History and present of the building stones and the quarries around the Seto Inland Sea, southwest Japan

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Building stones, mainly granite and marble, mined in the area around the Seto Inland Sea was mapped along with the information of historic buildings in which those stones are used. Seto Inland Sea lies in the southwest Japan. Cretaceous to Paleogene granite intrusive bodies are exposed in the area which have provided many granite quarries on the islands and along the coast of the Seto Inland Sea. Some of the historically largest marble (limestone) localities also lie near the Seto Inland Sea. Granites and marbles are the two major rock types used for building stones. Many of the historic buildings in the Tokyo capital built before the world war II have used the stones mined in Japan. The provenance, however, have not always been recorded. As many provenance information as possible was mapped in this study.

Interview survey in some of the stone quarries around the Seto Inland Sea revealed that the stone industry have changed its structure in responce to the increase of the import of finished stone materials. Some granite quarry had mainly produced building quarries until about 1970's, but all of the surviving granite quarry presently produce tombstone and religious products. Many factors are found to mark the difference between quarries in different area: quarrying technique, site location, or the ownership of the site.

Keywords: building stone, granite, Seto Inland Sea, quarry, tombstone, headstone

Acceptance of plate tectonics in Japan and "Sinking of Japan"

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"Sinking of Japan" (Nihon Chinbotsu) is a disaster novel written by Sakyo Komatsu, published in 1973. The story of it was made into a movie in the same year. Both the book and the movie were big hits in Japan. By the hits of them, the public at large thought plate tectonics as an established theory or a hypothesis.

Acceptance of new scientific theory, however, needs many researches and arguments. In geology, acceptance of plate tectonics was also taken in the different style, because purposes for research and techniques between each science were quite different. Acceptance of plate tectonics in geology started since 1969 in the world. In Japan, examination of the geological structure of the Japanese islands with this theory started in the 1970s.

The scientific research in geology was progressed by the radiolarian research called a "radiolarian revolution". However, scientific research in Japan took time because of complicated geological structure. It was very earlier than a scientific research that the theory was generally known in Japan. By the record, acceptance of plate tectonics in geology seemed to be later. About research of the acceptance of the scientific theories in each community, how research was progressed should be taken into account.

Keywords: plate tectonics, science history, movie, Nihon Chinbotsu

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A model of modern science and its working: Dual Feedback-Loop Operator

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Origin of science and its working may be traced back to the nature of a primitive creature sensing the environments and reacting towards better adaptation for survival succession. The basic cognitive mechanism of interaction between the life and its environment may be neuron networks and their informational interactions in molecular level. The modern science is interpreted as one of the advanced type of interaction between the natural world and anthropoid society in which so many individuals contribute to create collective intelligence. Now, we can utilize the collective intelligence as if it is a tool kit, or practically a set of black-gray box tools

The proposed model of science is operational, whereas it is different in its utility from the operationalism proposed by Bridgman (1927). The present idea is a phenomenological macro model, in which the environmental world(W) is regarded as an input through observation, and the output is a set of 'likely model(M) of the World and its extent of uncertainty', mapped onto our cognitive space as a collective intelligence for anthropoid. In short, we write $M = dFLO \times W$, where dFLO is a mapping operator with dual feedback loops: (1) OBL (observation loop) to provide the better information acquired by observation on W, and (2) WHL (working hypothesis loop) to provide the information on what could be compared with those from OB loop. (dFLO: acronym of dual feedback loop operator). The main body of dFLO generates the better model M of W than before by innovation through the comparison of information provided by the two loops and also generates two types of command information to two feedback loops for their innovation. Successive innovation of M leads to the evolution of M together with dFLO. This feature appears to fit very well with the intuition by most working scientists. We note that the dFLO model of science possesses the internal structures; nesting of many dFLOs of various hierarchy levels in many different disciplines including not only science but also technology, etc. as the essential tools to run the operator. The present model of science may be a substantially innovated version of hypothetico-deductive method.

The forthcoming research works on this model of science will be the application of dFLO of respective disciplines of our interests. At the developmental stage in a particular field, most of the works may be data collection in a way of classic natural history within the OBL, without active commitment of WHL to interpret the data in terms of the origin and/or mechanisms of what we have observed. Later WHL is activated as a consequence of new theories and/or new type of output from OBL, etc. Further development may lead this discipline to be a black box tool ran by a group of specialists and other outside scientists utilize only the outcome without committing the technical and theoretical details in this field. A typical example may be the study of physical properties of relatively simple materials, which are now computed numerically on the basis of the first principle theory referring to quantum physics with less involving the OBL. Once an indication of new phenomenon yet to know is suggested either from OBL, WHL, the dFLO starts to evolve differently.

Additional type of evolution of dFLO is differentiation to the sub-disciplines with their proper dFLO as a result of too much expansion to be followed by individual scientists. This situation is demanded by saving the human brains in a way of division of expertise. Another type of evolution of dFLO may be the collaborative coagulation of dFLO in different disciplines supported by different expertise towards the formation of collective intelligence.

A swarm or cloud of all of dFLO in efficient mutual interactions can be regarded as a sound and active 'collective intelligence' for our anthropoid society.

Keywords: philosophy of science

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A case study of the dFLO - Optimal designing of the data acquisition and the inverse problem on the structure estimation

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The notion of the dual-feedback-loop operator (dFLO) is a generalized scheme of the hypothetico-deductive method in scientific research and an elementary tool to understand the behaviors of nature by repeated renovations both of acquiring the observational information and of modeling the essence of target behaviors on the trial and error basis. The structure estimation of Earth's interiors and/or engineering structures such as buildings would be a good example to demonstrate how the dFLO works because its workload is mainly dedicated to designing two feedback loops of observing a wave field and of the inverse problem to estimate structural parameters, which are intimately related to each other and then it is an operator to transform the data observed to the structural parameters required. In our report, we will show the importance of designing the objective function which represents the difference between the observational data and the results of the forward problem calculation because it gives suggestions on how the data acquisition should be modified in the next step and also on how the model should be rebuilt.

Keywords: philosophy of science, structure estimation

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A review of recent studies on "Collective Intelligence"

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According to an overview of earth's history, we can see the gross picture of human evolution. Originally we were self-replicating molecules, next to the single-celled bacteria and became various species of multicellular gregarious animals which think logically. It is a major event on earth's history that human being began to do science evolving explosively to enable us to recognize ourselves as such an entity. This event is called the seventh big event in the whole Earth's history (Kumazawa: 2002). At present, human being has obtained a potential to control other lives together with their environment and started to interfere the natural evolution. Recognizing this situation, we think we have an important responsibility of utilizing our intelligence towards what is ought to be. However, we know we have not intelligent enough to do what is expected to do. A straightforward approach demanded may be the study and development of "collective intelligence".

Current human society is changing rapidly in association with the realization of information society. A group regarding information (knowledge, wisdom, idea) as a potential resource to be utilized extends their competitive edge and creates new ideas and technologies. Another type of reasoning is such that predictions by crowds of ordinary people are smarter than predictions by some professionals (Page:2004,Surowiecki:2005). The concept of collective intelligence is utilized in a system such as data mining and even for controlling someone's decision. Examples are not limited to Google's search system, Wikipedia, stock price prediction, a way to find optimal solution, and clustering. Now, collective intelligence may possibly decide where the society is heading in future.

However, we know from one's previous socio-psychological experiments that the crowd is not the basis of good judgment(Darley and Latane:1968). Because an atmosphere or a common knowledge that develop when the people gather mislead someone. These are the mass psychology, bystander effect, totalitarian ego.

For these reasons, it is ideal that we make use not only the information in the accumulated knowledge, but for us to bring out the collective intelligence in real time and prevent someone from falling into mass psychology. Some companies are beginning to practice the collective intelligence in utilization of "knowledge, diversity, and disruption".

In this way, despite a general awareness of the importance of collective intelligence, the concept and structure are still in the discussion stage. In this research, we review the studies on "collective intelligence" in artificial life and artificial intelligence and what the scientists have so far.

Keywords: Collective Intelligence, Crowd Psychology, Artficial Life, Artificial Intelligence

Framing of Japanese newspaper in reporting issues of seismic disaster

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Mass-media is an important tool for the transfer of scientific and technological information, concepts, and ideas to public. Generally, there are two types of scientific and technological knowledge; One is strongly linked to political issues and the building of social infrastructure, and the other is fundamental researches leading to the cultural enrichment. In Earth and Planetary Sciences, the former is mainly risk information of natural disasters, such as global warming, earthquake and volcano. Various kinds of information in Earth and Planetary Sciences are delivered via mass-media to public and they make a contribution to the public understanding of Earth and Planetary Sciences and the improvement of social life. Here, this study examines how the scientific knowledge of seismic disasters is pictured by mass-media with use of the content analysis.

To prevent the seismic disaster, it is essential to improving disaster preparedness and management in peacetime. Seismological researches have been indeed powerfully promoted at universities and others in the earthquake-prone country, Japan and some laws have been created on the base of many seismological results. Because these laws significantly control the social living through the disaster prevention education, public works, and so on, efforts to rank each law in order of importance have to proceed under the national consensus. Then, it requires public to have primary seismological knowledge to some extent when advancing countermeasures to prevent the seismic disaster. As the prime means of communication between government agencies, seismologist, and the general population, mass-media plays an important role in the process that the public perceives a potential seismic risk. From this view point, it is crucial to comprehend how seismological knowledge is portrayed and covered in mass-media coverage.

In this study, in order to reveal how Japanese mass-media frame scientific information about conceivable seismic risk, this study focuses on seismic disasters which occur in foreign countries. The reason why the coverage of Japanese mass-media for seismic disasters in foreign countries is adopted as the subject of research in this study is explained by following three points:

(1) Because there are few political issues which Japanese government should deal with, it may be easier to find out the media framing of seismological information.

(2) There may be enough time to constitute what people have opinions about Japanese insufficient strategies by checking foreign responses for seismic disasters through mass-media.

(3) The seismic disaster which is one of most important issues in Japan is of considerable concern in Japanese mass-media.

Here, the content analysis of newspaper coverage for the Sumatra Earthquake in late 2004 is performed. Various questionnaire results pointed out that the most popular mass-media for a whole generation of people is the television and newspaper. All articles published in newspapers are recorded, classified and indexed separately. Moreover, the reproducible result can be obtained because the database of Japanese newspapers is exhaustively complete. The typical national newspapers in Japan are Asahi Shimbun, Mainichi Shimbun, and Yomiuri Shimbun, which are called three major newspapers, and they have a circulation of several million. Hence, it is thought that the nature of newspaper coverage of the seismological knowledge can be significantly outlined by the content analysis for three major newspapers. In this study, both qualitative and quantitative studies are used. In the quantitative study, the articles are categorized by the Self-Organizing Maps method. In this presentation, the author introduces the findings from the content analysis and discusses which kinds of issue newspapers are likely to select.

Keywords: newspaper, seismic disaster, science communication, framing, risk communication, content analysis