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Invention of Email in Newark, NJ (1978): The First Email System

Abstract: The invention of email in Newark, New Jersey reveals fundamental truths about the nature of innovation and exposes the "histories" and propaganda of the "golden triangle" of *the military-industrial-academic complex* whose multi-trillion dollar *brand* advertises itself as the source of all revolutionary innovations. Such propaganda are constructed and packaged by those consecrated as "historians" who hone this branding to brainwash humanity that war brings good things to life. This cabal anoints and exalts its "innovators," predominantly whites, and a few persons of color, who pledge to its hegemony of innovation. The indisputable facts of the invention of email in 1978 by V.A. Shiva Ayyadurai, a 14-year-old, dark-skinned, lower-caste, Indian immigrant prodigy, working as a research scholar at the University of Medicine and Dentistry of New Jersey (UMDNJ) in Newark, defy such "histories." The boy's invention, the first electronic *system* replicating the complex and myriad functions of the interoffice, inter-organizational paper-based mail system (inbox, outbox, memo, address book, etc.), which he named "email," was motivated by his desire to create and to do the "impossible." Email was invented to digitize this entire system of *civilian office communications* and *not* just to exchange text messages reliably for *military battlefield communications*. Email was the first end user software application that made the digital revolution accessible to ordinary people who had never experienced the computer keyboard or terminal. Ayyadurai's evolution as an inventor and scientist continued, far beyond email, to his completing four degrees at MIT, receiving worldwide acclaim, and being exalted as an *innovator* during his thirty-three years at MIT, while within the triangle. He served their needs as a penultimate ambassador and "model minority" to enhance their brand's image of "inclusivity," "diversity," and "equality." However, when the Smithsonian requested and obtained artifacts documenting email's origin in 1978, in Newark, on February 16, 2012, and when Ayyadurai accepted this great American honor, he unwittingly pitted himself against their brand. The cabal unleashed disinformation claiming email was created before 1978. When these claims were debunked and Ayyadurai continued sharing facts, the attacks escalated to a public "lynching" revealing an insidious side of racism, which exalts persons of color when needed, and expels and annihilates them when they challenge false histories and propaganda. Email did emerge from "collaboration," but not from their triangle, but organically in a local, and indigenous ecosystem of a small medical college, where a brilliant young boy, committed teachers, a loving family, and a dedicated mentor, solved a civilian problem, exemplifying countless other innovations across millennia, inspired to advance life not retrofitted from technologies intended to maim and kill. Such histories are deliberately not documented to perpetuate lies that war is good and to mask its rapacious profits. Documenting the invention of email in Newark, New Jersey, therefore, is a historical imperative towards breaking this diabolical trance to reveal a fundamental truth: innovation can occur, anytime, anyplace by anybody, and war and profit are not its necessary and required impetus.

1.1 What is Email?

Email is actually a *system* --- a system of interlocking parts (§2.0) intended to emulate the *interoffice, inter-organizational mail system* consisting of the Inbox, Outbox, Folders, Memo, Attachment, Address Book, etc., the now-familiar components of every email system (Pearl, 1993; Ramey, 1993; Markus, 1994; Tsuei, 2003), made accessible and easy-to-use for *end users* (ordinary people with little to no computer experience) to manage the complex and myriad functions necessary for office communications mediated through the model of the interoffice memorandum (Yates and Orlikowski, 1992; Foster, 1994; Holmes, 1995; Morrisett, 1996).

Prior to 1978, experts in the ARPAnet community had concluded it "impossible" (§3.0) to invent a full-scale emulation of the interoffice, inter-organizational mail system (Crocker, 1977; Nightingale, 2014). In the RAND Report, published on December 1977, its author, Mr. David Crocker, a leading member of the ARPAnet community, conveyed the impossibility of creating such a system. The RAND Report's introductory sections defined the limits and scope of the ARPAnet's then-current work in electronic messaging:

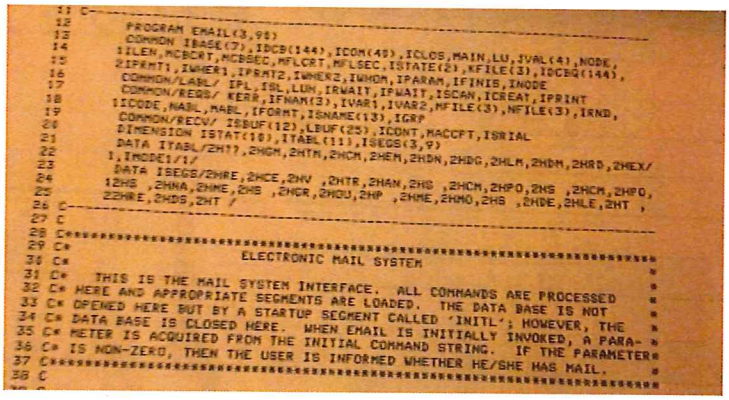
> *"At this time, **no attempt is being made to emulate a full-scale, inter-organizational mail system** [p.4].... The fact that the system is intended for use **in various organizational contexts** and by **users of differing expertise makes it almost impossible to build a system which responds to all users' needs** [p.7]."* (Crocker, 1977)

1.2 The Invention of Email in Newark, NJ

In 1978, Dr. V.A. Shiva Ayyadurai, then a 14-year-old prodigy, who was accepted into a special program in computer science at the Courant Institute of Mathematical Sciences in New York University (NYU) (Mullish, 1978), was hired by Dr. Leslie P. Michelson to be a research scholar, and later a Research Fellow, (Michelson, 2012) at the UMDNJ (§4.0). Michelson challenged Ayyadurai to create an electronic version of the interoffice mail system (Aamoth, 2012; Nanos, 2013; Gopalakrishnan, 2014).

Ayyadurai took on this challenge ("Livingston Student", 1980; Michelson, Bodow, Brezenhoff and Field, 2013), and did "attempt" to create such a system, and did do the "impossible," when he became the first to conceive, design and implement a pioneering software application that replicated the functions of the entire interoffice, inter-organizational mail system (McLeod and Bender, 1982) for "use in various organizational contexts" and by "users of differing expertise" ranging *from* secretaries, office workers, students, doctors, e.g. *end users*, who had never

experienced a computer keyboard or terminal *to* technical personnel such as systems analysts, programmers, scientists and engineers, who were highly experienced computer users (Cheney and Lyons, 1980).



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C-------------------------------------------------------------------------
      PROGRAM EMAIL(3,99)
      COMMON IBASE(7),IDCB(144),ICOM(40),ICLOS,MAIN,LU,IVAL(4),NODE,
     1ILEN,MCBCRT,MCBSEC,MFLCRT,MFLSEC,ISTATE(2),KFILE(3),IDCB2(144),
     2IPRMT1,IWHER1,IPRMT2,IWHER2,IWHOM,IPARM,IFINIS,INODE
      COMMON/LABL/ IPL,IBL,LUN,IRWAIT,IPWAIT,ISCAN,ICREAT,IPRINT
      COMMON/REQS/ KERR,IFNAM(3),IVAR1,IVAR2,MFILE(3),NFILE(3),IRND,
     1ICODE,NABL,MABL,IFORMT,ISNAME(13),IGRP
      COMMON/RECV/ ISBUF(12),LBUF(25),ICONT,MACCPT,ISRIAL
      DIMENSION ISTAT(10),ITABL(11),ISEGS(3,9)
      DATA ITABL/2H??,2HGM,2HTN,2HCM,2HEM,2HDN,2HDG,2HLM,2HDM,2HRD,2HEX/
     1,IMODES/1/
      DATA ISEGS/2HRE,2HCE,2HV ,2HTR,2HAN,2HC ,2HCM,2HPO,2HS ,2HCM,2HPO,
     12HS ,2HNA,2HME,2HS ,2HGR,2HOU,2HP ,2HME,2HNO,2HS ,2HDE,2HLE,2HT ,
     22HRE,2HDS,2HT /
C-------------------------------------------------------------------------
C
C**************************************************************************
C*                                                                        *
C*                        ELECTRONIC MAIL SYSTEM                          *
C*                                                                        *
C*   THIS IS THE MAIL SYSTEM INTERFACE.  ALL COMMANDS ARE PROCESSED       *
C* HERE AND APPROPRIATE SEGMENTS ARE LOADED.  THE DATA BASE IS NOT        *
C* OPENED HERE BUT BY A STARTUP SEGMENT CALLED 'INITL'; HOWEVER, THE      *
C* DATA BASE IS CLOSED HERE.  WHEN EMAIL IS INITIALLY INVOKED, A PARA-    *
C* METER IS ACQUIRED FROM THE INITIAL COMMAND STRING.  IF THE PARAMETER   *
C* IS NON-ZERO, THEN THE USER IS INFORMED WHETHER HE/SHE HAS MAIL.        *
C**************************************************************************
C
```

Fig. 1. The naming of email as "EMAIL" (c. 1978)

Email is not simply a *method* for the rudimentary exchange of text messages (Ngwenyama and Lee, 1997), as some have erroneously documented (Marold and Larsen, 1997), and one which continues to appear on popular websites such as Wikipedia, which define "email" as "a method of exchanging digital messages" ("Email", n.d., para 1). In the 1970s and early 1980s, developing such methods for the simple exchange of text messages was the focus of the military-industrial-academic complex that included the golden triangle of: (1) military: Defense Advanced Research Projects Agency (DARPA) and its ARPAnet researchers, (2) industrial: Raytheon/Bolt Beranek and Newman (BBN), and (3) academic: MIT, in order to support military battlefield communications (Kuo, 1979; Lyons, 1980; Postel, Sunshine and Cohen, 1981). The aim of their efforts was to develop such methods for the reliable communication of simple text messages from one location to another (Cerf, 1979; Malgieri, 1981).

The invention of email by Ayyadurai at UMDNJ in Newark, New Jersey, however, was not motivated to create such simple point-to-point exchange of text messages but rather to manage the complex functions of day-to-day *civilian office communications* where the interoffice memo (Yates, 1989) was the primary medium of formal business communications in the office environment (Gains, 1999; Orlikowski and Yates, 1994). The military had little interest in creating a system for managing the interoffice memorandum on the battlefield. This was far beyond their scope of work. They were not being funded to make the lives of ordinary office workers easier. The ARPAnet was neither designed nor built for this use (Patel, 2003). Clear evidence for this is reflected in the ARPAnet's own well-documented *ARPANET Information Brochure* (Dennett, Feinler and Perillo,

1985), as late as 1985 (seven years after the invention of email by Ayyadurai in Newark), which makes *no mention whatsoever* either about "email" or "electronic mail." In fact, there are no entries, starting with "e," to be found anywhere in the *Index* of this brochure!

The historical revisionism to define email as the simple exchange of text messages (§5.0) took place *after* Ayyadurai's invention so as to misappropriate credit specifically to Raytheon/BBN, a multi-billion dollar defense contractor which profits from the branding that it is the "inventor of email" in the lucrative cybersecurity market ('Raytheon Website', 2012) and, *more broadly* to the ARPAnet community that thrives on a false narrative that email and other great innovations can only emerge from the "triple helix" of the military-industrial-academic complex (Leydesdorff and Etzkowitz, 1996; Etzkowitz and Leydesdorff, 2000; Carayannis and Campbell, 2011).

In 1978, at UMDNJ, there was no ARPAnet. The challenge to invent email required the young boy to go far beyond just creating a simple means to exchange text messages using a computer network (already present at UMDNJ and independent of the ARPAnet), but demanded him to invent *an entire communications platform consisting of a sophisticated database and workflow systems architecture, while implementing the myriad features for enabling interoffice mail communications* (Smith, 2011; Gopalakrishnan, 2014) necessary for office workers to move from the world of the typewriter and paper communications to the realm of the keyboard, computer terminal and electronic communications, *delivered through an easy-to-use interface*. Ayyadurai's work was focused on digitizing the entire "system" of interoffice communications rather than just the mere transport of messages reliably from point-to-point (Westinghouse, 1981; Field, 2014).

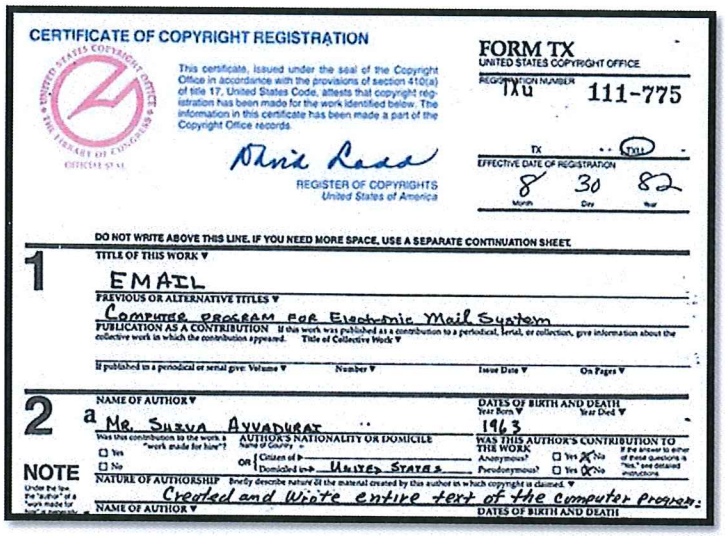
The components used to build email, furthermore, were not based on any tools or technologies built by DARPA or the ARPAnet community. The tools used by Ayyadurai to build email were: 1) computer hardware, 2) an operating system, 3) terminals and keyboard, 4) a network, 5) a programming language, and 6) a database system (Michelson, 2012; Field, 2014). *None of these components, which specifically existed at UMDNJ in 1978, were developed by the ARPAnet.* Erroneous claims by some "historians," tabloid journals, and blogs have asserted that the components used by Ayyadurai to invent email at UMDNJ had been created previously by the ARPAnet (Biddle, 2012; Aguilar, 2012). This is simply not true and serves only to perpetuate a false and revisionist history, going back to the 1970s when Raytheon/BBN attempted to take credit "...for having invented everything..." (Padlipsky, 2000).

EMAIL --- the first email system, operated independent of the ARPAnet or Internet, on its own private network known as the Laboratory Computer Network (LCN), which Michelson had earlier implemented to connect the four campuses of UMDNJ (Michelson, 2014). Email did not need to "transport messages," but pro-

vided a novel database-driven mechanism to share the interoffice memorandum across relevant users and organizational hierarchies, long before Simple Mail Transfer Protocol (SMTP) was made available in 1982 (Postel, 1982) and which was four years *after* email's invention at UMDNJ in 1978. Therefore, the golden triangle of DARPA (including the ARPAnet community), Raytheon/BBN and MIT cannot take credit for email's invention. Simply put, they were solving a different, and a much easier problem, from Ayyadurai's mission to create email, the first full-scale electronic emulation of the entire interoffice, inter-organizational mail system.

1.3 The Inventor of Email

Dr. V.A. Shiva Ayyadurai's distinction as the *inventor of email* is grounded on both technical and legal foundations (§6.0). In 1978, no legal methods existed to protect software inventions, until 1980 when the Copyright Act of 1976 was amended to become the Computer Software Act of 1980 (Crews, 1987; Lemley, et. al., 2006). Per the compliance requirements of the Computer Software Act of 1980, Ayyadurai, in 1981, applied for a United States Copyright to legally protect his software invention.



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If published in a periodical or serial give: Volume ▼ Number ▼ Issue Date ▼ On Pages ▼

2 NAME OF AUTHOR ▼
a Mr. Shiva Ayyadurai
DATES OF BIRTH AND DEATH
Year Born ▼ 1963 Year Died ▼
Was this contribution to the work a "work made for hire"? ☐ Yes ☐ No
AUTHOR'S NATIONALITY OR DOMICILE
Name of Country
OR { Citizen of ▶ / Domiciled in ▶ United States
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DATES OF BIRTH AND DEATH

Fig. 2. United States Copyright for EMAIL --- The First Email System.

On August 30, 1982, the United States government awarded Ayyadurai the first U.S. Copyright for *"Email," "Computer Program for Electronic Mail System"* (Ayyadurai, 1982a), officially recognizing him as the inventor of email --- the sys-

tem of interlocking parts designed to electronically emulate and expand the functionality of the paper-based interoffice mail system.

In addition, Ayyadurai was also awarded another Copyright for the *"Email User's Manual," "Operating Manual for Electronic Mail System Program"* (Ayyadurai, 1982b). The user's manual provided the office workers at UMDNJ a detailed guide on how to use email. Was Ayyadurai aware of the significance of his invention? In 1981, he submitted an essay on his invention for an awards entry to the Thomas Alva Edison/Max McGraw Foundation (Ayyadurai, 1981) to be considered for a scholarship to support his attending university. The concluding paragraph in Ayyadurai's essay reveals the prescience of the young inventor:

> *"[Email]'s practical applications are unlimited. Not only is mail sent electronically, as many telexes and teletypes are capable of doing, but it* ***offers a computational service that automates a secretary's or file clerk's work of writing a memorandum, document or letter, editing, filing, and retrieving. If electronic mail systems become a reality, they will surely create different patterns of communication, attitudes, and styles.*** *Volumes of written work, for example, shall become obsolete."*
>
> Excerpt of Statement by Ayyadurai as Teenager in 1981
> *Thomas Alva Edison/Max McGraw Awards Application*

His invention of email did not go unnoticed. For example, in 1981, Ayyadurai was recognized for his invention by distinctions such as the prestigious Westinghouse Science Talent Search Honors Group Award, and being featured on the front-page of MIT's *Tech Talk* (Miller, 1981) as one among 3 of 1,041 students, entering the MIT class of 1985, for having innovated something of deep significance.

1.4 Ayyadurai's Contributions Beyond the Invention of Email

Beyond his invention of email, from 1981 onward, Ayyadurai received worldwide acclaim as a prolific inventor and scientist as well as an entrepreneur who translated his ideas within the disciplines of media and medicine into tangible products and services for humankind. During 1981 to 2007, Ayyadurai went on to receive four degrees from MIT across the fields of electrical engineering, mechanical engineering, visual studies, and a doctorate in biological engineering (Trafton, 2007; Ayyadurai, 2014a). In 2014, Ayyadurai was nominated for the United States National Medal of Technology and Innovation.

MIT's *Technology Review*, one of the world's most eminent technology journals featured Ayyadurai on a front-page cover story on his pioneering innovations in artificial intelligence and automatic pattern recognition (Shapley, 2000) for