18. The Japanese launched the July 7 incident after 6

years. Mr. Chang witnessed a lot of countrymen were killed by Japanese, land was occupied, he realized it was due to the weakness of the country. The idea to revitalize the country through science and technology was spontaneously boomed in his mind which enhanced his devotion of his life to explore natural resources for the country.

Mr. Chang was born in an intellectual family, his father, CHANG Yi-sheng (常遺生) graduated from an advanced teachers' school which became "Da Tong University" (大同大學) later and, his mother graduated from a women teachers' school. His parents were teachers. This situation was rare when most Chinese were illiterate.

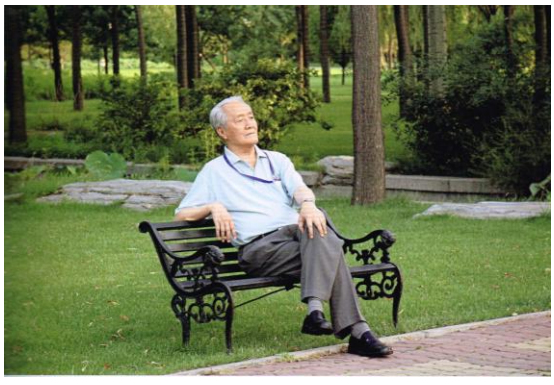
His father was working in Shanghai but followed the government policy to move schools to the inner province during the war period in 1937. His mother brought him together to return to their hometown in Jiangsu to take care of his grandmother.

However, Japanese marched to their hometown in 1940, parents were reluctant to send their children to schools which were under the administration of puppet government of Japanese, so Chang was taught by his mother up to primary 4. He was then sent to another private tutor who was a classmate of his father. Again he transferred to another better school which did not teach Japanese language or citizen courses. One of his teachers graduated from the law college of renowned Beijing University. The school hired a compere who graduated from Japan to entertain the Japanese officers. The school was considered as one of the best in their region.

Mr. Chang was educated in an upper high school in Nanjing in 1945 which was the subsidiary high school of Central University. The school employed some lecturers from the University to teach some courses, the school was the official editor for the textbooks. It taught English which was the core subject, French and German. It was doubtless the school was one of the best schools in the region. Mr. Chang studied French and sat in German. He still remembered some French phrases.

Mr. Chang is immersing in his memory

Mr. Chang disclosed the meaning of his name. The dictionary meaning of Yin-fo (印佛) means Yin- print, Fo- Buddha. Its actual meaning is that his father wanted his mind to be always occupied with certain Buddhism, but not be a Buddha, Mr. Chang said.



Enjoying silence

The only hobby of Mr. Chang is reading, he always keeps some books, such as literature, beside his bed. He loves "silence", he bears the silent attitude of Buddhism which keeps his steps forward after series of successes.

Interest in geology

Mr. Chang has two relatives, Mr. DING Wen-jiang (丁文江) and YAN Shuang (嚴爽) who were geologists and mining experts. Mr. Chang visited American News office and USSR Embassy in Nanjing in Saturday afternoon during his study in the City. He was impressed by pictures of the water resource engineering of Tennessee, USA and hydro-electric power of Volga river. So he decided to choose either hydro- engineering or geology in Tsinghua University after he graduated from high school. He graduated from Tsinghua in 1952. His father objected his choice because job of geologists was unstable and dangerous at that time. However, nothing would stop the young man to do what he wanted.

He said, "Geology is interesting, we can study the secret of the earth and explore the fortune of the minerals which would make our country rich, my choice for geology is nothing wrong."

His family

His family

Mr. Chang's wife, WANG De-yong（汪德鏞）graduated from Nanjing University in geology in 1955, she was an engineer of professor level. They have two daughters and one son. Mr. Chang expressed his sincere thanks to his wife for her support, he had been out of home for 4 years during "Cultural Revolution". Mr. Chang was grateful that he did not squander his time during the "Cultural Revolution" as he was abroad. But his wife suffered the impacts for the family and took care of the 3 children whom were 8, 7 and 3 years old respectively in 1966.

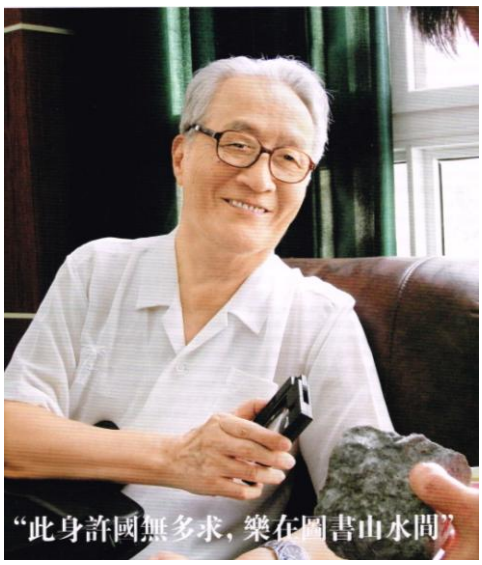
His younger daughter married an American in New Jersey, USA, she is in IT field. His son is living in California, also in IT field. The elder daughter is in China. Mr. Chang has a happy family.

Missions

From 1965-1969, Mr. Chang was sent to Vietnam as Chinese assisted expert consultant for Sheng Quan Copper Mine（勝權銅礦）.From 1970- 1974, he was in Albania in charge of the investigation of four copper mines, he was praised as doing "model job" by the director of geology of Albania.

Sharing experience with the workers

He worked for Anhui Bureau of geology from 1977-2000, he visited Latin America, such as Mexico, Peru, Chile, Brazil and Argentina as Foreign aid expert.



Geological contribution

Mr. Chang is a practical geologist, most of his scientific contribution comes from his practical experience, from the data of field investigation. His success would be concluded in three main fields.

1. Deposit
Mr. Chang most of his time involved in skarn copper deposits during his twenty years plus field exploration.

In 1980, he proposed a new type of deposit should be specified – Strata bound skarn type which refers to a stratiform deposit formed by metasomation, superimposed and alteration when the hot fluid first cooled to be skarn rock and later the metamorphosed rock. The model settled the controversy between the deposit is sedimentary or hydrothermal, it explains the formation of the stratums in the skarn deposit.

2. Regional metallogeny
Mr. Chang had worked in metallogenic belts along Yangtze River for many years, he had a profound study in the metallogenic factors since the Yanshanian movement which resulted in several metallogenic belts and covered the most eastern portion of China.

Mr. Chang found a minor-activity basement fracture along east-west direction in Tong Ling (銅陵) mining area, whereas the metallogenic belt is developed bearing the control factor of metallogeny of the region. He named this concept as “Basement fracture ore- controlling structure” in 1963. It is confirmed in the succeeding half century mine exploration.

Mr. Chang initially concluded the study of regional metallogenic belt on a typical continental metallogenic belt along middle and downstream of Yangtze River.

3. Mine exploration
People say mine exploration is not only a kind of science but it is also an art. Many mines are found when the geology is not quite known, it requires the strong sense of geologists to make a more real decision when little information have been collected. It is a process of studying and investigating at the same time.

“The source of geological cognizance is in the fields, just as Mr. LI Si- Guang (李四光) said, only here, the genuine scientific problems and theories were born”- CHANG

Practical mine exploration

1. Based on Mr. Chang’s guiding theory of mine exploration, he found the largest copper mine of Anhui- Dong Gua Shan copper mine (冬瓜山銅礦）. The ore body was buried deep, it was not discovered in the initial drilling in 1969 because the drilling was drastic biased. It was not detected by ordinary geophysical or chemical methods, the magnetic field was weak especially it was isolated by a layer of electrical shield (coal layer), so the theory exploration was the only

choice at that time.

Site investigation

2. Feng Huang Shan mine（鳳凰山礦田）
The area was covered with gossan and magnetite, the Russian geologists in 1956 concluded the gossan was the oxide of pyrite, so it was not a valuable mine. However, Mr. Chang reviewed the investigation reports, he found an analysis report indicating a great amount of copper in the gossan, so he suspected there should have copper below, it becomes a major copper mine afterwards.

Road of learning

Mr. Chang recalled his first job after graduation, he was assigned to the 321 geological team in Tong Guan Shan (銅官山), Tong Ling, Anhui, the leader was the renowned geologist, GUO Wen-gui（郭文魁）,the team was equipped with the best equipment at that time. He was assigned another job in Hua Dong Bureau of Geology under another supervisor, YAN Kun-yuan (嚴坤元) after working 3 years in 321. Later he was assigned to Yangtze team which was a joint venture between China and USSR for prospecting copper mines along middle and down stream of Yangyze river, he learnt a lot from the Russian in this period.

We would conclude Mr. Chang received perfect education and under supervison of experienced experts in the early working stage aside from his talent and diligence. All of these created a master.

Geological development of China

New China established her geology department in 1952 and started her first “Five year Plan” in 1953. China underwent a complex development in the history of the Republic. However, Mr. Chang is the one who witnessed this process. Mr. Chang contributes his life in the mining fields.

Geologists classify mine exploration into several stages, such as outcrop exploration, technical exploration and information exploration etc, these are the technical view, they neglect the target of the exploration.

Mr. Chang summarizes the geological exploration of China into three stages:
1. From point to 2-dimension
This period includes the very beginning up to 1960;
2. Regional exploration, looking for breakthrough;
This period is from 1960- now. Many useful information were collected around the year 1958 (Climb mountains & down to villages movement);
3. Deep & 3-dimension mine exploration

The proposal was initiated by Mr. Chang when the depth of exploration is usually from 300 ~ 500 meters. The depth should penetrate 1,500 or even 2,000 meters. The idea was presented to the Vice Minister-WEN Jia-bao (溫家寶) and now the Premier who felt interesting in 1985.

The geological development was highly appreciated in the early stage of People’s Republic of China, the geological work is similar to “a horse which blocks the roads of

thousand horses", Chairman MAO said. Iron and steel industry was rapidly developed after cultural revolution.

The characteristic of Chinese iron mines is "less rich mines and more poor mines", so somebody preferred to buy the minerals rather than mining locally because the cost is high.

A serious recession happened from 1985-2004 which resulted in three faults,
1. The continuity of geological work is broken;
2. The development of human resources is broken;
3. The inheritance of mine exploration experience is broken.
Mr. Chang suggested a long –term plan should be installed to avoid any big variation.

Appointment of professorship

Views on education

"Nevertheless a master is not easily created, but an elite class institute will not be established without any master", Mr. Chang said. He pointed out the Department of Philosophy of Tsinghua University would not march its summit as it were in Fifties last century because it is missing the masters such as FENG You-lan (馮友蘭), JIN Yue-lin（金岳霖）.

Professional appointments

Mr. Chang was appointed as Chief engineer of 321 geological team of Anhui; Deputy Director General of Bureau of Geology and Mineral Exploration of Anhui Province; Chief engineer; Dean of School of Earth and Space Sciences of University of Science and Technology of China; and he is also a Visiting Professor of Hefei University of Technology.

Awards and prizes

No special award for scientists was granted before the Cultural Revolution. The first medals of Mr. Chang were awarded by Albania and Vietnam.

Mr. Chang was awarded special prize of "National award for Science and Technology Progress", first prize of "Scientific and Technical Achievements award". He was also awarded first and second "Labor Medals" from foreign governments. He has won Prize for "Scientific and Technological Progress of Ho Leung Ho Lee Foundation".

Major publications

"Geological exploration report of Tong Guan Shan copper mine, Tong Ling, Anhui, 1955" -《安徽銅陵銅官山銅礦地質勘探報告》, "Geological exploration report of East and West copper deposit of Lion Mountain, Tong Ling, Anhui, 1963"- 《安徽銅陵獅子山礦區東、西獅子山銅礦床地質勘探報告》, "Several problems of certain endogenetic mineralization, 1965"-《某區內生礦化作用的幾個問題》(1965), "Certain problems of metallogeny and distribution of major copper deposits in China, 1976, second author"- 《中國主要類型銅礦成礦與分佈的若干問題》, "Concerning deposits of strata bound skarn type, 1980"- 《關於層控式矽卡岩型礦

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Contemporary Geoscientists of China
- ZHENG Yong-fei (地球化學家鄭永飛)
by George Tsang

Thanks to my enrolment in the PhD programme at University of Science and Technology, I had the chance to interview my respective teacher- Professor ZHENG Yong-fei (鄭永飛).

The interview took place in Professor’s office.

Dr. Zheng is at his young age of fifties, he earned his membership as an academician of Chinese Academy of Sciences in 2009 which is the highest title for scholars in China.

The birth of a master

Professor Zheng was born in Oct, 1959 in a farmer’s family in Chang Feng County (長豐縣), Hefei of Anhui Province. His father, Mr. ZHENG Zhang-wen (鄭章文) was a honest and educated person who worked from a party secretary of brigade to the vice mayor of the county. Literature was the hobby of the young ZHENG, he read several traditional Chinese classical literature while making notes at the same time. Professor Zheng is considered as an amateur of literature, he said, “Literature enriches and cheers my life, it brings me so much….”

Interview

A good teacher

Professor ZHENG spent 2 1/2 years as broadcaster and citizen-managed teacher in village during “Cultural Revolution”. He agreed the migration of educated young people to villages would have changed the structure of the rural areas, especially the standard of education nevertheless someone might object it.

“We will never regret” Professor ZHENG concluded his episode with those young people who contributed their best time of their life in villages.

The erudite teacher drew the attention of the students. He said, “The standard of a good teacher is very simple. First, draw the

attention of the students and be sure they understand what you are talking about; Second, the students can complete your assignment in one hour after class. This is the test for teaching effect". Professor Zheng is using these two simple rules to demand himself even as a respective professor in the highest institute of the country today.

Professor ZHENG started his first degree in Geology in Nanjing University in 1978. "It is God's decision to assign me to study geology, not my choice" this is his reply when people ask why he chose geology because that is cold and hard topic at that time. He thought it was a chance for him to study, his interested in geology was not developed, he did not mind for any assignment, he should study well so he could get a good job in future.

His interest in Geochemistry was activated after some years of studies, he tried to combine geology and other sciences, he studied a lot of atomic physics, quantum chemistry and statistics.

Professor Zheng was assigned to work in Nanjing Institute of Geology and Mineral Resources after successfully defended his masteral dissertation in April, 1985. He was known to the geology field after he published 5 articles in core journals only in a year. He was further known to the world when his 4 articles were accepted for verbal delivery in Sixth International Conference of Geochronology, Cosmochronology and Isotope Geology in University of Cambridge in 1986.

"Professor Zheng earned his PhD degree under the supervision of renowned geochemist from University of Goettingen, Germany in 1991. He pursued his postdoctoral studies in Institute for Mineralogy, Petrology and Geochemistry, University of Tübingen.

Affection for motherland

The young scholar's heart was longing to return to his motherland as soon as possible nevertheless he was abroad. His poems says, "I should return in autumn when I become stronger as my ages increase; It blossoms if I keep on watering" As a result, he terminated his seven years' studies at abroad and returned homeland at the autumn of 1993. He worked in University of Science and Technology of China in Hefei that is only 2 hour car distance from his hometown, He has been working there since then.

Academic Achievements

1. Professor ZHENG was the first one to successfully modify the increment method for theoretical calculation of oxygen isotope fractionation in crystalline minerals. He quantitatively evaluated the effect of chemical composition and crystal structure on oxygen isotope fractionation in minerals. His calculated data are consistent with, results from natural observation and experimental measurement. In fact, all calculated fractionation parameters are widely applied to petrogenetic and metallogenic studies.

2. Professor Zheng was the first to provide a novel interpretation of negative oxygen isotope anomaly in ultrahigh pressure (UHP) metamorphic rocks from the Dabie-Sulu orogenic belt (大别山-蘇魯造山帶). He demonstrated that the preservation of negative oxygen isotope anomaly in the UHP eclogite was caused by the rapid subduction of continental

plate into the mantle and then rapidly retraced back to the crustal level with only a short residence in the mantle. He called this process as “ice cream-frying model”, and attempted to quantify the competition between geochemical thermodynamic and kinetics during UHP metamorphism at mantle depths. In doing so, he has developed his research from stable isotope geochemistry to the chemical geodynamics of continental subduction zones.

3. Professor ZHENG is the first to focus on slab-mantle interaction in both oceanic and continental subduction channels. He noted a series of similarities and differences in petrology and geochemistry between crustal rocks of different origins and thus deciphered them within the framework of plate’s interface interaction. He has developed the common zircon U-Pb dating to the sophisticated metamorphic zirconology. His insights into subduction channel processes have provided a powerful model to interpret the petrogenesis of interpolate and intraplate magmatic rocks.

3-7 Professor

This is the title he earned at School of Earth and Space Sciences in University of Science and Technology of China which means he starts his work from 7 a.m. up to 7 p.m., Monday to Sunday (7 days). He buried himself in the midst of books, articles, data analysis, doing experiments, and verification of assumptions etc.

Interactive teaching method is used in class that 1/3 time is allocated for teaching, 1/3 for student presentation and 1/3 for discussion. He said, “The stage should be reserved for students so that they can get teaching experience, give them a performance chance !”.

“We know how to do better only when we have understood what others doing”, Professor ZHENG said. He always sends his PhD students and postdoctoral fellows to attend the international conferences with full funding for their expenses, so they could learn the latest developments of science.

”Professor ZHENG presses strict demand for students through his rigorous teaching attitude”, “ He always explains the profound terms in simple language which make us discover some new things” His graduates commented. He edits word by word for students’ articles which would be published in journals.

The author of this article recalls his experience in attending Professor’s lecture, he requested us to prepare an article in around 5000 to 10,000 words of SCI standard within 2 1/2 months, my topic is “Porphyry copper deposits of Andean type”. My previous teacher would probably give me one or two semester to finish it.

Success of students

Among the PhD students of Professor Zheng, two students won “The 100 excellent PhD dissertations”, two students won “The 100 excellent nomination of PhD dissertations”, three students won “Excellent PhD dissertations of Chinese Academy of Sciences”, three students won the second, third and fourth prizes of “Second class prize for Natural Science” respectively.

Professional appointments

Professor Zheng is a PhD programme supervisor, a member of China Democratic League, Deputy to the National People's Congress, Director of Key Laboratory of Crust-Mantle Materials and Environments in Chinese Academy of Sciences, Deputy dean of School of Earth and Space Sciences in University of Science and Technology.

He was elected as Fellow of Mineralogical Society of America (The first scientist from China).

He has membership of The Geochemical Society and American Geophysical Union.

He served as Executive associate editor of "Chinese Science Bulletin", Associate editor of "Geochemical Journal", "Terra Nova" and "Ore Geology Review" and Board of editorial of "Chemical Geology", "Lithos" and "Journal of Asian Earth Sciences".

He is Vice Chairman of "Chinese Society of Mineralogy, Petrology and Geochemistry" and Vice Chairman of "Geological Society of China (Anhui)".

Site investigation in the Qin-lin Mt

Professor Zheng speaks in neat and tidy manner, "Take care of my own job, try my best to do the best, one will not achieve anything if too much things are considered", he said. The modest and sincere discourse of the professor disclosed reasons of his success. He is so confident of what he is doing.

Academic valuation

Professor Zheng won the highest score for the quotations of his articles among the scientists in China according to the statistic of ISI for 2000 pioneer geochemists of the world between 2001-2012. He is considered as one of the 50 top geochemists of the world.

Professor Zheng has already published more than 60 articles in SCI journals solely or as first author, some of them are quoted by international renowned journals such as "Nature" and "Science". His formula for computation of mineral oxygen isotope fractionation factors is included in the American textbook- "Principles of Geochemistry"- Columbia University Press, 1997.

His published books include 《Stable Isotopes Geochemistry》in 2000 and 《Chemical Geodynamics》in 1999.

In USTC

Awards and Prizes

Professor Zheng won "Hou Defeng Award of Chinese Society for Mineralogy, Petrology and Geochemistry", "Gold Hammer prize" of Geological Society of China, "Young Science & Technology Award" of China, "Young Scientist Award of China", Second

prize in China's "State Natural Science", Prize for "Scientific and Technological Progress of Ho Leung Ho Lee Foundation" and "Cheung Kong Achievement Award". He was also the winner of first batch of "Hundred Talents Program" sponsored by Chinese Academy of Sciences in 1994.

Second prize in China's State Natural Science, 2004

"The laboratory determination and theoretical computation of oxygen isotope fractionation factors for minerals" was awarded the second prize in the absence of first prize together with other 27 scientific achievements. This achievement was composed in a series of 26 articles which were published in renowned scientific journals as a conclusion of his 12 years' research. His research is considered as the preparation for the thermometer of the earth.

A master is created

It seems the master 's road to geochemistry was mainly God's mandate, he had no special interest in this field before he studied in Nanjing University, his parents and his family had less influence on his career. The success is mainly due to his hard working and diligence. The master applies his precise observation to disclose the secret of nature. He is a rigorous and good teacher besides an excellent scientist.

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Obituary - John Tattersall

（By Paul Cheung）

John Tattersall

The Society notes with sadness the passing away of John Tattersall, our Vice-Chairman of the Professional Branch from 2010-2012 at the age of 59.

John attended professional interview for Certified Professional Geologist (CPG) of GSHK and had been elected as CPG in August 2009. He was kindly accepted to be the Vice- Chairman of the Professional Branch in 2010. He promoted the status of local professional geologists through full support of Society's activities. He encouraged young geologists to join the geological society as committee members. He was also members of Institution of Materials, Minerals and Mining, Hong Kong Institution of Engineers (Geotechnical) and was a Chartered Engineer and Registered Professional Engineer (Geotechnical).

John was born in Lancashire, U.K. in 1953. He got his BSc (Hons.) and MSc in Geology (1977) and Rock Mechanics & Excavation Engineering (1978) respectively at the University of Newcastle Upon Tyne. After one year of research in the University. He worked as engineering geologist with the Howard Humphreys & Partners between 1979 and 1981 and Scott Wilson Kirpatrick & Partners (Hong Kong) between 1981 and 1987. He then moved to Oman, Turkey

and U.K. with Maunsell Consultants Limited, Maunsell/PBI and G. Maunsell & Partners respectively as Chief Engineering Geologist. He returned to Hong Kong in 1995 with AECOM and his last position was executive director.

John had 30 years of engineering geology and geotechnical experience. His expertise were in rockslope engineering, rock foundation, natural terrain hazards, hard rock and soft ground tunnelling and caverns. He had published many technical papers in the international conferences. He was the principal author of the Engineering Geological Practice in Hong Kong (GEO Publication No. 1/2007). He was also responsible for writing of other GEO Reports e.g. Design basis for and Use of standardized debris-resisting barriers (GEO Report Nos. 174 & 182).

He had given numerous presentations and lectures on project-related work to the Hong Kong Institution of Engineers, Hong Kong Tunnelling Society and MSc courses at the University of Hong Kong.

Although he will be greatly missed, his legacy lives on. He will be long remembered by the geological community in Hong Kong and worldwide for his significant contributions to the field of engineering geology.

Our deepest condolences go out to John's families.

Diamond- By William Chow

Popigai Crater

In the last month, local newspapers reported that the world's largest diamond deposit was found in an impact crater in northern Russia. This crater was resulted from the impact of an asteroid which was estimated 5 to 8 km in diameter and crashed onto the Earth at a speed about 15 to 20 km per second. The impact caused high temperature and great pressure which immediately melted thousands of cubic kilometers of country rocks and millions of tons of ejecta exploded into the air. It left a depression about 100 km in diameter which was encircled by a belt of deformed rock about 20 km wide. This event happened 35 million years ago.

World's largest diamond deposit

The report stated that scientists of the USSR had researched the Popigai Crater in the late 70's. They discovered a great diamond deposit at the Popigai Crater and believed that diamonds were formed from the Archean graphite-garnet gneiss after the impact. Although the gneiss was overlain by strata of sedimentary rocks, the impact vaporized the surface rocks that exposed the underlain gneiss to enormous heat and high pressure. Subsequently, the graphite content within the gneiss was transformed into diamonds in minutes.

It was estimated that the diamond bearing rock had a volume up to 1600 cubic kilometers where the diamond stockpile exceeded the total of the identified deposits in the world. Due to political and economic reasons, the discovery was not released until now. Would this deposit affect the demand/supply equilibrium in diamond trade and hence the price level of diamond? The answer is given at the end of this article. Now, let's look at the mechanism of the conversion of graphite into diamond and the formation of diamond deposit.

Graphite and diamond

Both graphite and diamond are minerals of native element which are composed of carbon. Because of the difference in the atomic structure (Figure 1), these two minerals display contradicting physical characteristics (Figure 2).

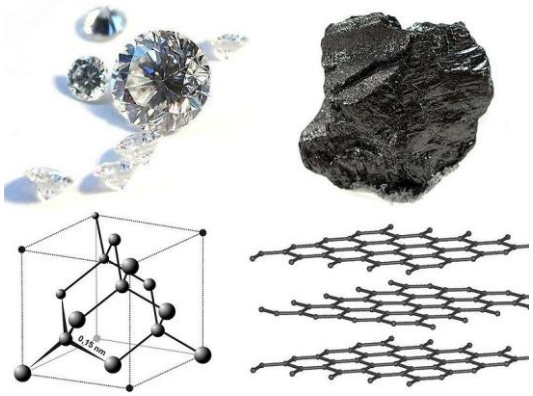


Figure 1. Atomic structures of diamond (left) and graphite (right)

	Diamond	Graphite
Crystal System	Cubic	Hexagonal
Crystal Form	Octahedral, dodecahedral, aggregate	Foliated masses
Hardness	10	1
Specific Gravity	3.52	2.23
Cleavage	Perfect: 4 directions (octahedral)	Perfect: 1 direction (basal)
Color	Colorless, yellow, brown, green, pink, black	Black
Luster	Adamantine	Greasy

Figure 2. Physical properties of diamond and graphite

Certainly, when one tries to covert graphite into diamond, he has to modify the basic units of graphite to that of diamond. Figure 3 shows the basic units of these two minerals. They are the fundamental building blocks which make up the atomic structures of both minerals in Figure 1. The process of modification can be attained through a change of temperature and pressure.

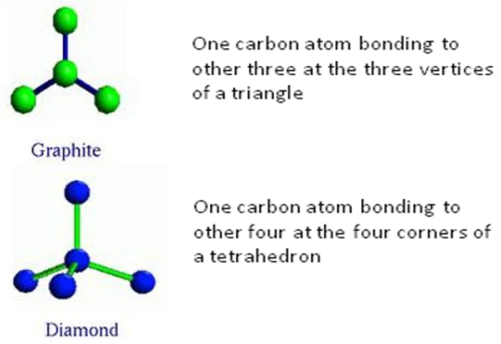


Figure 3. Base units of atomic structures of graphite and diamond

Since graphite and diamond originate from different arrays of carbon atoms, the phase diagram in Figure 4 demonstrates the relationship of heat and pressure in the crystallization of graphite and diamond.

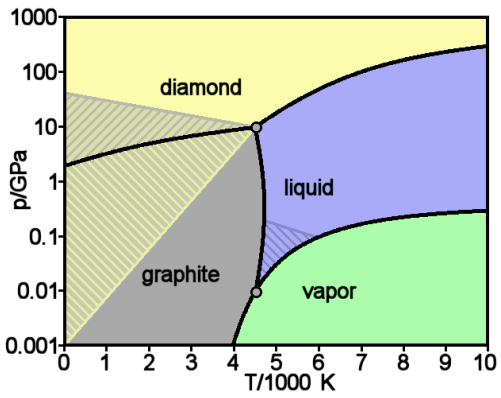


Figure 4. Phase diagram of carbon (formation of graphite and diamond)

Back to the Popigai Crater, when the asteroid hit on ground at a very high speed, it melted the graphite of the Archean gneiss and freed the carbons atoms from graphite structure. Owing to the high pressure which was greater than the threshold between graphite and diamond, plus the high temperature generated from the impact, carbon atoms re-crystallized into diamond. This is the

chronicle of the world's largest diamond deposit in the northern Russia. Yet all of these happened in a very short time.

Formation of primary diamond ore

Apart from this extraordinary diamond deposit which was formed by the impact of a meteorite, diamonds are either found in primary deposits (kimberlite and lamproite) or secondary deposits (river beds, lake beds, sea beds). Nearly all of the existing diamond mines are operated in kimberlite pipes. Kimberlite is an ultramafic rock that solidifies from magma originating at the upper mantle.

In Figure 4, the favourable conditions (both the temperature and pressure) for carbon atoms to crystallize into diamonds indicate that these charming crystals actually grow beneath the earth crust. When studying inclusions in diamond crystals, scientists realize that they mainly form under two environments: peridotitic and eclogitic. The former is 130 – 180 km down into the earth and the latter even exceeds 180 km. Most recovered diamonds are found existing for more than thousand millions years.

There may be diamond reservoirs about hundred kilometers below our feet. How can miners dig up diamonds at this great depth? Indeed, diamonds are caught and are brought to the surface (or near surface). When there is a great fault zone extending from the ground level towards the upper mantle (or vice versa), the mantle rock under this fault zone melts because of the release of enormous pressure after the faulting. It turns into kimberlite (or lamproite) magma and thrusts it way towards the earth surface through these giant crevices. In the course of its way up, the magma may pass through a diamond reservoir and catches some of these diamonds in the form of xenocrysts. They are carried by the magma and settle at or near the surface when the magma ceases to proceed. Subsequent erosion and weathering expose diamond crystals in their primary or secondary deposits.

It explains why primary diamond deposits can only be located in kimberlite of lamproite pipes. Nevertheless, not all of these pipes contain diamonds. If the fault zone does not happen in the portion of the mantle where diamond forms, the ultramafic magma carries no diamond. Indeed, diamond is a very rare mineral.

Even the ultramafic magma carries diamond crystals on the way to the earth surface. If the magma rises up at a very low speed when the temperature and pressure decrease gradually, the diamond crystals may convert into graphite. Especially the pressure is a significant element in the formation of diamond/graphite. Therefore the diamond bearing kimberlite magma is believed going through a violent volcanic eruption which rises up in a very high speed.

Value of Popigai Crater Diamonds

Was it right for the USSR to conceal the discovery to maintain the price level of diamond in the 70's?

Firstly, the diamonds found in the Popigai Crater are of industrial grade only. It was because the impact only produced the required critical pressure in second, though the generated heat persisted for a while. Diamonds could not grow in larger sizes to become gem quality. They are aggregate of minute grains only usable for abrasion or other industrial purposes. This reserve does

not interfere with the normal function in the market of gem diamond.

Secondly, the supply of industrial grade diamonds mainly comes from the production of synthetic diamonds (which are made from graphite) in laboratory at reasonable costs. Popigai Crater is situated at the remote north of Russia where the extraction and recovery of these diamonds incur a huge investment in the construction of infrastructure such as transport network, power plant, treatment plant, dormitory and other facilities.

Therefore it is not cost-effective to exploit these diamonds.

Celebration for the 30th Anniversary of The Geological Society of Hong Kong

By Organizing Committee of 30th Anniversary Celebration

The Geological Society of Hong Kong (GSHK) celebrated its 30th Anniversary in the middle of this year. The Organizing Committee (OC) formed was headed by Mr. Paul CHEUNG (Vice President of GSHK) and with following people as OC members: Dr. Margie CHEN, Mr. Dennis YUEN, Mr. W. K. LEUNG, Mr. Felix LEE, Miss Candy LEI, Mr. C. S. KONG, Mr. Jeffrey WONG, Mr. H. Y. LIN, Mr. C. W. LEE, Mr. C. S. LAM, Mr. K. W. LAI, Ms Denise TANG, and Mr. Patrick HO. The OC provided valuable and innovative arrangement and preparation over 12 months before the 30th Anniversary celebration which had led to the success of the event.

Strictly speaking, the 30th Anniversary celebration event was composed of three sections:

1. the day-time conference on 29th June 2012;
2. the dinner celebration on 29th June 2012; and
3. field trip to Tung Lung Chau and Po Toi Islands on 30th June 2012

Day-Time Conference on 29th June 2012

The day was started with a conference titled "Recent Development on Geology and Engineering Geology" with prominent speakers not only from Geotechnical Engineering Office of Hong Kong SAR government and Hong Kong University, but also from the Chinese Academy of Engineering – State of Oceanography Administration, renowned universities of China and Taiwan and also some specialists from well-know firms of the industry including one from Germany.

The conference covered broad geological topics which included submarine geology, earthquake, mapping, petrology, structural geology and engineering geology.

The Mcs

We had our wonderful MCs, Miss Candy Lei and Mr. Jeffrey Wong who facilitated the whole day events. Through the arrangement of the OC, audio instant-translation service (English and Putonghua) was provided during the conference sessions.

Conference on going

↑ Speakers of the Conference ↓

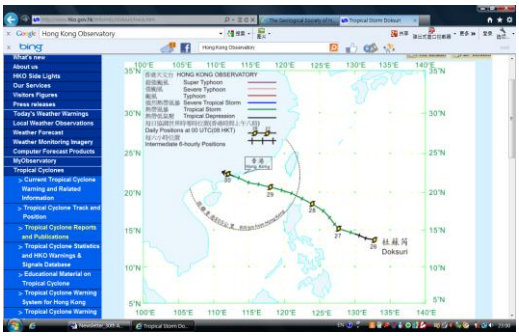
With a house-full of participants and the inspiring discussions during the day, we knew that the conference was fascinated by all.

Dinner Celebration on 29th June 2012

At the very same venue, the seminar was followed by our celebration dinner with house-full of guests and members in a balminess atmosphere. The opening of the dinner celebration was announced by the President of GSHK, Dr. Margie CHEN. Mr. Dennis YUEN briefed the history of GSHK from 1982 to present.

↑ Some activities of the conference ↓

The winners of the photograph competition were also announced and prizes were awarded to them with joy. Mr. William Chau gave a slide-show of GSHK's XinJiang trip in 2009. It came the auction of rock samples, minerals and fossils (Donated by Mr. C.M. LEE, etc.) in the middle of the dinner which brought us to the climax of the evening. It was a joyful and meaningful evening to GSHK.



The typhoon, Doksuri, also came for our celebration in the evening near the end of the dinner and the No. 8 NE gale or storm signal was issued at 11:00 p.m. by the Hong Kong Observatory. Doksuri was closest to Hong Kong at 1 a.m. on 30th June 2012. For safety reasons, OC had to cancel the scheduled field trips on 30th June 2012 and gave way for Doksuri to leave Hong Kong. Nevertheless, we had launched a same boat trip to Po Toi on 22nd September with a full reservation.

Thanks to all the guests, speakers, sponsors, participants and, last but not least, our organization committee members and helpers from The University of Hong Kong and the Hong Kong Polytechnic University who had put their greatest efforts and made the day so enjoyable and memorable.

Photograph Competition Results

1st Prize of Photo Competition

2nd Prize of Photo Competition

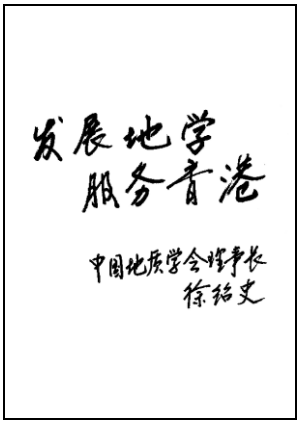
3rd Prize of Photo Competition

Merit prize-1 of Photo Competition

Merit prize-2 of Photo Competition

Merit prize-3 of Photo Competition

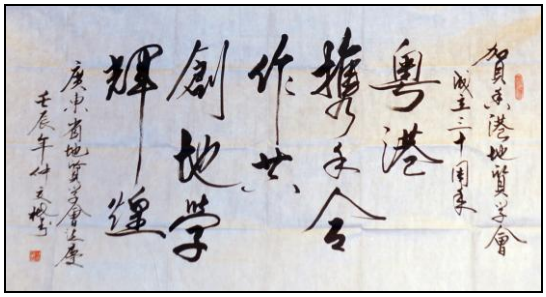
Compliments



Geological Society of China

Geological Society of China

Liaison Office of Central People's Government in Hong Kong S.A.R.



Geological Society of Guangdong, China

Taiwan Association of Professional Applied Geologists