
THE STATUS OF GEOSCIENCE EDUCATION IN NIGERIA

**M.A. Omar Rahaman
Professor of Geology
Obafemi Awolowo University, Ile-Ife**

**NAPE Monthly Technical Presentation
Wednesday, May 18, 2016**



PRESENTATION OUTLINE

- Introduction and General Overview
- Discourse on Philosophy and Science
- Basin Evolution - Orogenesis Processes Vs. Plate Tectonics
- Geology – X-Ray as Hermeneutic and Historical Science
- Education: Core Value Definitions
- Learning Methods & Concepts
- Issues in Geoscience Education in Nigeria
- The Way Forward - Remedial Options

INTRODUCTION

- Geological Sciences Vs. Experimental Sciences
- The making of today's industry-fit Geoscience student
- The deteriorating quality of instruction and graduates in the Nigerian higher education system today
- Examining Factors responsible for this decline
- The Responsibility Matrix- Government, School, Parents, Students, Alumni, Oil & Gas Companies
- Engaging External Consultant Professional Practitioners
- Stakeholders contributions required for positive changes

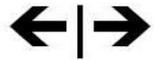
DISCOURSE ON PHILOSOPHY AND SCIENCE

- Thoughts on Ancient Greeks concept to Present - science was a part of philosophy that broke away from natural philosophy
- Science has been presented as a source of objective knowledge, but how has science obtained this knowledge
- What is the geologist's understanding of the nature of geology?
- During the 20th Century, two main schools of thought were developed: Analytic, and Continental
- Review of the 20th Century modern Physics – Quantum Mechanics, Classical Mechanics, Relativity, The Uncertainty Principle, etc

BASIN EVOLUTION – OROGENESIS VS. TECTONICS

- Concept of orogenesis - The geosynclinal theory
- Moving from Orogenesis to Plate Tectonics

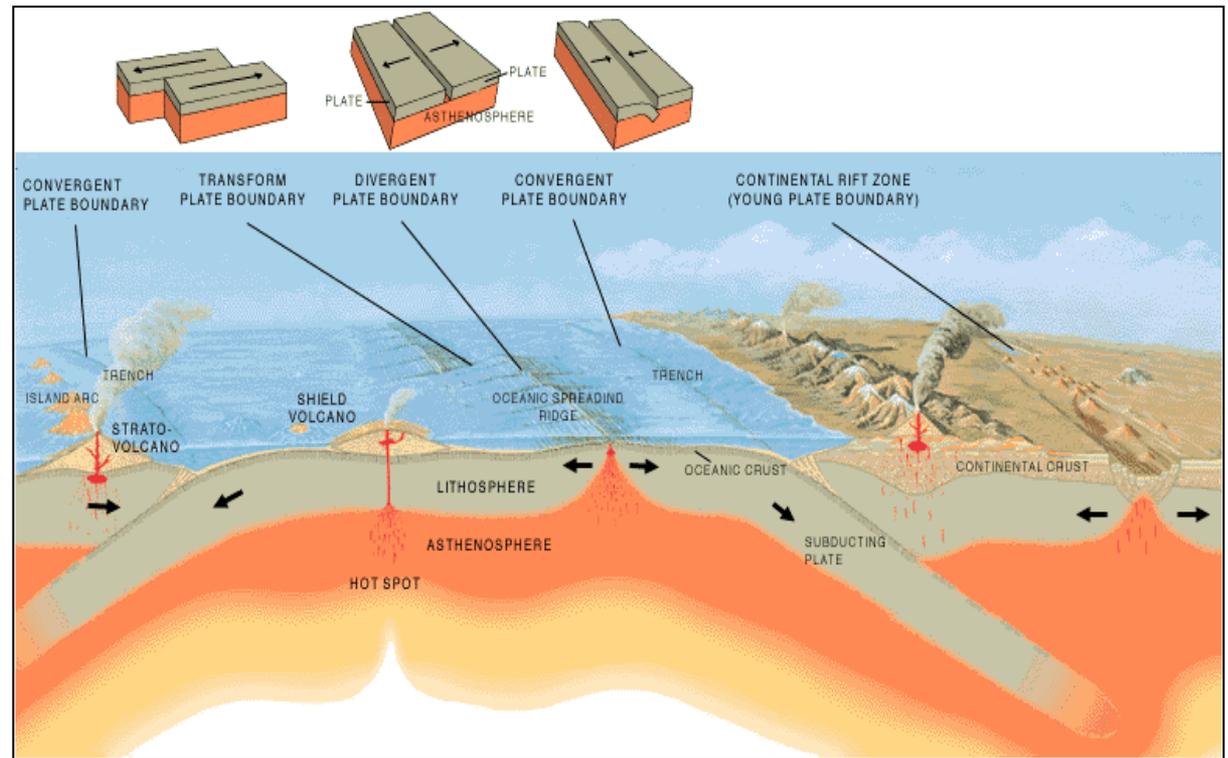
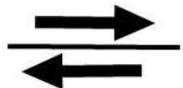
- Divergent (Tensional)



- Convergent (Compressional)



- Transform (Shear)



Source: Pearson Prentice Hall, Inc. 2006

Plate Tectonic Interpretation of orogeny (Sawkinset *al.*, 1974).

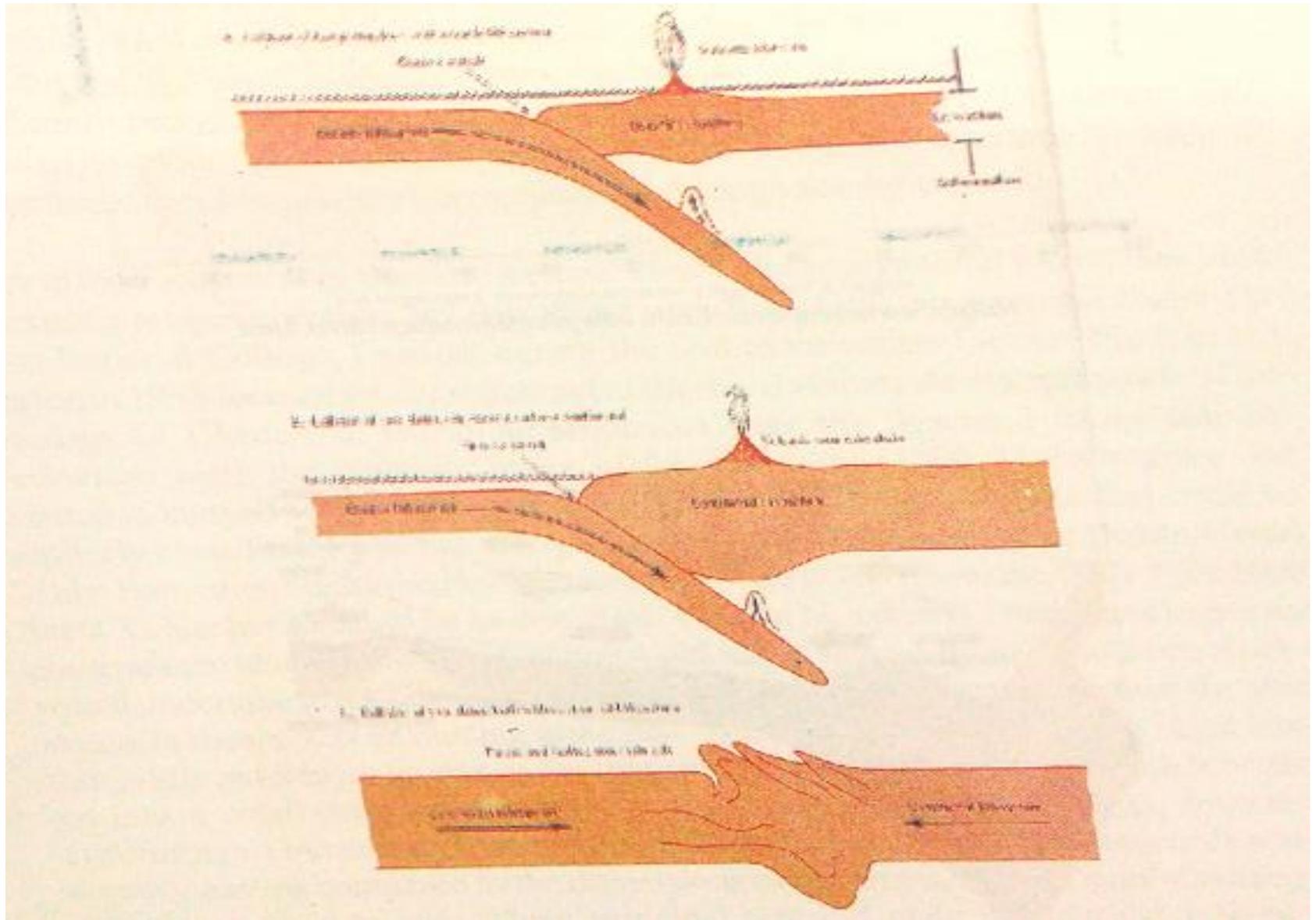


Plate Tectonic Interpretation of Geology east of the West African Craton (After Burke and Dewey, 1970).

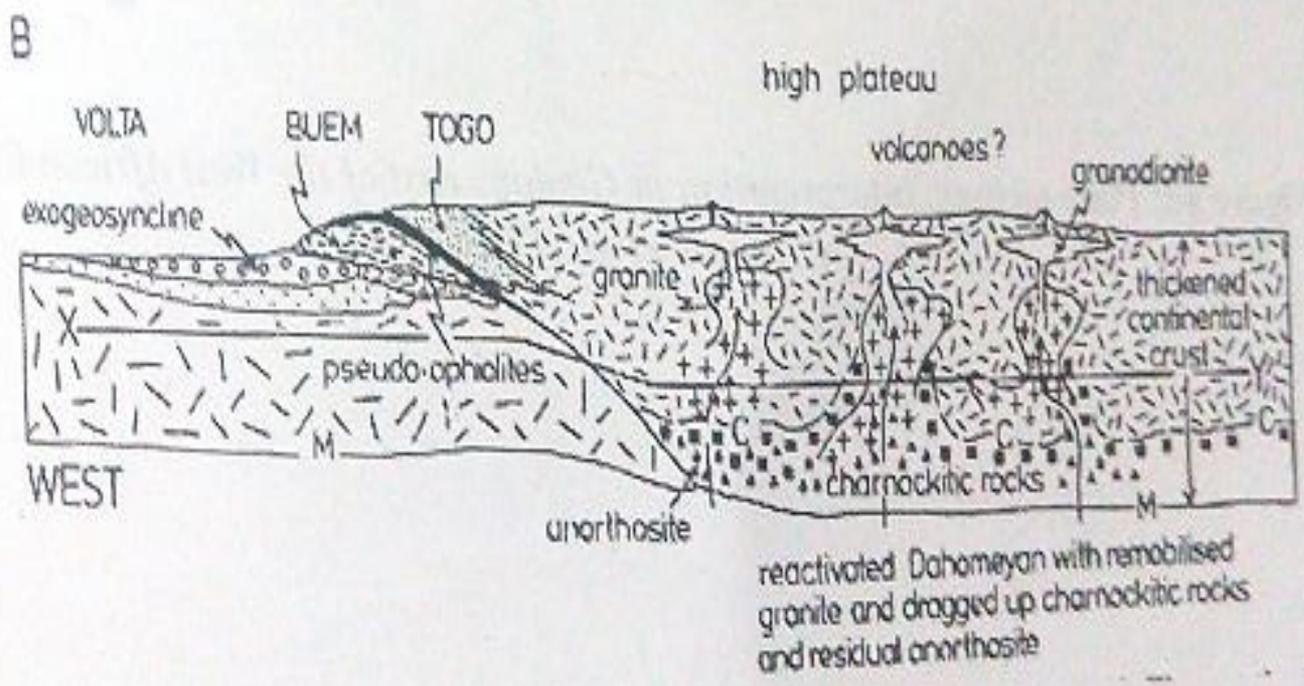
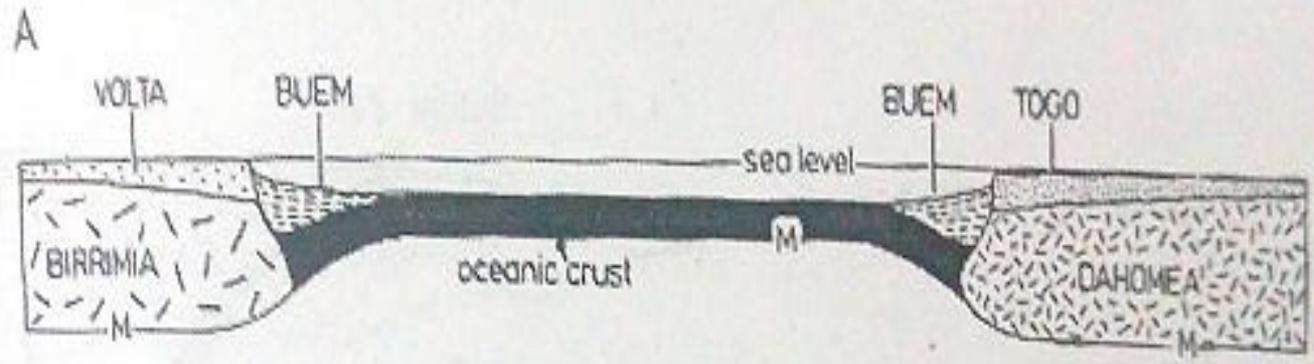


Plate Tectonic Interpretation of Geology east of the West African Craton (Affaton, *et al.*, 1987)

crust is subducted along a shallow dipping Benioff zone beneath a passive margin (fig. 8).

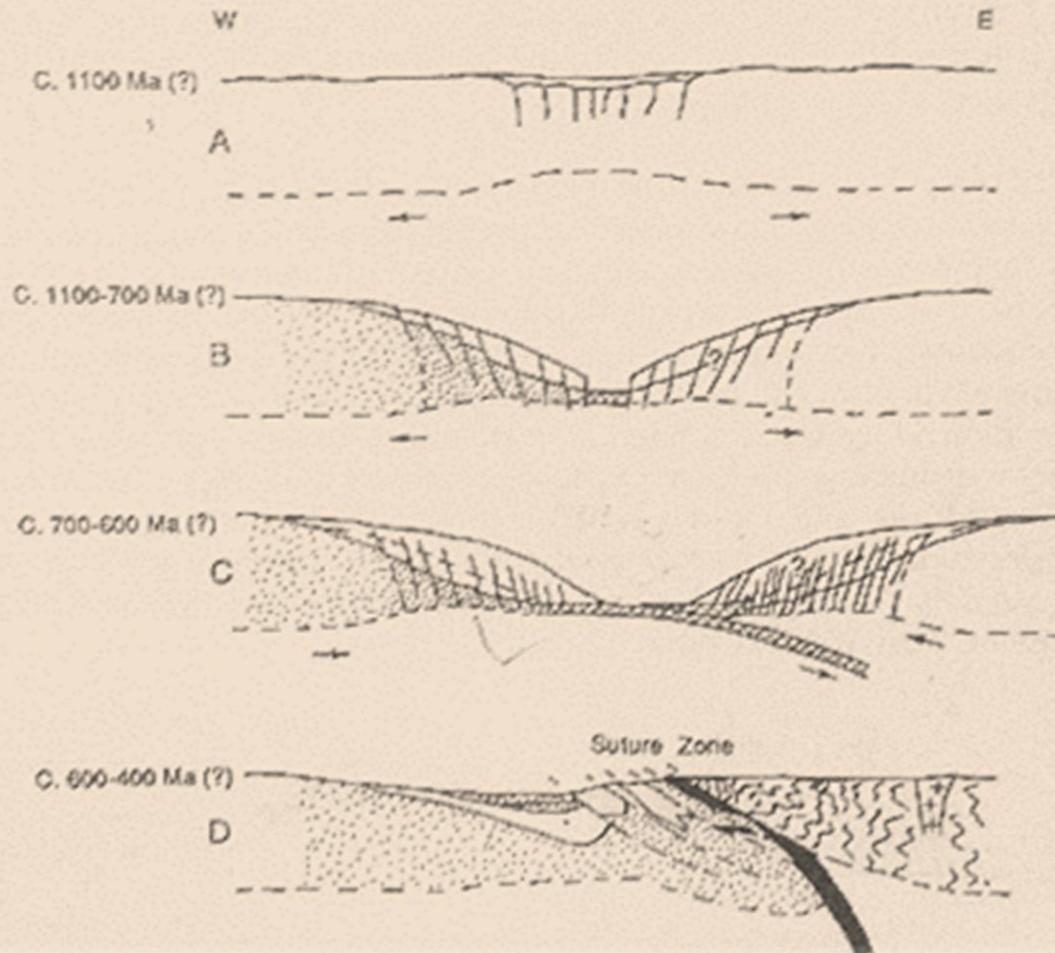
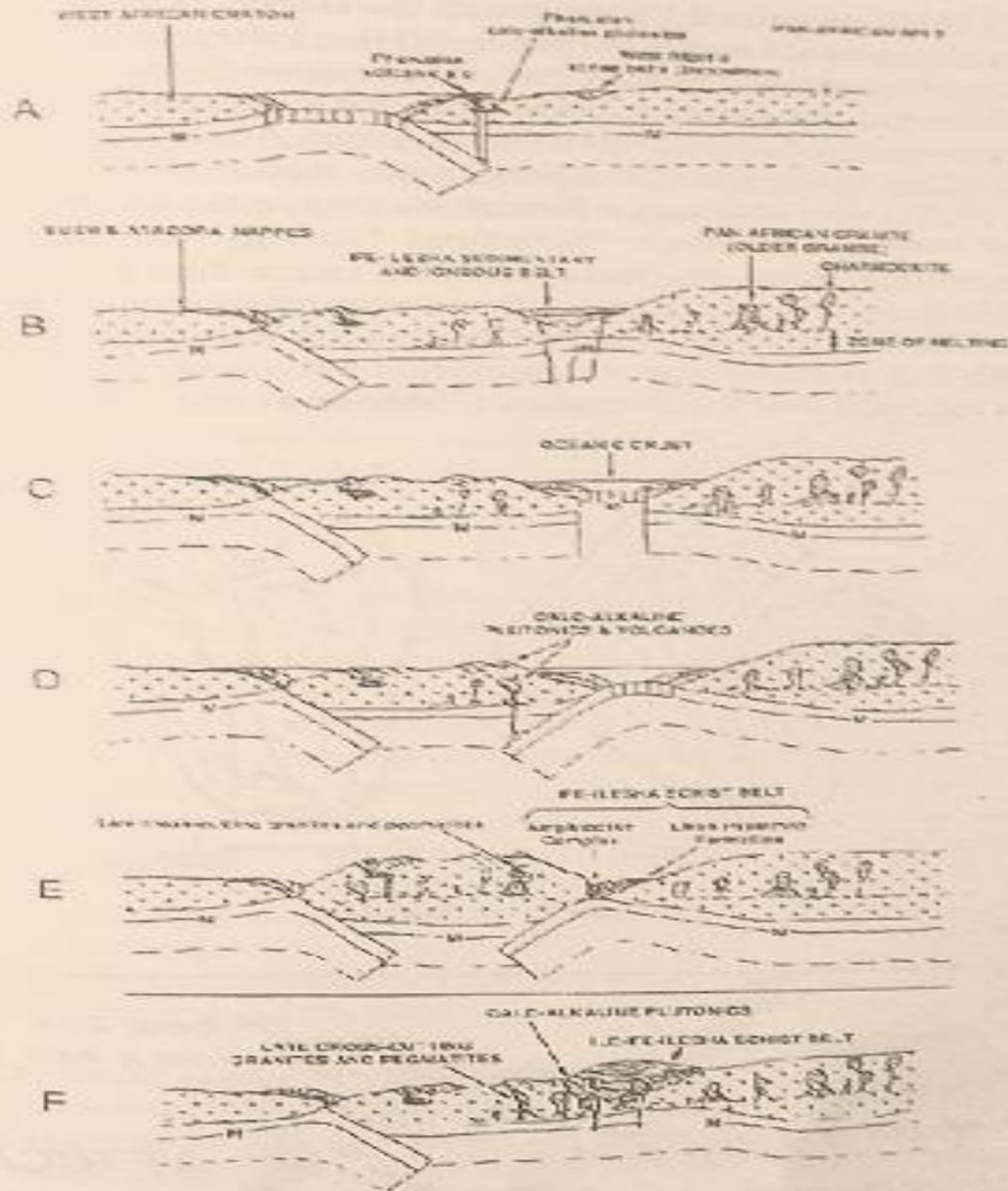


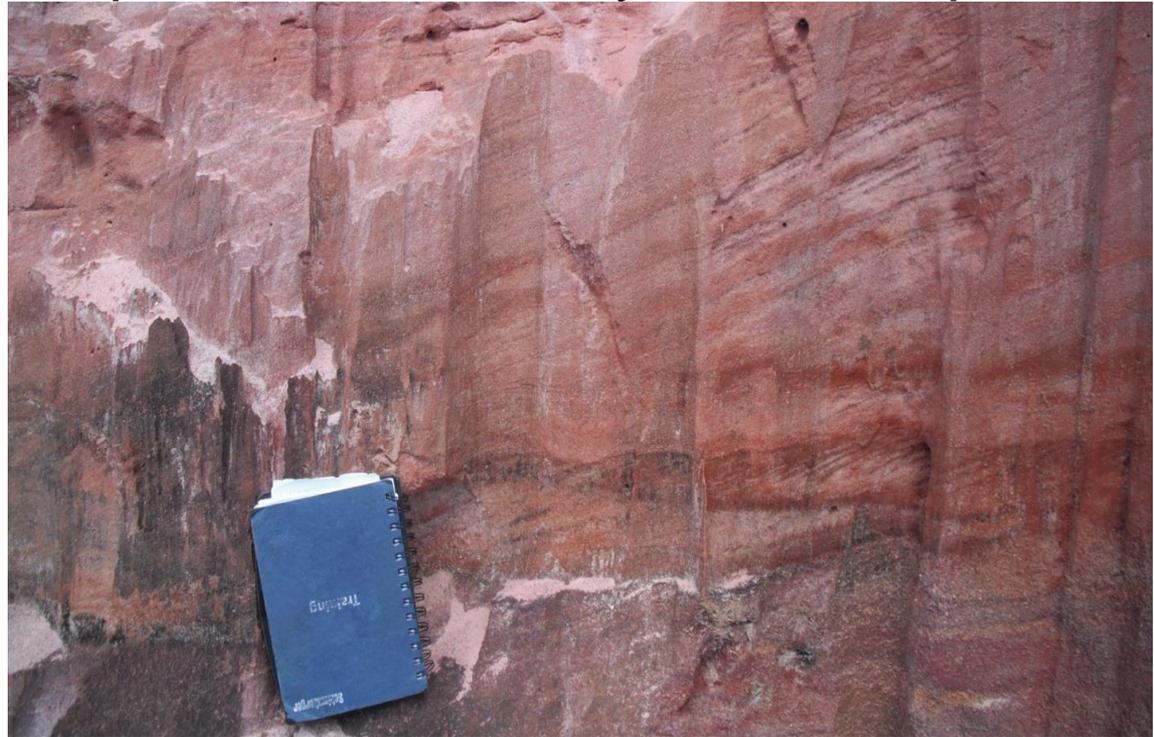
Plate Tectonic Interpretation of Geology (adapted from Rahaman, 1988).



GEOLOGY – HERMENEUTIC & HISTORICAL SCIENCE

- Geologic understanding is best understood as a hermeneutic (interpretative) process
- Our perception of an outcrop is constrained by our conceptions
 - Describe based observations
 - Interpret/Model
 - Deductions
 - Conclude
 - Recommend

The outcrop means nothing to those who have not been taught the concept of “seeing” the rock - Rahaman



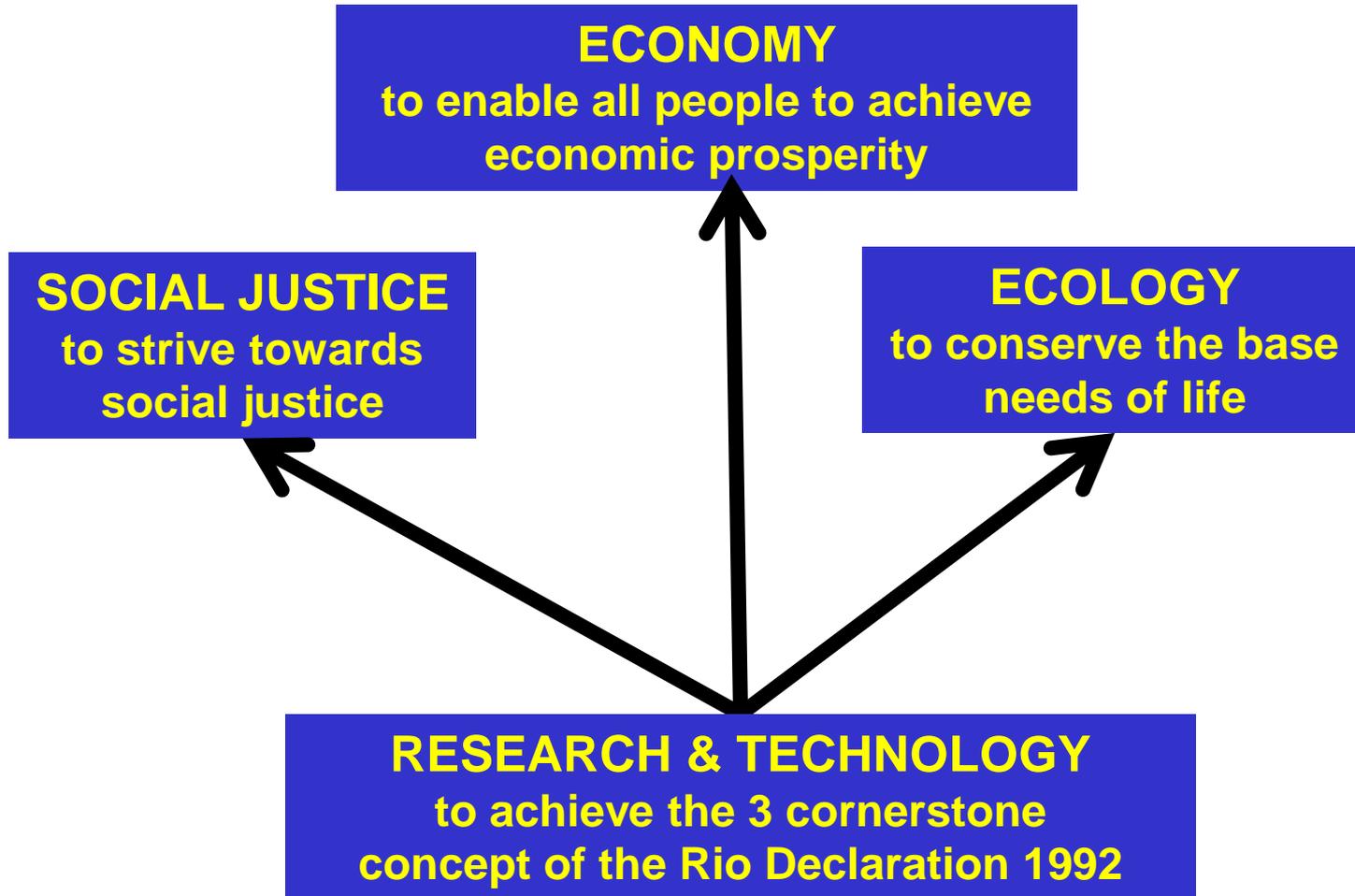
An exposure on Bida Basin, along Agbaja Road (Source: Dept. of Geology, OAU).

GEOLOGY – HERMENEUTIC & HISTORICAL SCIENCE

- According to Frodeman (1995), geology as an historical science is characterized by three points:
 - The limited role or relevance of laboratory experiments;
 - The problem of natural kinds;
 - The nature of geology as a narrative science
- Unlike Physics and Chemistry, time, space, and history are constraints to geological understanding
- Geological reasoning – based on overall coherence of a theory rather than a correspondence between present and past
- Historical Sciences employs narrative logic while Experimental Sciences employs deductive-nomological model

EDUCATION – CORE VALUE DEFINITIONS

Education is an important factor in economic growth and development



EDUCATION: LEARNING DEFINITIONS

- Learning is a subtle and complex process - It is a thought process; requires mental engagement and concentration
 - We learn in the classroom by being taught by a teacher
 - We learn by being an apprentice to a master
 - We learn by doing and experiencing things
 - We learn from one another through collaborations
 - We learn by ourselves using the library, internet, etc.
 - We learn unconsciously by inspirations and insights

EDUCATION: LEARNING METHODS - CONCEPTS

TEACHER LEARNING - CONCEPTS

- Teacher learning still dominates in the geosciences
 - Teacher is active – relies on textbooks, lecture notes, journals, filling worksheets, etc
 - Focuses on students' ability to reproduce knowledge transmitted to them rather than produce knowledge of their own
 - Students were passive recipients of information and failed to develop their thinking skills (Daher, 2011).
- Required Change
 - Create a Shared Learning Interactive Environment to foster openness, collaboration, and thinking process

EDUCATION: LEARNING METHODS - CONCEPTS

BLENDED LEARNING - CONCEPTS

- Blended learning approach in which e – learning courses are coupled with instructor led courses
- Supplemented by practical sessions – taking knowledge to skill
- Key elements in blended learning are:
 - Learning is an active not a passive process
 - Competencies are defined and assessed
 - Formal training must be relevant and timely
 - learning period combines theory and application

The Editorial of the Tribune Newspaper of Friday 9th September 2011 captioned "FIRST CLASS FAILURES"

17 Nigerian Tribune
Friday, 9 September, 2011

TRIBUNE EDITORIAL

THE AFRICAN
NEWSPAPERS OF
NIGERIA PLC

Founder:
CHIEF OBAFEMI AWOLowo GCFR, SAS
(1909-1987)

Co-Founder/Chairman
Chief (Dr) H.L.D. Awolowo (CON)

Publisher & Vice Chairman
MASTER Oluwole Awolowo

Managing Director / Editor-in-Chief
Sam Adesua

Executive Director, Finance
Jimoh Olaoye (ACA, Ph.D)

Contoller (Human Resources)
Fola Oke

Senior Manager (Adverts)
Bisi Yomi-Layinka

Senior Manager (Sales & Distribution)
Adeolu Adeyefa

Chief Internal Auditor
Ayokunle Olaoye

Production Manager
Israel A. Ojabanire

Ibadan Office
Advert Hot Lines 08123359272
08078891778

South West Regional Office
Advert Hot Line 08077227269

Lagos Office
Advert Hot Line 08055333067
(01) 7642829; (01) 8196930

South South Regional Office
No. 25 Ikwerre Rd, Mile 1, Diobu,
P/Harcourt, Rivers State
Advert Hot Line 08033017167

FIRST-CLASS FAILURES

WHILE declaring the 9th Nigerian National Petroleum Corporation (NNPC) National Quiz competition open recently, the corporation's Group Managing Director, Mr Auster Oniwon, revealed that the just concluded recruitment examination conducted by the NNPC was unprecedented as 80 per cent of the applicants, who were mainly first class and second class upper graduates, failed the examination.

THIS depressing revelation came along with the observation made by the country's Minister of Education, Professor Ruqayyatu Rufa'i, that Nigerian graduates are a burden to the society. If the stakeholders in the education sector had an inkling of the extent to which the sector had been consumed by rot, we are sure that they did not know it had reached an emergency such that the NNPC disclosure represented.

IF it is understood generally that the greatest resource any country can have is its human resources, then it will be easy to appreciate the grave danger which Nigeria is facing as a result of the deterioration of its human resources in terms of quality and depth. A couple of years ago, the chairman of the governing council of a Nigerian university lamented openly on the pages of a newspaper how corruption had afflicted the operations of the university system to such an extent that certificates no longer represented the knowledge or ability of their owners. In that university, many female students simply registered for courses and promptly proceeded abroad to work. For a remittance of a fixed amount of foreign currency, their lecturers colluded with them to score high marks in examinations written for them by paid 'mercenaries.' The result was that such female students passed out in flying colours while the students who meticulously attended the lectures barely passed their examinations.

MANY private universities which have very strong schools of Management and Social Sciences have lecturers from federal universities who buoy their profiles before the National Universities Commission (NUC) for accreditation. These universities too have been awarding first-class degrees without restraint. To be sure, these private universities have been reluctant to fail students who deserve to be failed because of the exorbitant school fees. It would seem that the private universities are profitable investments

to cash in on the various lapses in the education sector. How indeed could a student who could not score the average of 200 marks in the UTME but who could afford private university education eventually pass out with a first-class?

THERE is hardly any doubt that a reprehensible lowering of standards exists in the education sector, even if experts disagree that standards are falling. The products of the Nigerian university are hardly worth the certificates which they brandish. According to Dr Levi Ajuonuma, who represented the Group Managing Director of the NNPC at the launch of the National Quiz Competition, there was a need to shift the focus from mere paper qualification. While this may be an advisable position for human resources managers to be able to select the few good apples from a basket of rotten ones, we refuse to accept it as a veritable panacea for the issues at hand.

WE think that there should be a concerted effort to rescue the universities from the cesspit of decay into which it has sunk. The NUC cannot continue to approve universities for which there are no available lecturers or professors to teach. For quite a long time now, Nigerian universities have been depleted of capable hands. Many of them have been lost to brain drain. Even a few too, having discovered the gravy in civil service during secondment, have refused to go back to the dreary world of unrewarding bookish life.

WE think that the NUC should enforce standards. It is dangerous to issue certificates of competence to unworthy people. It is sad and tragic enough to know that no Nigerian university ranks among the world's first 2,500 universities. For first-class and second class upper graduates to be found wanting is absolutely unacceptable. The Senate Committee on Education, Federal Ministry of Education and other stakeholders should help the NUC to insist on standards and redeem the quality of the certificates being issued by Nigerian universities.

ISSUES IN GEOSCIENCE EDUCATION IN NIGERIA

DECLINING STANDARDS & FACTORS

Rahaman (2002) identified the following factors, among others, to be responsible for the decline in the quality of instructions and maintenance of high academic standards in our institutions:

- Cutback in funding
- Exponential increase in student enrollment
- Decline in the number and varieties of facilities available for teaching and research
- Poor caliber and inadequate staffing of departments
- Student quality
- Falsification of accreditation exercise results

THE WAY FORWARD – REMEDIAL OPTIONS

All stakeholders need to collaborate to achieve the following to advance geoscience education in Nigeria

- Increase Funding for Universities for facilities and equipment
- Staff & Student Capability Enhancement Training
 - Example - ExxonMobil Train-the-Trainer delivered through short courses, Basin Evaluation (2013), 4-D Seismic (2014), Sequence Stratigraphy (2015), Structural Geology (2016)
 - Shell University Staff Sabbatical Opportunities
- Collaborative Effort – NUC, NAPE, NMGS, Industry to redesign geoscience curriculum that meets End-User
- Engage Service Providers or Professional Consultants to fill critical skill gaps in the Universities
- Run credible accreditation process devoid of undue influencing

THANKS FOR LISTENING!