# GEOLOGICAL SOCIETY OF HONG KONG NEWSLETTER

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**Letter to Editor – "A view on H.K.'s Global Geopark" by William Chow**

H.K. Geopark has been 'promoted' from a national level to a global level recently. There are rare Government TV commercials telling the change of the state. Contrary to the high profile attention when the 'national' Geopark was established, the Authority does not treat this promotion in an equal importance. The only announcement comes together with the opening of a Prehistoric Story Room (sponsored by a charity fund of the Bank of China). Anyway, no matter what level the H.K. Geoparks is, I would like to review it after sharing an event 10 years ago.

In Dec 2003, I traveled to London and spent two days at seaside for fossil hunting - Charmouth in East Dorset and Folkestone in Kent.

Charmouth is quite far away from London. I planned this trip before I departed from Hong Kong. It took me about 2 hours by rail from London to Axminster and then almost another hour after interchanging to a local bus to Charmouth via Lyme Regis. The rocks along the shore between Charmouth and Lyme Regies belong to the Blue Lias which is a formation of limestone and shale layers from the late Triassic to the early Jurassic. You can find ichthyosaurus bones, if you are lucky, and pyritised ammonite on the beach. Actually I saw a guy carried a metal detector. He reminded me the nickname of pyrite: Fool's Gold.


*Fig.1- Charmouth Heritage Coast Centre*

I did not find ichthyosaurus. What came under my collection included: common ammonite, pyritised ammonite, belemnite. On the following day, I brought along with some of my findings to the Natural History Museum where I asked for an assistance of identification from the duty geologist. He introduced me another site of fossil hunting which was more convenient to access. This was Folkestone, just an hour away from London by rail .

Located 10 km southwest of Dover, Folkestone is an old fishing and trading port situated at the narrowest section of the English Channel. Due to the nearness to the Continent, construction of coastal defense from the Napoleon age till the World War II still remains. At the Folkestone Harbour, you can see the spectacular white cliff of chalk near Dover. Nevertheless, along the seafront of Flokestone, there are Gault clay and Greensand formations of Lower Cretaceous which are well known for yielding ammonite with nacreous shells. I found fossils of ammonite and gastropod ;

and a few twinned crystals of selenite, a variety of gypsum. They were typical swallow-tail twins, although not at museum quality. A local man showed me his finding that he believed to be a broken piece of crab fossil,.

*Fig. 2- Looking for fossils at Folkestone*

My experience in the U.K. makes me think about the Geopark in Hong Kong. I doubt whether the H.K. Authority understands the meaning of a Geopark and whether the current policy is competent enough to advocate the education and study of geology. The UNESCO suggests three main themes of Geoparks [1] : conservation, education and geotourism. Does H.K. Geopark meet these themes? Before we go into this question. let's look at the U.K. case first.

The destination of my first fossil hunting trip was Charmouth. This small town is located at the famous Jurassic Coast[2] in the southern part of England. Jurassic Coast has been awarded World Heritage in 2001, which has been the first World Heritage site in the U.K. According to the Official Guide to the Jurassic Coast: "The theme that runs through the World Heritage Site is the discovery of 'deep time'. The Site is a spectacular record of changes that took place over millions of years, the creation of rocks, landforms and the evolution of species. It is also a story of the birth of science." This introduction signifies the critical role of the Jurassic Coast in the science of geology in the U.K.

Similar to Geopark, World Heritage has the same function in the conservation of natural (and/or cultural) features[3]. Did I break any regulations of the U.K. when I collected fossils at the Jurassic Coast? No. There is no rule prohibiting anyone from picking and collecting fossils in the region. But codes [4] in promoting 'responsible collecting' are in place to avoid 'inappropriate collecting'. According to the U.K. Authority, the Jurassic Coast is subject to severe coastal erosion. Fossils are washed down into the sea and disintegrate gradually. They will soon vanish even though if they are not picked up by people.

Then what is the conservation done to this area? First of all, sea erosion is a nature phenomenon and a scope of science worth studying. It is no way to stop it. No large-scale artificial structure will be constructed to protect the shoreline from erosion. The best conservation [5] is to promote the significance of the area to the public and draw the attention of people to geology. The British realizes that geology is a science of digging and analyzing in the field. Everybody can contribute to the development of geology if there are new findings.

1 unesdoc.unesco.org/images/0015/001500/150007e.pdf

2 www.jurassiccoast.com

3 whc.unesco.org/en/conventiontext

4 www.jurassiccoast.com/285/visiting-the-coast-31/be-safe-along-the-coast-151/safety-and-the-fossil-code-378.html

5 www.jurassiccoast.com/309/section/conserving-the-coast-35.html

In the 19th Century, some people[6] in Lyme Regis earned their living by digging and selling fossils. They also conduced to the development of paleontology. Now there are full sets of ichthyosaurus skeletons in the Natural History Museum which were discovered in the Jurassic Coast by that time. The natural value is conserved in human's minds when these findings are tuned into knowledge and passed to next generations.

What does our Geopark do? Conservation? Yes, literally. The Geopark codes[7] state that it is illegal to take away any rocks. Education? Certainly not.

The real meaning of conservation is to stop any large-scale construction in the area, like housing estates, commercial complexes etc that will threaten the integrity of landscape and damage the geological interest. If no collecting of rock sample is allowed, this is definitely no conservation, but just 'conservative'. Or it is just only a 'populism' way of conservation. I do not feel strange about the rule of not allowing the taking away of rocks. H.K. Geopark has been established by the Authority with the assistance of a local organization whose main objective is the conservation of rocks. One kind of activities held by this body is to wash off painting on rock surfaces. Actually it is scratching instead of washing. Except an action of anti-graffiti, I do not see it being a conservation because this activity causes a secondary damage to the rock surface if the original painting is counted as the primary one. Moreover, the debris and powder scraped from rocks contain chemicals of the paint and they fall onto the nearby ground which contaminate the surrounding soil and endanger living things.

Why I regard the H.K. Geopark as 'conservative'? Let's revisit the rule of not allowing taking rocks from Geopark again. Which law regulates the Geopark? It is Chapter 476 Marine Parks Ordinance. Why does a law of marine parks govern the Geopark? It is because some designated Geopark area coincide with the marine parks. Do the gazetted marine parks cover all the area of Geopark? I am not sure. Section 8 of Chapter 476A concerns about the protection of the shore and Section 15B of the same ordinance restricts the collection of marine life and resources. These laws aim at controlling human activities in safeguarding not only the marine lives but also their habitat. Suppose one removes a rock from location A to location B, one may expose a living thing at location A to the dangerous environment and cover up the sunlight and other nutritious supply to another living thing at location B. I remember an old English proverb leant many years ago: people who live in glass houses should not throw stones. Now we should not throw stones in Geoparks. I understand it is not a field test to count the number of bounces of rocks when being thrust to the sea surface at a certain angle. But many geologists and their colleagues/students will do so in a field trip. Remember it is an offense now if it happens in a Geopark.

The law applied to a Geopark originates from the protection of marine lives. I respect lives. However, I do not accept the constraint of activities in accordance with reasons not from the consideration of geo-science but from the other scope of science. Why can't we have dedicated laws fitting with the need of a Geopark? I am afraid that our officers are totally not familiar with geo-science and especially that the responsible department mainly handles

6 en.wikipedia.org/wiki/Mary_Anning

7 www.geopark.gov.hk/en_codes.html

plants and animals. They just adopt an old-minded principle 'not-to-touch' as if they are protecting lives. Such a policy has nothing to do with the study and education of geo-science. All over the world there are many geoparks and reserves having various policies that may or may not allow the moving away of rocks. It depends on the consideration of how the knowledge is disseminated. Apart from the Jurassic Coast, the Burgess Shale, another famous paleontological site, addresses a concept of science literacy[8] which organizes fossil trips so that participants collect fossils under a proper guidance and learn from what they find. This is conservation. To keep everything intact is just conservative.

Conservative does not help the education in the transfer of knowledge. Nor does it encourage scientific research. Field work is an effective way to study geo-science. Students collect samples to facilitate their learning. My interest in geo-science started at the time when I firstly entered into the Geography Room of my secondary school where I saw the rock samples in display racks. If students are deprived of the opportunity of taking samples, how do they learn well the subject? The development of geo-science has been due to the endeavour of many people including trained professionals, amateurs and collectors. It is impossible for trained geologists to uncover all important findings in the field without the participation of amateurs and collectors. Not to mention the local residents in Lyme Regis led the advancement of paleontology in the 19th Century, the first formally identified fossils of H.K. was discovered by Dr. Heanley who was a physician working in the H.K. Government. When I was talking with the duty geologist in the Natural History Museum, a couple showed a rock to him and asked for an identification. It was quite interesting that the specimen did not look like a fossil or a mineral. Other colleagues were called to examine it. I want to raise a point that the effort of amateurs cannot be neglected. Unfortunately, the HK Geopark does not serve to stimulate education and science research.

The UNESCO puts forward geotourism in Geoparks to achieve sustainability - a state of equilibrium and co-existence between human interests as well as natural features. Sustainability focuses on the welfare of mankind, rather than non-living things. As regards, I wonder why someone raises arguments against the erection of wind farm southeast of Basalt Island (not in the Geopark) because it just only affects the outlook of the Geopark. Whether the utility company increases capital expenditure to magnify the asset-based return is a matter of monitoring. But I cannot agree with the points that global warming is still in doubt and no sufficient scientific investigation can draw the conclusion. They are quite familiar to me as President George Bush also used these excuses to reject Kyoto Protocol.

Maybe geotourism is too restrictive in the scope of business to be developed. Let's just put it as a geo-business. The H.K. authority does not mention about geotourism or geo-business when relating to Geopark. Someone even said that Geopark is not a economic project. Why not? The first official document announcing the establishment of H.K. Geopark was the Chief Executive's Policy Address under the section of economic development. (I forgot which year.) The Jurassic Coast authority recognizes that the commercial fossils digging has been supporting the living of

8 www.burgess-shale.bc.ca/foundation/mission

some Lyme Regis families for more than 200 years and is not going to stop it. It has become a part of the socio-environmental development already.

Every week-ends many boats of local tour companies sail to islands of Sai Kung and carry hundreds of local visitors. This is a good business. Companies earn profit and pay tax. Employment of tour guides is secured. Restaurants of Sai Kung are crowded with visitors. Why deny the commercial benefit? Why deny the economic impact? Unless someone does not want to open up the market share and keeps the business opportunity among insiders. Nevertheless the portion of profit going to pockets of native residents is not much. Here I suggest native residents sell to visitors with the rocks collected from their backyard. Students can have samples for their study. This is a win-win situation. Agree? It is not my original idea but a copy cat.

In the Petrified Forest National Park in the US, there are notices to advise not to take away the fragments of petrified wood. But visitors can buy them in souvenir shops which state that they are collected from private lands. The most original idea of geo-business is a private columbarium being built on private land at Ma Shi Chau. On one hand this answers to the Chief Executive's requirement of setting up columbarium at each district. On the other hand, the Geopark represents a good 'Fungshui' for ancestors and their descendents have rests in minds. This is a legal business and I wonder why someone still opposes. At least the proprietor earns the profit from employing his own resources. It is far better than some local tour operators who take advantages from professional bodies to obtain field information as free lunch without playing the normal commercial rule.

I remember a bible story: A rich father will travel to some other places for a long time. Before he leaves he divides his wealth into 3 parts and assigns to his 3 sons. The eldest son invests his part and makes a big profit. The second son does the same, though the profit is not as much as his elder brother. The last son only keeps the wealth in a safe and does nothing. When their father returns, who will be commended and who will be blamed? It is so sad that we cannot make the best use of the natural gift as a tool for the study of geo-science. As this is a science of exploration, window-shopping type expedition is definitely not a geo-science education and research. Just like a diamond crystal. It would not display brilliancy and lustre if it is not faceted. Our Geopark is just mountains and islands for sight-seeing.

To me, the H.K. Geopark is a certain part of the Country Park injected with plasticizers for preserving its shape and given a new name. I hope this letter can lead to the consideration of the positioning of HK Geopark.

Last but not the least, on one Saturday afternoon in October, I heard the following description on Sharp Island given by a volunteer (?) who belong to the Geopark service centre next to Sai Kung Bus Terminus: Monzonite is an intrusive rock; it was formed inside the earth crust, but exposed to earth surface when it was not fully solidified... This is our HK GLOBAL Geopark. OMG!!

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**“Mineral Resource Estimation in China”**
**By George Tsang**

In 1986, China passed her first legal document to formally include the exploration and mining rights in “Mineral Resources Law of the People’s Republic of China” which says the said rights are not transferable, for lease or as collateral.

The law was revised in 1996 as follows, “the exploration right and mining right shall be obtained with compensation”, “exploration and mining rights or licences may be transferred under some provisions”. Details of the exchange of mining and exploration rights are guided by provisions set up by State Council.

All natural resources are belong to the country, the mining right is granted to certain people for developing the resource for some years under certain conditions.

China adopts the gradual system starting from exploration right to mining right, the mining right is reserved priority for the company which has done the exploration job. The appraisal focuses on the estimation of the value of exploration and mining rights. The mineral resources estimation includes two major portions, the technical and economic estimation.

The estimation involve cross fields background, such as knowledge of exploration, ore sorting, refinery, law, economy and accountancy. The appraisers may be accountants, lawyers, property appraisers, geologists, metallurgists, but you should know at least some basic knowledge of other concerned fields.

The natural resources are defined as bearing certain value and it could be utilized by human beings in certain period.

The American divides mineral resources into three categories, namely economic, marginally economic and subeconomic. While mineral resources include identified resources and inferred resources. Mineral reserves refer to extractable reserves or recoverable reserves, that is, it refers to the portion that can be mined in industrial scale. (Zhang Qin Li et al) However, China has been using the similar category since Dec 1999.

According to the classification for resources / reserves of solid fuels and mineral commodities- GB/ T17766- 1999, a 3-digit code is used to classify the reserves, the first number represents economy, the second digit represents feasibility, the third is geological creditability.

The technical view of estimation depends on exact identification of orebodies. We know the existence of orebodies is in form of inhomogeneous which bearing the characteristics of distribution in groups and concentration in veins. The technical investigation includes the study of the country rocks, environment, engineering, geology, composition of the minerals, hydrogeology etc.

The major techniques in estimating the location and size of the orebodies include, extrapolation methods such as time rate, crustal abundance, cumulative tonnage versus grade; Analog methods such as frequency, regression, trend, geometric probability, component, simulation, Bayesian etc (Zhang Qin Li et al). Certainly, we should also study the metallogenic models of the deposits.

In the “Block Models” of technical estimation, Chinese classify the blocks of resource / reserve into different grades before estimation, while foreign peers estimate blocks of different features then add up. ( Yang Zheng Xi et al ) While polygonal method /closest neigbour and triangular methods are frequently used by westerners.

The estimation of resources/ reserves is simplified by using SD software developed by a Beijing professor, the SD represents spline for S and Chinese pronunciation D for fractal dynamic, another meaning is Chinese pronunciation for search- progress.

The common methods for economic estimation include the market comparison approach, cost approach and benefit approach.

Market comparison approach is easily accepted by all parties, it reflects the current market value of the said mine, but it requires an active market with numerous cases for choices. It seems not quite applicable for Chinese market as the transactions are not enough. Another disadvantage is that it is not easy to find a comparable target as features are different for any two mines. The method requires minor exploration data but usually important data are not disclosed by the owner..

The estimation for mining right may apply market method or benefit method while estimation for mining right may use cost method as additionally method.

The economic estimation relies on “Accounting law of The People’s Republic of China”, General Rules on Enterprise Finance”, “Accounting Standard for Business Enterprises” etc. However, the estimation standard for enterprises with or without mining rights is different (Beijing Jing Wei). The ordinary financial estimation for enterprises depends on annual financial period, but for mining companies, the assessment only considers the profit earning during the mine service period, the cash flow is accounted for the expecting annual earning in the period.

The estimation for mining right is predictable. The production ability is accounted as sold products. The mining companies estimation relies on profit earning of the mines during its’ service period, while other companies rely on annual financial basis.

The cash flow of mine projects relies on the prediction of ability of annual profit earning, the estimation depends on total investment cash flow. The production is regarded as the total sales. All values assessed is considered as the present value at the estimated date.

Discounted cash flow method is widely used abroad for mineral resources estimation, the net present value reflects the present value of the reserve. China is using similar method.

Taxes for mining companies include sales, VAT, operation, city maintenance construction, resources, education supplemental, mineral resources compensation, stamps, property, vehicle utilization, land use, import/ export, income etc. (Liu Bao Shun)

Chinese appraisal of mineral resources requires the appraisers to consider the country benefit aside from the view of the enterprises.

However, formal training for the mineral resources appraisers is not enough, the

concerned course is usually offered as an elective course in geology programmes. In Hong Kong, evaluation of resources are sometimes handled by non-geological people, such as civil engineers, the stock exchange requires the mine evaluation appraised by "competent person" which is a blurry term. Certainly, the appraisers with overseas professional memberships are acceptable.

China requires all appraisal jobs should be done by certified appraisers who have passed the professional qualification examination which is held every two years.

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**"Field trip to Lung Ha Wan" by Peter Cheung of Geo Interest Group**

A few members of the Soc, including myself, attended a course on Geo-Tourism in the 4th quarter of 2010. On the completion of the course, I called up a group for enhancing our knowledge in geology by means of self-learning by organizing and participating field trips as illustrated in the "Hong Kong Geology Guide Book" published by the CEDD of the Government of HKSAR. I named the group as "Geo Interest Group" with its web-site launched in Facebook in early 2011 (web-site: http://www.facebook.com/pages/Geo-Interest-Group/155765104485164). Seven field trips have been arranged in the year of 2011 with participation of those who are fond of Geology and hiking. Normally, I would draw up a brief report on each field trip for sharing among members of the Geo Interest Group in order to refresh participants' memory. Taking Felix's suggestion, I depicted below a brief report on our recent field trip to Lung Ha Wan for sharing with members of the Soc. Anyone who feel interest in such kind of activities could join us in future trips.

At 11:15 am on 11 Dec 2011, we arrived at the observation location near the Ancient Rock Carving. We inspected the Rhyolitic Lava (流紋岩熔岩) of the Pan Long Wan Formation (檳榔灣組). The outcrops there were clear and we observed that the rocks were dominated by trachydacite and rhyolitic lava (粗面英安質熔岩). We also found many flow banded and stratified trachydacite lava with some of them extended over a small region with a contiguous pattern. We also took the opportunity to see the nearby Ancient Rock Carving following our inspection activity.

*Fig. 3 - Trachydacite and rhyolitic lava*

*Fig. 4 - Flow banded trachydacite lava*

On the slope of the road, we observed the Fine Vitric Tuff (細粒玻璃凝灰岩) of the Clear water Bay Formation (清水灣組) on the fresh surface of some rocks. We found some other similar rocks on the boulder beach located at the end of the Lung Ha Wan Road. The rocks there contained many feldspar crystals together with fine ash vitric tuff. Under sunlight, the shining vitric material had been conspicuous.

*Fig. 5 - Fine Vitric Tuff*

*Fig. 6- Spherically weathered tuff*

Passing-by the Equestrain & Education Center, we took a snack break on a grassland over the hill top. Around 1:30 pm, we started hiking along the trail of the Country Park. Surprisingly, we found some spherically weathered tuff scattered along the two sides. Under pleasing environment and beautiful scenery, we slowed down our pace and finished our hiking in 2 hours over a one-hour walk trail. We took a bus at 4:15pm back to Kowloon. Although the event had overrun by 2 hours, all participants were still filling with joyful mood seeming the party was still on-going while on our way back.

*Fig. 7 - Beautiful scenery around*

*Fig. 8 - Beautiful scenery around*

We had tried in vain to reach an access path to some interesting coastal landforms. Maybe the structures of the Equestrain & Education Center had blocked our view to it. Nevertheless, we would explore it again in our future visit to Lung Ha Wan. On the other hand, Alan, our team member, found a Stone Axe on the boulder beach that might draw archaeological interest furnishing this field trip with a good ending.

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