

## ELEMENTS OF PHYSICS IN YORUBA CULTURE AND AGRICULTURE

DR. H. M. OLAITAN

DEPARTMENT OF PHYSICS LAGOS STATE UNIVERSITY, LAGOS

## ABSTRACT

The content of the scientific knowledge of the early Yorubas, encapsulated in their traditional religious beliefs and practices were to a large extent determined by their observations of nature. The early Yoruba men were mostly farmers or hunters while the women were mainly farm workers and hawkers of agricultural consumables and processed products. In this paper, attempt will be made, within the framework of contemporary Physics, to understand, explain, and interpret the elements of Physics in their culture and agricultural practices especially with respect to their combination of mechanical knowledge and their interdisciplinary knowledge of the peculiarities of nature.

1.0 ELECTROMAGNETICS IN EARLY YORUBA AGRICULTURE

The early Yorubas studied, researched and practiced the art of rain making and water dousing (OLAITAN (1)). Hydrology was so important to them because they believed that water was the blood of the soil –the husband of the seed-the father of all plant on earth. The life in a seed lies dormant until water vitalises and then awakens it to activate life of its kind. They believed water is nature's greatest gift to all growing things; it is indeed the foundation of life. According to the early Yorubas (ADEKOGBE (2)).

*'A kii ba omi sota: meaning "Nobody is an enemy of water"*

*"Iri kekere ni idi odo. Iriwawa ni idi ojo" meaning " Tiny drops of dew can become a stream; heavy dews turn sometimes to rain" "Ojo ni oko agbado" meaning "Rain is the husband of the maize"*

The early Yorubas were mainly farmers and to them water was a very important factor in their daily lives. They would therefore go to any extent to find good water whether underground or otherwise. In many areas in Yorubaland the source of water was underground or otherwise. In many areas in Yorubaland the source of water was underground. Hence their interest in the art of water dousing (or divining) which was linked with the involvement of spirits of some certain trees (OMISANDE(3)) helping in locating the source of underground water. What they practiced however, could be explained in terms of some elements of ideas in contemporary physics (OLAITAN (4)).

The early Yoruba water douser (or diviner\_ would cut a fresh forked twig of a certain tree (walnut tree for example). He would then hold the forked ends of the twig in his two hands with the remaining pointed end to the twig pointing away from him. He would now attempt to locate the probable co-ordinates of the underground water. The point at which he experienced a dip in the twig registered the co-ordinates of the underground water. This would be followed by digging of a well (popularly known as 'kanga' in Yorubaland) at the spot (OLAITAN (5)).

The elements of Physics involved in the water dousing (divining) of the early Yorubas is in the realm of electromagnetism rather than the involvement of spirits as modulated by the early Yorubas. The sun sends a constant stream of negative solar energy to earth which penetrates moist ground. If the ground contains no moisture, the sun's rays are unable to penetrate the earth's surface and the dry soil will repel solar energy, causing the negative energy to change to the positive, producing heat. Sun's rays produce no heat until they meet an object of opposed electrical character. The atmosphere through which sun's rays pass is electro-positive. The light (an electro-magnetic radiation), as sun rays in passing through atmosphere causes friction which results in heat. It also produces electricity and magnetism. The earth; the plant life on the earth, the oceans and water streams on and within the earth are electro-positively charged, which is the opposite electrical force that comes directly from the sun. Men and animals are charged with positive electrical energy. Underground water is constantly being charged with earth penetrating sun rays just as is surface water. The same rays change cold ocean water to vapour; keeping the hydrologic cycle always in motion. Underground water absorbs the same solar energy. Excess energy which the underground water is unable to hold is reflected upwards as positive energy to the earth's surface to nourish grass, plants and trees.

When a man walks directly above underground water, the positive energy from the water below arises vertically to make contact with the positively charged man, probably through the feet. When a man carries a pointed dousing rod, be it metal or a fresh moist branch from a tree, energy entering the feet will over-

charge the man's body to escape through the most freed exit, which is the point of the dousing rod, the rod acting as a sensitive extension of the man's body.

The charge of positive electricity flowing rapidly through the restricted end-point of the dousing rod is drawn strongly into the negative electricity flowing everywhere towards the earth in the always present moist air. When the two energies meet, a closed electrical circuit is formed which remains active until the rod is dropped or until the man walks on the water body vertically underground. He therefore, experiences a dip in the dousing rod when he is vertically above the underground water body, which clearly locates and registers its co-ordinates.

When lightning directs its radiation towards an object on earth, such as a house, or any other structure, it can be picked up by a lightning rod. The rods, the house and the earth are positively charged. The lightning rods being grounded in moist soil, will cause the lightning to strike them and to pass through the rods to enter the ground without any injury to the building. The sharp pointed lightning rods give proof that electrical currents enter an object via the best conducting path the object offers. The newer, sharply pointed metal locating instruments of the modern douser and lightning rods operate on much the same electrical principle; so also does a forked twig (freshly cut from a walnut tree for example) as used by the early Yorubas in their so-called spiritual modulated Physics agro-allied applications.

## 2.0 RAIN PREDICTION PHYSICS IN EARLY YORUBA AGRICULTURE

The early Yorubas studied, inter alia, not only rain production, but also types and nature of rainfall as indicated in the saying (SOSANYA) (6)).

*“Mo de werewere bi eji ale,  
Mo de warawara, bi eji ara,  
Mode papa pa bi eji iyaleta”*

*Meaning:*

*“I come slowly like the night rain,  
I come quickly like the morning rain  
I come scatteredly like the afternoon rain”*

The early Yorubas researched into the prediction of rainfall. In this field they scored a series of success in that they could predict the occurrence of rain to within the tolerance allowed by the statistical nature of their observations. (OLAITAN (7))

In the dry experiment of the early Yorubas, the farmer would pick up some of the dry earth under a tree, throws it upwards and notices the scatter of the light particles of the dust. From the scatter and its rapidity, the imminence of rain is predicted.

In the hand-saliva hygrometer experiment of the early Yorubas, the farmer would spit on the back of his palm and notices the time taken for the saliva to dry off. If the saliva dries up quickly the chance of rain falling at that time is put as negligible. But if the saliva dries up slowly (not fast enough) the imminence of rain is confirmed.

These two predictive experiments have strong physical basis. The early Yorubas recognized that high wind and presence of water vapour in the air were two conditions of rainfall. The second experiment was designed to measure in effect relative humidity (which must be high for rain to fall). If the saliva dries very quickly, the early Yorubas recognized the very low water content in air (and hence low relative humidity); otherwise slow drying of the saliva indicated to them high water content in the air (high relative humidity) and hence the imminence of rainfall. The hand-saliva system thus constitutes a hygrometer. The first experiment predicts rainfall from the existence and speed of wind. If the light particles of dust were scattered fast, then there is a fast wind blowing and one of the conditions for rainfall is thus satisfied. In fact experienced Yoruba farmer could look at the leaves on a tree and predict fairly accurately the imminence of rain. If the leaves appear still, there is no wind and hence the chances of having rain is small. These results find expression in the traditional Yoruba saying

*“E fufu ti ko se we igbo lalolalo kii rojo” meaning “A wind that does not disturb the leaves of the forest can't lead to rain” (OLAITAN (8))*

### 3.0 IONOSPHERIC AND LUNAR EFFECTS IN EARLY YORUBA AGRICULTURE

The early Yorubas knew that the lunar cycle affects human behaviour. They discovered that there were aberrant behaviours most common at the time of full moon. In the traditional agricultural practices of the early Yorubas, the farmers usually delayed the planting of heir seeds till during the period of full moon (Koledoye (9)). This practice could be explained within the framework of contemporary physics in view of the fact that during the period of full moon, there is a greater than usual accumulation of positive ions in the air and at such times the metabolic processes of life are accelerated. Hence, seeds, for instance, germinated more readily at such times (Kraueger (10)).

The ionosphere is that part of the earth's outer atmosphere where ions and free electrons are normally present in sufficient quantities to affect the propagation of radio waves. The moon orbits the earth outside the ionosphere. Like the earth it is time and repels the negative outer face of the ionosphere. Thus the ionosphere is pushed closer to the earth and the interaction between the positively charged underside and the negatively charged earth means that when the moon is full, or nearly full, the number of positive ions close to the earth's surface increases.

### 4.0 MECHANICAL ROBOTICS IN EARLY YORUBA AGRICULTURE

Combining mechanical knowledge with their unexcelled knowledge of the peculiarities of climate and of the behaviours of animals in their locality, the early Yorubas succeeded when revolutionary inventions were actually made; when they built machines which worked for them during their absence; when their intelligence invented robots to take their place while they were busy attending to other duties, in view of their arduous task hunting, farming and food gathering. The early Yoruba farmers devised hundreds of traps; all adapted to the special condition of their surroundings. These included such Yoruba traps as Gboro, Ofin, Akantanpo, Kegboja, Okun, Ebiti, Ikonkoso, Irin, Sapo, Oso, Pampe, Ate, Takute, Igere, Awon e.t.c. (Koledoye (9)) which in terms of elements of Physics involved can be classified as gravity traps; snare traps; spring-pole traps and torsion traps (OLAITAN (11)). The elements of gravity and mechanical concepts involved in the Yoruba design Physics are quite exiting.

### 5.0

#### CONCLUSION

The research above is vital to the elucidation and illumination of the early Yorubas as being well versed in elementary meteorology and Physics of the lower atmosphere. These, in combination with their knowledge of elementary mechanical design Physics together with their ingenious usage of peculiarities of climate, have provided profound positive effects on the traditional agricultural practices of the early Yorubas. Some of these practices are however still evident in the agricultural practices of the present day Yorubas. The narrow cultural distribution of science is merely a consequence of the way in which science has been defined. Knowledge, of one sort or another, is found in every culture, including that of the early Yorubas, which contributed immensely to their local economy and well being through meaningful applications of their wealth of knowledge to their traditional agricultural practices.

### 6.0 REFERENCES

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