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We also have a .DOC version of what's below that includes the images - available on request. Bear in mind that that file is over 1Mb --ebk]

An Historic Report On Life In Space: Tesla, Marconi, Todd

by

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AMERICAN ROCKET SOCIETY
17th ANNUAL MEETING AND
SPACE FLIGHT EXPOSITION
PAN PACIFIC AUDITORIUM
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NOVEMBER 13 - 18, 1962

Commentary

Introduction:

Our attention was directed toward the existence of this paper by one of our colleagues in the scientific community. After further inquiry, it was found that this paper is archived at the Linda Hall Library (an independent research library of science and technology, 800-662-1545) in Kansas City, Missouri.

The paper is archived on microfiche and, after further investigation, we found that no original hard copy is obtainable from either the Linda Hall Library or IBM's archives. We then ordered a photocopy of the paper be made from microfiche and sent to NIDS. What we present below are scanned images of this photocopy in JPG format which is the lowest image format size obtainable for this document.

The text and figures 1 and 4 are clear and legible after scanning, but we found that figures 2 and 3 are difficult to understand as they are photographic data from a Jenkins Radio-Camera (ca. 1924).

The Linda Hall Library provided three photocopies of the page containing the four figures using different contrasts for each to help us find the best copy of these microfiche images. Thus, we provide below two scanned images of figures 2 and 3 to let the viewer see for themselves what we believe to be the two best presentations of them. Figures 2 and 3 are difficult to understand or interpret since they represent photographic data from the Jenkins Radio-Camera.

During the years 1899-1924 three experimental scientists, Nikola Tesla, Guglielmo Marconi, and David Todd (working independently of each other) observed laboratory data and related phenomenon which suggested the possibility that they were monitoring interplanetary communications. During the same period (199-1924) the Russian theorist Konstantin Tsiolkovsky deduced a model of an intelligence existing independently of terrestrial influence.

Tesla, Marconi, and Todd did not know that they were working with identical data, nor did they know that these data corroborated, in a quantitative manner, the theoretical model built by Tsiolkovsky.

This paper presents the investigations and experimental data of Nikola Tesla, Guglielmo Marconi and David Todd. The data are first brought together in a historical model (1899-1924) and then are shown to be the natural complement of a current theoretical model (1959-1962). These data are then recommended for assembly into a quantitative five model according to the theoretical outline described by Tsiolkovsky.*1

Our purpose in this paper is to examine the original data of Tesla, Marconi and Todd in response to a rhetorical inquiry presented by the Office of the Director of Defense Research and Engineering, asking: "What research is being done to keep abreast of the scientific advances of the past... to see that there is not needless duplication of effort? Did the advances of the past fail to find application due to a lack of need for application at the time, or failure to have developed some technique or material ancillary to the application of the scientific advance?"

*1 For purpose of economy-of-presentation, biographical details of Tesla, Marconi, Todd and Tsiolkovsky are omitted and only as much historical background is used as is necessary to establish a chronology of events. 1

Tesla: Experiments in High-Frequency (1892-1907)

As early as 1892, Nikola Tesla had defined the use of the magnetic field of the terrestrial globe as a means of signal and energy transmission.² To reduce this idea to practice, Tesla designed and built equipment³ capable of producing high-frequency currents, including the ability for tuning both transmitting and receiving coils to any desired frequency or wavelength.⁴

In a paper delivered at the 1893 meeting of the National Electric Light Association, Tesla stated that the purpose of his laboratory investigation was to know what is the capacitance of

the earth, and what charge does it contain if electrified. "Though we have no positive evidence of a charged body existing in space without other oppositely charged electric bodies being near," said Tesla, "there is a fair probability that the earth is such a body, for by whatever process it was separated*2 ... it must have retained a charge as occurs in all processes of mechanical separation."5

Tesla continued his lecture, stating that the intent of his calculations was "... to ascertain at what period the earth's charge when disturbed, oscillates, with respect to an oppositely charged system or known circuit."6 In effect Tesla was theorizing that the planet Earth has a circuit-identification, i.e., a 'signature' of its own, and that, given the proper equipment, he could broadcast this identity wholesale into the universe.

*2 Tesla's views regarding the origin of the earth are derived from ideas proposed by Sir George Darwin (1845-1912), e.g., that the moon was torn from the Earth by solar tides cf. 'Mysteries of the Moon', Dr. Harold Urey, New York Times, October 8, 1961

By 1896 Tesla developed a prototype oscillator of sufficient capacity that he was able to demonstrate a 'loop' circuit which was tied in with the earth's magnetic field. Test of the oscillator at the Houston Street Laboratory (New York) in 1896 are bet remembered for the 'earthquake' tremors that were distributed over an area of twelve city blocks. Three years after the Houston Street effort Tesla was now ready to begin a full scale experiment. For this purpose he had constructed a special laboratory near Colorado Springs, Colorado.

The Colorado laboratory (Figure 1) was located on a vast expanse of plain, 2000 meters above sea level. The entire laboratory was designed in keeping with Tesla's plan to make the terrestrial globe a propagation device for the transmission of energy.

[] Figure 1. With reference to Figure 1, the mast is 280 feet high and is topped with a copper ball approximately three feet in diameter. The interior of the building was walled in a circular manner to accommodate the winding of a primary coil 75 feet in diameter. In operation, surges of power were driven, alternately, into the earth and outward from the top of the mast. Broadcast wavelengths were registered at 2000 meters.7 Banks of incandescent lights 'plugged into' the ground 26 miles from the laboratory-site flowed and flashed and throughout the experiments. Specialized instrumentation built to record the experiments at the Colorado laboratory was sensitive to the point that Tesla could detect and catalogue every type of atmospheric electrical disturbance within a radius of 1100 miles.

It was during the tests conducted in Colorado in 1899 that Tesla detected the phenomenon which he described as an interplanetary communication. Speaking of the data that, unexpectedly, had registered on his instruments Tesla said that the signals took place "... periodically, and with such a clear suggestion of number and order that they were not traceable to any cause then known to me. I was familiar ... with such electrical disturbances as are produced by the sun, Aurora Borealis and earth currents, and I was as sure as I could be of any fact that these variations were due to none of these causes. The nature of my experiments precluded the possibility of the changes being produced by atmospheric disturbances ... Although I could not decipher their meaning, it was impossible for me to think of them as having been entirely accidental ... a purpose was behind these signals8 ... they are the results of an attempt by some human beings, not of our world, to speak to us by signals .. I am absolutely certain that they are not caused by anything terrestrial."9

Following the experience in Colorado in 1899, Tesla became increasingly reluctant to release further details via the press and other public media. There is reason to believe, however, that the phenomenon Tesla recorded in Colorado, in 1899, consisted of three parts which, eventually, Tesla identified in terms analogous only to our present-day Information Theory. Tesla's efforts to respond in kind with a fourth part were therefore understandably abstruse to the point where "... for particular reasons," he said, the "... full technical report

descriptive of the apparatus and results would be reserved for the records of the academies of science."¹⁰

Marconi-Todd: Observations and Experimentation (1899-1924)

On March 27, 1899, while Tesla was completing construction of the Colorado laboratory, Guglielmo Marconi concluded his first significant communication experiment: wireless transmission/receiving across the English Channel.

The achievement (transmission of the code-letter 'V' from Wimereaux, France, to South Foreland, England - a distance of 50 miles) was the culmination of personal convictions and laboratory efforts closely resembling the equipment approach taken by Tesla. "Electrical actions or manifestations," said Marconi in 1897, describing his basic patent, "are transmitted through the air, earth, or water by means of electric oscillations of high frequency."¹¹ And again, as with Tesla, Marconi's method of inquiry was to search for, and to duplicate the prototypes already existing in nature.¹² Experimental techniques, according to Marconi's view are "... no more than a simple consequence of observing and studying the means employed by nature to obtain her effects of heat, light, of magnetism across space. As the heat and light of the sun upon which depend the life of our planet are transmitted across millions and millions of kilometers of space, as the light of the most distant stars, as the electrical and magnetic perturbations of nature are manifested to us after having crossed the most immeasurable distances, it appeared to me {Marconi} that by adopting means similar to those adopted by nature, it should be possible to transmit these effects at our will..."¹³ The correctness of Marconi's approach, i.e., finding his prototypes in the phenomena of nature, and implementing his findings with compatible devices, was aptly demonstrated on December 12, 1901, with the transmission of the first transatlantic message. Signals (a repetition of the code-letter "S") sent from the 25 Kilowatt station at Poldhu (Pold-ju) in Cornwall, England, were received via a kite-borne antenna flown from St. Johns, Newfoundland, a distance of 1800 miles. Following this success and the eventual establishment of an international Wireless Telegraph Company, Marconi once again turned to basic research.

To ensure personal independence, Marconi fitted out a floating laboratory (the 220 foot yacht Elettra). In this environment Marconi could work "...at all hours of the day and the night, finding without delay suitable grounds for all kinds of experiments which would be difficult and complicated to carry out on land."¹⁴ It was in September, 1921, aboard the Elettra, while conducting atmospheric experiments in the Mediterranean area, that Marconi detected the phenomenon which he described as an interplanetary communication. The first report of this experience was released by J. C. H. MacBeth, London Manager of the Marconi Wireless Telegraph Company.

"The signals", MacBeth said, "registered high in the meter band, although the maximum length of earth-produced waves at the time was 14,000 meters. The theory that the waves were produced by electrical disturbances was disproved by the regularity of the pulses. Although the pulses apparently consisted of a code, the only signal similar to earth codes was one resembling the letter 'V' in the Marconi Code. Marconi himself expressed the belief that the signal had originated ... at some point in outer space."¹⁵

In his own discussion of the signals Marconi stated that he expected interplanetary communications to take the form of a "... transmission of pictures accompanied by a simple code."¹⁶ In this statement Marconi anticipated by 3 years the results of the remarkable "listening" experiment conducted by Dr. David Todd, then professor of Astronomy at Amherst College, Massachusetts.

[] On the night of August 22, 1924, the planet Mars approached to within thirty-four and a half million miles.¹⁷ Realizing that this close an approach would not come again until the year 2000, a "listening" experiment was arranged by Dr. Todd. At Dr. Todd's suggestion the U.S. Government, through diplomatic channels, requested that all countries with high-power transmitters turn off their equipment for 5 minutes every hour from 11:50 p.m. August 21, to 11:50 p.m. August 23.¹⁸

A radio-photo message device was used to record results of the experiment. The device¹⁹ was attached to a receiving set and adjusted to a wave-length of 6000 meters. Incoming radio signals received during the test period were converted to light signals which, in turn were printed on a reel of photo-sensitive tape five inches wide. Figure 2 (left) Figure 3 (below)

[]

The printed tape, following the experiment, was 25 feet long, comprising 16 printed frames, and contained a pattern of dots and dashes (Figure 2) plus some configurations of grouped signals (Figure 3) located at approximately 30 minutes intervals on the tape.²⁰

The rationale for determining whether the signals reported by Tesla, Marconi and Todd, i.e., between 1899 and 1924, are the result of random noise, electrical leaks, or the effects of various diathermy machines, or whether the signals are authentic, requires first of all that the data be assembled into a historical model. The second requirement is that the model agree with a theoretical construct. And, finally, that in the matching of the historical model to the theoretical construct there be neither 'forcing' nor expedient collusion. We shall examine all three of these conditions.

Historical Model

As shown in Figure 4 there is a consistency of signal-to-noise-response between the sending of the Morse 'V' in March, 1899, and the monitoring of an unknown identical response in September, 1921. In this first cycle the signal-to-response time was 22 years. The consistency holds true again for the sending of the Morse 'S' in December, 1901, and the monitoring of the Morse 'S' plus an additional code in August, 1924. Again the signal-to-noise time was 22 years. No other data are known. Prudence demands that we not surmise and add more to the model than actually exists.

Theoretical Model []

If we regard the historical model (Figure 4) as a discrete period of time (1899-1924) marking the very earliest attempts at communication by means of electromagnetic radiation, then, according to the hypothesis of Dr. Frank D. Drake (Radio Astronomy Observatory, Green Bank, West Virginia), other older civilizations searching the universe for radiation from abodes of life would "... detect the very early transmissions of a civilization having just discovered radio.²¹ Using passive observation equipment on the order of a very powerful radio telescope, detection of these primitive efforts would be reliable and quick.²²

Figure 4. Drake's hypothesis agrees closely with the data of the historical model. Tesla's Colorado experiments in 1899 were, using Drake's words, "... the very early transmission of a civilization having just discovered radio".²³ The immediate detection of Tesla's experiments by means of passive observation equipment is strongly suggest in the delayed signal-echo-phenomena observed by Hals, Stormer, Van Der Pol, and E. V. Appleton (1927-1928),²⁴ and the careful calculations and experimental data by Budden and Yates (1952) concluding that the delayed echo-phenomena they were examining was in fact the result of planar reflections from a system "... fixed in space relative to the earth and moving [in orbit] permanently with the earth."²⁵

"Once a civilization is discovered," says Drake, continuing his hypothesis, "it is expected that ... an introductory signal [be sent] to the new found civilization."²⁶ In this regard the multi-million volt surges of radio noise generated by Tesla during the Colorado experiments in 1899 were intended to produce electrical waves "... of such magnitude that, without the slightest doubt, [the] effect will be perceptible on some of our nearer planets."²⁷ During a pause in the experiments there had been noted by Tesla - and anticipating by 60 years Drake's comment above - a series of incoming signals "... taking place

periodically and with such a clear suggestion of number and order ... the feeling in constantly growing on me that I had been the first to hear the greeting of one planet to another."28

The physical characteristics of the monitored signals as listed in the historical model (Figure 4), and as posited in theory, likewise present a remarkable similarity. The signals monitored by Tesla (1899), Marconi (1921); and by Hals, Stormer and Van Der Pol (1927) are characteristically simple. The signals are, basically, a "response-in-kind" repeating the original transmission, although on a higher-frequency, and performing, at least in part, a recognition function. In this respect the historical model supports Sebastian von Hoerner's opinion that "... the nature of the signals will be defined entirely by the purpose they serve and by the most economical way to achieve this purpose."29

The simplicity appropriate to a recognition of a civilization just having discovered electromagnetic techniques is likewise consistent with M. H. Briggs' theory that another civilization would "... deliberately render the signal capable of detection as an artificial transmission by sending a 'message' composed of some regularly repeated pattern of impulses."30

A more sophisticated theory - which nevertheless is exactly analogous with the radio-photo data recorded during Dr. Todd's 'listening' experiment (1924) is offered in Drake's private suggestion that other civilizations would "... send out pulses in clusters - a series of pulses followed by a pause, another series, another pause, and so on. The number of signals in each pulse could stand for intensity of light or dark and we could build up a picture on the basis of the information received."31 The radio-photo tape used in the 'listening' experiment (1924) recorded 16 increments or frames, of clustered pulses, each increment separated by a 30 minute pause. The format of the pulses suggested two distinct efforts: signals, and images (Figures 2 and 3). A most interesting comment here, and certainly beyond explanation, is Marconi's emphatic statement to the press (September, 1921) following his own experience of monitoring signals originating from an unknown point in space, that he fully expected interplanetary communication to be in the form of "...transmission of pictures accompanied by a simple code."32

The final piece of information carried over from the historical model is the data representing signal-to-response time. Tesla's experience, as we have noted earlier, is identifiable with the Budden and Yates conclusion pointing to the existence of a system fixed in space relative to the earth and moving in orbit permanently with the earth,33 and with F. D. Drake's theory of a passive observation system tuned to detect and to respond quickly to new sources of electromagnetic radiation. With Marconi and Todd, however, the signal-to-response time on both occasions was 22 years. And here, too, the historical model agrees most exactly with the contemporary theory that the probability of occurrence of life in the universe is best predictable on the basis of considering first those stars most resembling our own sun. The following table, prepared by Su-Shu-Huang34 of the Institute of Advanced Studies, at Princeton, quantitatively reconstructed this theory:

Nearby Stars On Whose Planets (If Any) Living Beings Have A Better-Than-Average Chance To Develop

Star	Distance in Light Years	Spectral Type	Luminosity
Sun		G2	1.00
Epsilon Eridani	10.8	K2	0.34
Tau Ceti	11.8	G4	0.38

Signal-to-response times rated at the speed of light place the transmitted/monitored signals of Marconi and Todd exactly in the Epsilon/Eridani/Tau Ceti bracket.

The Antecedence of the Historical Model

The experience of Tesla, Marconi, and Todd were, respectively, personal and individual; there was no joint effort or comparative analysis either before or after the experience. In each instance a particular phenomenon was observed and recorded - and nothing more. As discrete events representative of isolated scientific phenomena distributed over the years 1899-1924, the value of each event at the time of occurrence was, therefore, impossible to ascertain. In composite form, however (as brought together in Figure 4), there comes into existence and without in any way distorting the individual events themselves - an inter-relationship of events. This inter-relationship (and the potential it carries) is the male factor that makes theory come alive with meaning. For this reason neither the events of the historical model nor the data of the theoretical construct can, alone, be meaningful. The fact that the historical model came into existence first, and that the shaping of the theoretical model came 35 years later (beginning in 1959), is less important than the fact that each is a natural complement to the other.

Tsiolkovsky: An Advanced Theoretical Model

In the development of a theoretical model to give meaning to the historical events of 1899-1924 we have used the interim period of 35 years as a guarantee, i.e., an insulation, to assure that the complementary matching is natural rather than collusive. We have presented an historical approach to the subject and, deliberately, have avoided any attempt to interpret the data, reserving this subject for a specific paper.³⁵

As a preliminary estimate, however, there are indications that the final interpretation will proceed more along the lines of Information Theory, and Image Processing, rather than in the conventional manner of reducing signals to alpha-numeric characters. The factors of guidance in this future effort are the intuitions inherent in the advanced theoretical model proposed by Konstantin Tsiolkovsky (1857-1935). In the same manner that the model comprising the historical events of 1899-1924 is complementary to the opinions of the present-day scientific community, so too can we predict with some accuracy that a quantitative analysis of these same historical data will advance the state of the art to the level of Tsiolkovsky's theory of interplanetary communication.

Even before Shannon's development of the Information Theory (1948), Tsiolkovsky had maintained that "...the simple repetition of signals is an obsolete method, convenient only in the initial state of interstellar communication, in a form of short and simple signals."³⁶ Probing deeply for answers to the questions of entropy and negentropy, Tsiolkovsky worked with concepts that would not be related to signal theory until many years later with the advent of Wiener, Shannon, and Weaver.

"Science cannot avoid strange paths" was Tsiolkovsky's dictum. In this paper we have utilized the historic approach in an attempt to mark out the beginning of just such a path, and, insofar as possible, to remove some of the strangeness.

References

1. Office of the Director of Defense Research and Engineering, January, 1961 'Important Areas of Electronic Research' quoting W. R. G. Baker, President of Syracuse University Research Corporation.
2. Nikola Tesla, 'Experiments with Alternative Currents', The Institute of Electrical Engineers, London, England, February, 1892.
3. The equipment built in 1893 is described in U.S. Government Patents, Numbers 645, 576 and 649, 621. These patents descriptions contain all the fundamental features of radio broadcasting and receiving circuits. The work was accomplished 14 years in advance of Marconi's similar effort.
4. 'Prodigal Genius, The Life of Nikola Tesla', John J.

O'Neill, Ives Washburn, Incorporated, 1994, Part II, Chapter VIII, pp. 121-127.

5. Ibid., Part II, Chapter VIII, p. 132.
6. Ibid., Part II, Chapter VIII, p. 132.
7. Nikola Tesla, 'The Transmission of Electric Energy Without Wires', The Electrical World and Engineer, March 5, 1904.
8. Nikola Tesla, 'Talking with the Planets' Current Literature, March, 1901, pp. 359-360.
9. 'Tesla Has a Message from the Stars', Western Electrician, January 12, 1901, p. 33.
10. Western Electrician, July 13, 1907, p. 37.
11. Guglielmo Marconi, Patent Number 12,039 (England), July 2, 1897.

12. Compare with Pope Pious XII, Address to the Third International Communication Congress, October 12, 1935. The extraordinary achievements of science and technology "... are in reality nothing but the discovery and possession of forces and pre-existing laws which the Creator spread throughout the universe and which have operated actively since the beginning of creation.

13. 'My Father, Marconi', Degna Marconi, McGraw-Hill Company, New York, 1962, Part II, Chapter VII, p. 148.

14. Ibid., Part III, Chapter VIII, p.231

15. Condensed from an article by Vincent H. Gaddis.

16. The New York Times, September 3, 1921, 4:4.

17. Mars is, on the average, 200,000,000 miles from Earth, and, at the greatest distance, is 235,000,000 miles from Earth. On August 23, 1924, Mars and Earth were almost at the critical positions for a minimum separation of 34,648,000 miles.

18. The general description of this experiment is derived from accounts carried in the Washington Post, August 21-22, 1924, The New York Times, August 23, 1924; and from a further article by Vincent H. Gaddis.

19. The machine was a Jenkins Radio-Camera, regularly used for recording on a long photo-sensitive paper strip five-inches wide a radio-transmitted message or news copy sent by radio directly from a typewritten paper strip in the sending machine at the broadcasting station. In the camera a very small light source is arranged to traverse this photo strip in transverse lines, sixty lines to the inch. The Longitudinal movement of the paper strip and the transverse movement of the light are both accomplished by an electric motor attachment, the motor being situated outside the light tight camera box.

The camera box was located in a dark room so that the camera could be opened and the paper strip put in and taken out without getting it light-struck. The adjustment of the motor speed was such as to move the strip about an inch every half-hour.

The tiny light was attached to a radio receiving set located inside the dark room and the radio set adjusted to the longest wave length possible with this set (between 5000 and 6000 meters).

About 25 feet of the photo strip was put into the machine at about 1:20pm, Friday, August 22, 1924, and taken out Saturday somewhat later in the afternoon, it is being discovered that the strip had all passed through when the camera was opened.

Any incoming radio signals which were within the limits of the wave length of the set would flash the tiny lamp, and these flashes would be recorded on the light-sensitive strip. The completed strip, which was developed on a motion picture film rack, contained a record of all incoming radio signals.

20. A detailed and quantitative analysis of the signals

received by Dr. David Todd in 1924 is the subject of a paper currently in preparation by Mr. C. D. Jackson of the IBM Systems Analysis Group, in Bethesda, Maryland. This paper, entitled 'An Experiment in Extra-Terrestrial Communications' will be offered to the American Rocket Society at a future meeting.

21. F. D. Drake, 'Project OZMA', Physics Today, April, 1961, pp. 40-46.
22. F. D. Drake, Ibid.
23. See Note Number 3 (Tesla's experimental application of radio technology.)
24. Nature, No. 3079, Vol. 122, November 3, 1928; Nature, No. 3084, Vol. 122, December 8, 1928; see also A. Hoyt Taylor and L. C. Young, Proc., IRE, 16, 561, 1928.
25. K. G. Budden and G. G. Yates, 'A Search for Radio Echoes of Long Delay', Journal of Atmospheric and Terrestrial Physics, 1952, Vol. 2, pp. 272 - 281, Pergamon Press, Ltd., London.
26. F. D. Drake, 'Project OZMA', Physics Today, April, 1961, pp. 40-46.
27. Vjekoslav Gradecak, quoting Nikola Tesla, in 'Electricity for Space Exploration', Ryan Aerospace, Vol. 23, February 1962, No. 1, Ryan Aeronautical Company, San Diego, California.
28. Nikola Tesla, 'Talking With the Planets', Current Literature, March, 1901, pp. 359-360.
29. Sebastian von Hoerner, 'The Search for Signals from Other Civilizations', Science, December, 1961, pp. 1839 and ff.
30. Michael H. Briggs, 'Superior Galactic Communities', Nature, 187, 1102; 1960.
31. Editorial, quoting Dr. F. D. Drake, Science, Volume 130, Number 3391, December 25, 1959.
32. The New York Times, 4:4, September 3, 1921.
33. See Budden and Yates, Note Number 25.
34. Su-Shu Huang, 'Occurrence of Life in the Universe', American Scientist, Volume 47, No. 3., September, 1959, pp. 397-402.
35. See Note No. 20.
36. Private Communication, September 4, 1962, from Dr. Alexis N. Tsvetikov, Department of Biophysics, Stanford University, Stanford, California.

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