

Otto Herrmann. The Monism of the German Monistic League (1913). *Mon.*, XXIII, 543.

C. W. Kendall. Reflections on Immortality; Chap. XI of Haeckel's *Riddle of the Universe* (1913). *Mon.*, XXIII, 595.

## CURRENTS OF THOUGHT IN THE ORIENT.

BY B. K. ROY.

*Jagadish Chandra Bose and His Resonant Recorder.*

Ask any educated man in India who the greatest of all living scientists in that country is, and the unanimous reply will be—Dr. Jagadish Chandra Bose. Dr. Paul S. Reinsch thus writes in his *Intellectual and Political Currents in the Far East*: "While it is the genius of India to be imaginative and philosophical, the Hindus are by no means lacking in capacity for accurate scientific work. That they are thus gifted has been abundantly proven by the achievements of such men as the renowned physicist, Dr. Jagadish Chandra Bose, who is by many considered to be the first inventor of wireless telegraphy; and of P. C. Roy and Gazzar, both noted chemists."

In the October *Modern Review* (Calcutta) Dr. Bose (author of *Plant Response*, *Comparative Electro-Physiology* and *Researches on Irritability of Plants*—all published by Longmans, Green & Co.) contributes an interesting article in which he gives an account of his newly invented "resonant recorder" by which the speed of nervous impulse in plants may be automatically recorded.

"All plants," says Dr. Bose, "are sensitive, and in certain plants there are tissues which beat spontaneously like the heart-beat of the animal. These throbbings are affected by drugs precisely in the same manner as the pulsations of the animal heart are affected by similar circumstances. As regards the electric response, the writer had in the year 1901 in his Friday evening discourse before the Royal Institution demonstrated the identical nature of reactions in the plant and in the animal. There remained only the question of the nervous impulse in plants, the discovery of which was announced by the writer ten years ago. It took, however, all those years before his conclusions found full acceptance by the publication in the *Philosophical Transactions* of the Royal Society. . . .

"Though the effects produced in the animal and plant are so similar, yet from the results of certain experiments carried out by the leading plant physiologist, Pfeffer, it had been definitely settled that in the plant there is nothing corresponding to the nervous impulse in the animal. The effect transmitted in the plant is supposed to be one of hydro-mechanical blow and not of true excitation. . . .

"The question of nervous impulse in plants has thus to be attacked anew and I have employed for this purpose twelve different methods. They all prove conclusively that the impulse in the plant is identical in character with that in the animal. Of these I give below a short account of three different methods of investigation. It is obvious that the transmitted impulse in *Mimosa* must be of an excitatory or nervous character:

"1. If it can be shown that physiological changes induce appropriate vibration in the velocity of transmission of the impulse.

"2. If the impulse in the plant can be arrested by different physiological blocks by which nervous impulse in the animal is arrested.

"3. If excitation can be initiated and propagated without any physical disturbance. The central fact in the mechanical theory is the squeezing out of water for starting the hydraulic impulse. The hydro-mechanical theory must necessarily fall to the ground if stimulation can be effected without any mechanical disturbance whatsoever.

"The research ultimately resolves itself into the accurate measurement of the speed with which an impulse in the plant is transmitted and the variation of that speed under changed conditions.... In making these measurements the results are vitiated by our personal limitations. The conditions of the experiment demand accurate measurements of time-intervals shorter than a hundredth part of a second; but sluggishness of our perception makes such an attempt an impossibility. It is therefore absolutely necessary to invent a special device by which the plant itself should be compelled to write down the propagated speed of its own excitation."

So Dr. Bose after constant application with his characteristic assiduity invented his "resonant recorder," of which he says:

"The principle of my 'resonant recorder' depends on a certain phenomenon, known in music as resonance or sympathetic vibration. We may be so tuned as to thrill to certain notes and not to others. An artificial ear can be constructed to resonate to a sound of a definite pitch. The drum of the artificial ear is made of thin soap-film; a beam of light reflected from its surface forms characteristic patterns of color on a screen. To various cries this ear remains deaf, but the apathy disappears as soon as the note to which the ear is tuned is sounded at a distance. On account of sympathetic vibration the artificial ear-film is thrown into wildest commotion and the hitherto quiescent color pattern on the screen is now converted into a whirlpool of indescribably gorgeous colors of peacock green and molten gold.

"In the same manner, if the strings of two different violins are exactly tuned, then the note sounded on one will cause the other to vibrate in sympathy. We may likewise tune the vibrating 'writer' with a reed. Suppose the reed and writer had both been tuned to vibrate a hundred times in a second. When the reed is sounded the writer will also begin to vibrate in sympathy. In consequence of this the writer will no longer remain in continuous contact with the recording plate, but will deliver a succession of taps, a hundred times in a second. The record will therefore consist of a series of dots, the distance between one dot and the next representing one hundredth part of a second. With other recorders it is possible to measure still shorter intervals. It will now be understood, how by the device of the resonant recorder we not only get rid of the error due to friction, but make the record itself measure time, as short as may be desired. The extraordinary delicacy of this instrument will be understood when by its means it is possible to record a time interval as short as the thousandth part of the duration of a single beat of the heart....

"The plant has thus been made to exhibit many of the activities which we have been accustomed to associate only with animal life. In the one case, as in the other, stimulus of any kind will induce a responsive thrill. There are rhythmic tissues in the plant which like those in the animal go on throbbing ceaselessly. These spontaneous pulsations in one case as in the other, are affected by various drugs in an identical manner. And in one case as in the other, the tremor of excitation is transmitted with a definite and measured

speed from point to point along fiber-like channels. We have now before our mind's eye the whole organism of the moving, perceiving and responding plant—a complex unity and not a congeries of unrelated parts. The barriers which separated kindred phenomena are thus thrown down, and the animal and the plant are seen to be a multiform unity in a single ocean of being.”

*The Problem of Irreligion in Japan.*

In his paper on “Can We Ignore Religion?” in the *Japan Magazine* for December, President Masataro Sawayanagi of the Imperial University of Kyoto complains in a rather pathetic tone of the decadence of the religious spirit of Japan. He says:

“The present prevailing indifference to religion in Japan seems to me fraught with exceeding danger to the country. The degree in which religious motives influence the minds of the young men of Japan to-day is very limited indeed. But both history and experience teach that the more genuine religion pervades the national mind, the better for the country. That religion is an essential element of all high civilization goes without saying....Religion, as known among the Japanese to-day, means something suited to soothing the declining days of the aged and unfortunate. It is obviously not a power over the mind of youth; certainly not to the extent that it is in the west....In Japan we have nothing at all like the admirable influence that the church is exerting in the west. There is a complete divorce between youth and religion in Japan; and the consequence is that in times of moral and mental distress our young people are all at sea.

“How to create a stronger aspiration after faith among the people is one of the pressing problems of Japan. It is a task involving tremendous difficulty....Religion is not something to get; it is rather an atmosphere to live in. If we are to find God, may it not be by abiding in Him rather than by endeavoring to contain Him? What Japan lamentably lacks is this atmosphere. Listening to evangelistic orators and trying to catch the inspiration of great teachers are all well enough, but what the nation needs most is to create an atmosphere wherein religion can feel at home and grow till all men are enveloped in it. Let this divine atmosphere pervade the home and the community and the miasma of irreligion must inevitably disappear....

“Where then is the youth of Japan at this time to find the authority that should be obeyed? He will find it in the obligation that attaches to all good. The moral and spiritual laws that compel the best of men to right conduct are equally binding to all. There is no higher authority than that of righteousness, the motto of our present era. Man should lead a rational life; and it is irrational not to obey and follow the best. And the best is not necessarily the new. The best is that which has the authority of right, an authority that is very old, though always growing stronger because better appreciated. Good manners and customs are based on this authority, and such manners and customs are binding to all true men. Therefore let our young men follow in the way that leads to life.”

*The Tug of War in China.*

Immediately after the southern revolution Dr. Sun Yet Sen issued the following manifesto:

“During the period of the union of the North and South I recommended Yuan Shi Kai to the consideration of the national council, in the belief that

he would be true and loyal to the public and act according to the expectation of our countrymen. Ever since that time I have avoided power and interest, and have supported him whenever he was beset with danger and suspicion. Unexpectedly Yuan's treachery was wholly exposed by the murder of Sung. At the time, I published to the world my determination to oppose Yuan. If Yuan understood that public opinion could not be gainsaid, he should have resigned his office then. Unfortunately, Yuan is working solely for himself, and has shaped his actions accordingly in direct opposition to the people's desire, culminating in the people of the south-east taking up arms against him. Judging by the general situation, the safety of the nation and the vitality of the people will all depend upon Yuan alone, upon his remaining in or retiring from office. Although Yuan is a public servant, he is not only disregarding the welfare of the nation, but, on the contrary, he is willing to sacrifice both the country and the people in order to strengthen his own position. No such precedent should be permitted to be created in the republic of China."

The Chinese governmental reply is couched in the following words of General Yuan Hung:

"The present rebellion is founded on nothing but the personal ambition of certain men. The principal persons responsible for this rebellion are Huang-Hsing and Sun Yet Sen. Hardly was the republic formed when they began to scheme to get Yuan Shi Kai out of office. They have never supported him sincerely. Sun Yet Sen had nothing to do with the actual work of overthrowing the monarchy. The revolution was finished when he reached China. The world has a false idea about him. If Sun Yet Sen provided any tangible aid to the real revolution, I did not know of it. The least said about Huang-Hsing's military services to the revolution the better. The crowd squeezed \$30,000,000 while it controlled the Nanking provisional government."

Let our Chinese friends of all parties remember that united they stand, divided they fall, for enemies are at their gates.

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#### BOOK REVIEWS AND NOTES.

HAWAII PAST AND PRESENT. By *W. R. Castle Jr.* New York: Dodd, Mead & Co., 1913. Pp. 242. Price \$1.25 net.

The author was born and brought up in Hawaii and his account of the islands will be of particular interest to all Americans who may have an opportunity of visiting or settling in this beautiful territory recently acquired by the United States. The book is well illustrated. It is best characterized in the author's own words, who writes in the preface:

"This book has a double purpose: to tell those who stay at home something about Hawaii, the youngest of American territories; and to help those who are going there to plan their trip intelligently. Baedeker has not yet extended his labors to the Pacific islands, and no guidebook is available for the traveler. Many books have been written about special phases of Hawaii—its history or its commerce or its industry—but none has attempted to give concisely a survey of its history, its present conditions, and its natural beauty.... The information it contains has been gathered from most diverse sources, books, pamphlets,