

IEEE History Center

ISSUE 110, July 2019

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The newsletter reports on the activities of the IEEE History Center and on new resources and projects in electrical and computer history. It is published three times each year—once in hard copy (March) and twice electronically (July and November) by the IEEE History Center.

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By Michael N. Geselowitz, PhD

In the last issue of the Newsletter, we introduced “Footsteps,” our yearlong commemoration of the history of human space travel, emphasizing the role of engineering. Just as this issue reaches your inbox, the whole world should be paying attention to the 50th anniversary of human beings actually setting foot on the Moon. As you can see throughout this issue, the IEEE History Center is working

hard to ensure that, among all of the excitement, IEEE members get the credit that they deserve for this remarkable achievement. This is manifestation of our overall mission to preserve, research, and make known the heritage of IEEE, its members, their professions, and the related sciences and technologies.

As with all IEEE units, we work closely with volunteers—in our case, the members of the IEEE History Committee. What is most exciting at the History Center is that, in

HOW CAN THE HISTORY CENTER HELP YOU?

A Handy Guide to Some of Our Programs and Contacts

Engineering & Technology History Wiki: https://ethw.org/Main_Page

List of dedicated IEEE Milestones: https://ethw.org/Milestones:List_of_Milestones

How to Propose an IEEE Milestone: http://ieemilestones.ethw.org/Milestone_Guidelines_and_How_to_Propose_a_Milestone

Milestone proposals in process: http://ieemilestones.ethw.org/Milestones_Status_Report

Oral History Collection: https://ethw.org/Oral-History:List_of_all_Oral_Histories

REACH Program (free online materials for teaching the history of technology): https://reach.ieee.org/Support_for_scholars:

Fellowship in the History of Electrical and Computing Technologies:
<https://www.ieee.org/about/history-center/fellowship.html>

Pugh Young Scholar in Residence:
<https://www.ieee.org/about/history-center/internship.html>

Middleton History Prize (awarded to a book in the history of technology):
<https://www.ieee.org/about/history-center/middleton-award.html>

WAYS YOU CAN HELP HISTORY

As you read this newsletter, you will see the many success stories of the IEEE History Center and the ways it nurtures the heritage of the profession. As successful as the Center is, it relies on the support and contributions—financial, intellectual, and time and effort—of many people. We ask you to help further our work by:

Proposing an IEEE Milestone—Milestones recognize significant achievements in technology
ieemilestones.org

Contributing a First-Hand History—Written and oral histories help us chronicle important innovators and innovations
http://ethw.org/Oral-History:List_of_all_Oral_Histories

Authoring an article for the ETHW—The Engineering and Technology History Wiki (ETHW) is an authoritative collection of historical information about technology’s contributions to society
ethw.org/create

Supporting the History Center’s mission with a donation.

However you can help, it is always deeply appreciated.

NEWSLETTER SUBMISSION BOX

The IEEE History Center Newsletter welcomes submissions of letters to the editor, as well as articles for its **Reminiscences** and **Relic Hunting** departments. “Reminiscences” are accounts of history of a technology from the point of view of someone who worked in the technical area or was closely connected to someone who did. They may be narrated either in the first person or third person. “Relic Hunting” are accounts of finding or tracking down tangible pieces of electrical history in interesting or unsuspected places (in situ and still operating is of particular interest). Length: 500–1200 words. Submit to ieee-history@ieee.org. Articles and letters to the editor may be edited for style or length.

Erratum In the March 2019 issue of the newsletter, the Chair of the Life Members’ committee should have been Charles Turner.

the same way as we are working for the members, you the members are engaging with the History Committee and us to support this mission. Members write first-hand histories and other articles on the Engineering & Technology History Wiki https://ethw.org/Human_Space_Travel_Primary_Sources propose Milestones, are interviewed for oral histories, or in some cases conduct them, and, of course, support us financially. We are grateful for all of these activities.

For a fascinating look at how this partnership between members and historians came about, see the April 2019 issue of *Proceedings of the IEEE* (Volume 107, Number 4). In the

“Scanning the Past” feature (pages 847-855), History Center Outreach Historian Alex Magoun, who also serves as the Contributing Editor for History at *Proceedings*, describes how IEEE Fellow James Brittain (who died last year) came to join the IEEE History Committee in the 1970s and advocate for a professionally staffed “center for the history of engineering.” This center in its first incarnation came into existence in 1980, so 2020 will be the 40th anniversary of the IEEE History Center. I look forward to continuing to work with you and to celebrating with you next year.

Thank you again for your support.

IEEE VOLUNTEERS ACTIVELY PRESERVING HISTORY

In this issue, we continue our series profiling the history activities of IEEE units and learn how they preserve and promote the heritage of the profession.

IEEE CHICAGO SECTION CELEBRATES 125TH ANNIVERSARY

The IEEE Chicago Section hosted a fair in recognition of the 125th anniversary of its first meeting that was held at the Armour Institute in 1894. The Chicago Section was the first section formed outside the New York headquarters of the American Institute of Electrical Engineers (AIEE). The catalysis for forming the Chicago Section was the favorable impression gained through a successful Columbian Exposition, and the leadership of Chicagoland engineers, called “western engineers,” in petitioning what was then the AIEE to hold separate meetings outside New York.

Fifteen society chapters of the IEEE Chicago Section had tabletop or poster board displays that demonstrated the tech-

“The Chicago Section was the first section formed outside the New York headquarters of the American Institute of Electrical Engineers (AIEE).”



David Bart of the IEEE History Committee explains the origins of the Edison medal to an attendee.

nologies they represented such as communications, computers, electromagnetic compatibility, industrial automation, power engineering, product safety, signal processing, vehicular electronics, and engineering management. Student chapter members offered tips on computer programming. Affiliate groups Women in Engineering, Chicago/Rockford Consultants’ Network, Life Members and Young Professionals were invited to display. The winning Interdisciplinary teams from IIT’s IPRO Day were invited to showcase their accomplishments. Engineers were on hand to explain their day-to-day activities, and to discuss career opportunities in their technical specialty.

Continued on Page 4

SUBSCRIPTION INFORMATION

The IEEE History Center newsletter is available free to all persons interested in technological history – whether engineers, scholars, researchers, hobbyists, or interested members of the public. It is published in hard copy in March, and in electronic form in July and November of each year.

To subscribe to the IEEE History Center’s free newsletter, please send your name, postal mailing address, e-mail address (optional if you wish to receive the electronic versions), and IEEE member number

(if applicable – non-members are encouraged to subscribe as well) to ieee-history@ieee.org

Current and past issues of the newsletter can be accessed at www.ieee.org/about/history_center/newsletters.html

The IEEE History Center is a non-profit organization which relies on your support to preserve, research, and promote the legacy of electrical engineering and computing. To support the Center’s projects, such as the Engineering & Technology History Wiki, Milestones, and Oral History Collection, please click on www.ieeefoundation.org/donate_history



A view from the top of "The Pitch" where informal presentations were made.

Scheduled speakers covered both technical and professional topics, engineering history, educational opportunities, and issues facing our society. Poster board displays reflected technical accomplishments by Chicagoland engineers and the three Chicagoland milestones granted by the IEEE Board of Directors.

David Koehler, Region 4 director, presented Lisa Schoedel, Chicago Section Chair, a plaque recognizing the Chicago Sec-

tion's 125th anniversary. David Bart, treasurer of the IEEE History Committee spoke on the "Origins of the Edison Medal" and was one of the exhibitors showcasing his extensive collection of IEEE artifacts. High-school students, their families, IEEE members and non-members, IIT students, faculty, and alumni attended.



If it moved or sparked, students showed the most interest.

JAMES BRITTAIN AND THE FOUNDING OF THE HISTORY CENTER

Following brief memorials to IEEE Fellow James Brittain (1931-2018), outreach historian Alex Magoun dove deeper into Brittain's memoir to understand how he successfully championed what is now the IEEE History Center. The typescript, which Brittain documented with correspondence, photographs, and other papers, was donated to the center by Jo Ann Brittain, along with a generous gift in her husband's memory. In it, Brittain recounted an impoverished childhood of wildlife hunting and book learning before enlisting in the military. Within a year, the U.S. Air Force turned Brittain "from farm boy to a radar specialist in the 'high technology' of 1950." He used that training and government benefits to further his education at Clemson University in electrical engineering. While teaching, Brittain was bitten by the history bug and ultimately received the Ph.D. in the history of technology with his dissertation on B. A. Behrend and the origins of electrical engineering. Brittain's qualifications



Jim Brittain in his office at Georgia Tech in 1978

now perfectly bridged his disciplines on behalf of IEEE, but timing and allies were essential to the goal he posed. "Creating the Center for the History of Electrical Engineering also required a lot of writing, recruiting, and meetings," Magoun says. "Over seven years, Brittain was the spark-plug and integrator for the contributions of Donald Christiansen at *IEEE Spectrum* and Reed Crone at *Proceedings of the IEEE*; general manager Richard Emberson; volunteers Barney Finn, Charles Susskind, Fred Terman, Jack Ryder, and Robert Lucky; and many others who agreed that after nearly one hundred years it was time for IEEE to put its remarkable history in professional hands."

Dr. Magoun's article about Jim Brittain, and how he persuaded IEEE's leadership to preserve, document, and institutionalize its historic legacies, is in the April issue of *Proceedings of the IEEE*, pp 847-855, <https://ieeexplore.ieee.org/document/8674846>.

ELECTRICITY'S STORY TELLER: AN INTERVIEW WITH OUTREACH HISTORIAN ALEXANDER MAGOUN

"As electricity's storytellers, we strike a balance between documenting inspirational accomplishments for this and future generations, and fact-checking the myths—that is, not history—that accrete around certain people and events."

so we ensure that IEEE, its staff and members, understand how we got this far. Second, as electricity's storytellers, we strike a balance between documenting inspirational accomplishments for this and future generations, and fact-checking the myths—that is, not history—that accrete around certain people and events. A third way lies in "fostering" rather than promoting innovation. We have a professional obligation to be wary of inaccurate analogies to historic technologies, and to moderate the boundless optimism for the next big thing. Technologies like broadcast radio or the internet are tools only as good as the people who use them.

HCN: What are some of the aspects of your job that you find especially interesting or satisfying?

Magoun: One is the response to a history I've written or edited, or to a lecture I've prepared and given. Maybe 18,000 people have visited an article online, or maybe one person thanks me after a presentation. It's as gratifying to me as it is to any creator to have people appreciate your work. Another is the excitement of finding something unexpected, sometimes a "hidden figure," to adopt Margot Lee Shetterly's term, while researching something else. Recently, while poking through Google Images for a lecture on biomedical engineering, I found the first page of a 1940s article with Julia Herrick as one of the authors. She's the biophysicist who pioneered microwave diathermy and medical ultrasonics while also helping form what became the EMBS and UFFCS, and who never became an IEEE Fellow. With a bit more information, she'll be the subject of a forthcoming article.

History Center Newsletter: In what ways do you see the History Center and the preservation of technological history contributing to IEEE's mission of fostering an innovative future?

Magoun: First, all futures, even the revolutionary ones, are path dependent,

HCN: If you could go back in time, what historical moment would you like to have been present for?

Magoun: Do I know its consequences? Do I get to talk to the people involved? Berkeley Heights, New Jersey, 23 December 1947, for John Bardeen and Walter Brattain's demonstration of voice amplification via a germanium transistor is an obvious one. Dick Williams's lab in RCA's David Sarnoff Research Center for the electronic modulation of light by liquid crystals on 13 April 1962 is another moment less well recognized. If I could understand Danish, I'd like to go back to the University of Copenhagen on 21 April 1820 to hear what Hans Christian Ørsted really thought of his discovery of an electromagnetic effect. The moment Claude Shannon typed the last period on "A Mathematical Theory of Communication" in 1948? What did he do then, listen to Duke Ellington on a 78?

HCN: Who are some pioneers of technology who you find most interesting?

Magoun: The more you know, the more you want to know. I've spent the most time historically with David Sarnoff, so I'm fascinated by and respectful of the ego, the strength of character, it takes to run an innovative multinational corporation under constant antitrust and competitive pressure. Lynn Conway has written a stunningly honest memoir, explaining as no one else could her struggles to be herself, the effects those struggles had on her career, and the significance of her technical accomplishments. And I'd really like to know what the relationship between Charles Babbage and Ada Lovelace was like, thanks to Sydney Padua's meticulous scholarship and riotous imagination.

HCN: Do you feel you have a personal mission as a historian?

Magoun: It wasn't apparent to me until well into my career that I have not only a need but an obligation to speak the truth, and that's largely consequential only when you speak truth to power. It ties into the History Center's role in demythologizing the past, and into the excitement of uncovering or recovering facts that overturn accepted myths and "truths." This doesn't please people with secrets or agendas, but it's healthier for IEEE just as it is for society as a whole.

IEEE DAY AND MEMBER HISTORY

October 2019 will be the tenth anniversary of IEEE Day. IEEE's predecessor body, the American Institute of Electrical Engineers, held its first technical meeting in October 1884 in Philadelphia, Pennsylvania, U.S.A. IEEE Day, held annually on the first Tuesday of October, celebrates this historic meeting when engineers worldwide and IEEE members gathered to share their technical ideas 135 years ago.

When the AIEE and IRE merged in 1963 to form IEEE, IEEE had 150,000 members, primarily in the United States. Today,

IEEE has grown to more than 400,000 members in 160 countries. More than fifty percent of the membership lives in countries outside the United States. IEEE now has almost as many student members as it had total members in 1963.

https://ethw.org/IEEE_History

As part of our ongoing celebration of IEEE's members, the IEEE History Center

<https://www.ieee.org/about/history-center/programs.html>

There are two ways to share your story. You may either write your reminiscence (anywhere from a short paragraph to 600 words is suggested, but we're not fussy about length, picture optional), or record a short video clip.

All written stories and video clips will be considered for sharing on the member history page on the ETHW, during IEEE Day week on the IEEE Day website and messages encouraging members to join or renew. Your story or video clip might be chosen to be featured in future member testimonials online or in our annual membership collateral.

One of the objectives of IEEE Day is to demonstrate how thousands of IEEE members in local communities join together to collaborate on ideas that leverage technology for a better tomorrow. IEEE members are the engine behind IEEE. Our

and Member Engagement staff invite you to share your reminiscences of when/where/why you joined IEEE, and/or your best memory of being an IEEE member.

There are two ways to share your story. You may either write your reminiscence (anywhere from a short paragraph to 600 words is suggested, but we're not fussy about length, picture optional), or record a short vid-

eo clip. All written stories and video clips will be considered for sharing on the member history page on the ETHW, during IEEE Day week on the IEEE Day website and messages encouraging members to join or renew. Your story or video clip might be chosen to be featured in future member testimonials online or in our annual membership collateral.

INSTRUCTIONS TO SUBMITTERS

Email your material to d.maestri@ieee.org as an attachment, including your name, membership grade and Section in the body of the email so that we may recognize you.

Titles of files: when sending a file please make sure the filename is of the format NAMEIEEEmemberreminiscence (e.g. MaestriIEEEmemberreminiscence)

Video Submissions: To be in mov or mp4 format, in the English language, no larger than 1 GB and up to 60 seconds in length. Submissions may be edited for length as needed.

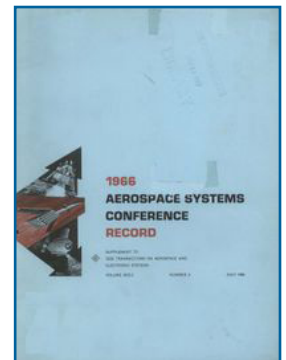
WOULD YOU CONSIDER MAKING A GIFT TO THE IEEE HISTORY CENTER FOR IEEE DAY?

If the history of the profession, and preserving the technical achievements of the past as a way of driving the innovation of the future, is important to you, why not support the IEEE History Center with a donation in advance of IEEE Day? You may donate online at https://www.ieeefoundation.org/donate_history

ETHW UPDATE

In 2019, the IEEE History Center is celebrating the 50th anniversary of the Moon landing and related human space travel events. A portal on the Engineering and Technology History Wiki (ETHW) has been set up by the History Center to easily access the online content related to human spaceflight endeavors. Available on the Wiki are numerous oral histories, first-hand histories, and encyclopedic articles. Over the course of 2019, more than 25 first-hand histories have been added

to the ETHW, and History Center staff encourages any member to contribute their own histories and knowledge to the site. To view the human spaceflight related material on the ETHW, or to contribute your own first-hand history, visit <http://ethw.org/footsteps>



IEEE, its members, and publications were crucial to space flight technologies

IEEE MILESTONES PROGRAM EMPHASISES PROFESSION'S CONTRIBUTIONS TO SPACE

In keeping with IEEE's celebration of its members' contributions to space technologies, the five IEEE Milestones recently given final approval by the Board of Directors include the Parkes Radiotelescope in Australia, which received the television signals from the first moonwalk. The Parkes Radiotelescope was also the subject of the film "The Dish." In addition, the 1946 detection of radar signals reflected from the Moon (Project Diana) was recently dedicated by the IEEE New Jersey Shore Section.

The five milestones recently approved by the Board of Directors are:

- Demonstration of a Radar Predecessor, 1904
- High Electron Mobility Transistor, HEMT, 1979

- Conductive Polymer Self-Regulating Heat-Tracing Cable, 1972
- Standardisation of the Ohm as a Unit of Electrical Resistance, 1861-1867
- Reception of First Communication to Earth from a Human Walking on the Moon, 1969

Milestones recently dedicated:

- First Studies of Ring Armature for Direct Current, 1860-1863
- Salva's Electric Telegraph, 1804
- Detection of Radar Signals from the Moon, 1946
- DIALOG Online Search System, 1966

A list of IEEE Milestone proposals in progress can be found at: http://ieeemilestones.ethw.org/Milestones_Status_Report

A list of dedicated IEEE Milestones can be found at: https://ethw.org/Milestones:List_of_Milestones

Any IEEE Member can propose a technical achievement as an IEEE Milestone, and the History Committee encourages milestone proposals as a way of preserving and publicizing the achievements of the profession. Information on how to propose a milestone can be found at: http://ieeemilestones.ethw.org/Milestone_Guidelines_and_How_to_Propose_a_Milestone



The Project Diana radar site then and now. The present dish is a later addition. Images courtesy of Wikipedia Commons and Lisa Nocks

CELEBRATING OUR HISTORY—INVENTING YOUR FUTURE

The 2019 Women’s History Month event at Stevens Institute, “Celebrating Our History-Inventing Your Future” on Wednesday, 27 March was a joint effort of New Jersey Coast section volunteer Kit August and historian Lisa Nocks of the IEEE History Center; Veronika Paprocka, Stevens Graduate Coordinator for Diversity Initiatives and Lore-El Women’s Center representative, Dhivya Shankar, Professional Development Chair, Lore-El Center for Women’s Leadership, and President, Stevens chapter, Society of Women Engineers.

Contributing to a lively round table discussion about the challenges and opportunities for women in engineering were Dr. Jennifer Chen, Professor of Electrical and Computer Engineering and Associate Director of the Wireless Information Network Laboratory (WINLAB) at Rutgers University, New Brunswick, N.J.; Dr. Kahina Lasfer project manager for systems communications engineering projects at MTA – New York City Transit; Dr. Paula

Muller, healthcare technology engineer and founder of Sociavi, which produces products and systems to assist seniors in staying connected with their families; and LTC Kathryn Pegues, Ph.D., Assistant Professor, Department of Systems Engineering, United States Military Academy, advisory council member, West Point Association of Graduates, admissions representative for West Point and the Naval Academy, and faculty adviser for the West Point cadet chapter of the Society of Women Engineers. The discussion was opened to the audience. Special thanks for their support to Dr. Victor Lawrence, IEEE Life member and professor of Electrical Engineering, Stevens, Dr. Beth McGrath, Stevens Chief of Staff, Dr. Sara Klein, Assistant Vice President for Student Affairs, Stevens Institute, and Dr. Susan Metz, Executive Director, Diversity and Inclusion and Senior Research Associate Office of the President, Stevens Institute.

STAFF NOTES

DR. FRANCESCO GERALI IS 2019 PUGH VISITING SCHOLAR



The History Center is pleased to welcome Dr. Francesco Gerali as the 2019 Pugh Visiting Scholar. Dr. Gerali earned his B.A. in Modern History (2003) and M.A. in Tools and Methods for Historical Research (2005) from the University of Genoa, Italy, and studied his Ph.D. in the History of Science (2009) at the University of Bari, Italy. In 2017, he completed his Master of Library and Information Science the University of Oklahoma, where is also worked as content manager in a digital humanities project. Dr. Gerali main field of expertise is the petroleum industry history. Dr. Gerali was re-

searcher associate in Mexico, Australia, France and the U.S. He has held a number of research fellowships, including the Moran Research Fellow at the Australia Academy of Science and Eugene Garfield Research Fellow at the American Philosophical Society. Currently, He is a visiting research scholar at the University of Oklahoma School of Library and Information Studies. He is the author of *L'opera e l'archivio spezzino di Giovanni Capellini, un geologo del XIX secolo*, as well as numerous journal articles on the history of oil & gas industry.

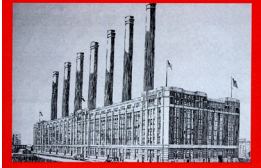
At the IEEE History Center Dr. Gerali is developing the project *Popular Oil: Contributions on the Oil & Gas Industry History for the Engineering and Technology History Wiki (ETHW)* and working on the early history of the electric logs

IEEE HISTORY CENTER PRESS AUTHOR JOSEPH CUNNINGHAM INTERVIEWED

Joseph Cunningham, author of *New York Power* which was published by the IEEE History Center Press, was interviewed for "Plugged In", a video program series by ConEdison that examines topics in electrical power generation and distribution: https://players.brightcove.net/954168402001/ryUAFUp0_default/index.html?videoid=6030007145001

New York Power has become the authoritative book on the history of the electrification of New York City.

NEW YORK POWER



Joseph J. Cunningham

IEEE FOUNDATION

FOUNDATION BOARD MEMBER ADDRESSES THE CHALLENGE OF OPEN ACCESS

One of the objectives of the IEEE Foundation is to help convert challenges facing IEEE into opportunities. A very topical challenge today involves the changing nature of publications. The challenge exists in how current day magazines, periodicals, journals, etc., are distributed by publishers, and accessed by readers. This logistical and financial conundrum has presented organizations, including IEEE, with challenges that alter a business model that has been in existence for decades.

As a result, the concept of Open Access is becoming more prevalent for the publishing world, and for IEEE. This concept is the mechanism via which publishers distribute information online, free of charge. Obviously such a concept has repercussions throughout the publishing world.

Thanks to one of our IEEE Foundation Board members, L. Dennis Shapiro, the IEEE Foundation is helping IEEE address this issue in at least one instance. Recently Dennis, an IEEE Life Fellow and retired Chairman and CEO of Lifeline Systems, Inc., offered an idea which helps provide a workable solution for all parties. An avid reader of 'Scanning the Past' a regular feature in the *Proceedings of the IEEE*, Dennis has agreed to sponsor the

"His objective is two-fold. First, to continue to bring the feature to as wide an audience as possible at no additional cost to them; second, to lead by example, hopefully motivating others to take a similar path."

feature for an introductory period. His objective is two-fold. First, to continue to bring the feature to as wide an audience as possible at no additional cost to them; second, to lead by example, hopefully motivating others to take a similar path.

History Center Outreach historian Alex Magoun, who also serves as associate editor for history for *Proceedings*, observed that Shapiro's gift enabled what "History Center staff, friends, and volunteers all seek: to share

IEEE's untold histories with the membership and the world."

The Foundation is happy to be the facilitator of this project, one which benefits *Proceedings*, the IEEE History Center, the IEEE Foundation, and all members of IEEE who are interested in maintaining access to this historically relevant and enjoyable feature. Read the open access article here: <https://ieeexplore.ieee.org/document/8710361>.

On behalf of all involved in the project, we thank Dennis for his creativity, his generosity, and his leadership on this issue. Should you have interest in helping to continue the impact of this effort by sponsoring an issue or issues, please contact the IEEE Foundation at +1 732 465 5871.

Your contributions to the **IEEE History Center Fund** preserve the heritage of the profession and its contributions to humanity. We invite you to find out more about the Center and its programs at <https://www.ieee.org/about/history-center> and more about the Engineering & Technology Wiki (ethw.org) To support the History Center's work, please go to https://www.ieeefoundation.org/donate_history

PARTICIPATING IN A COLLEGIAL RELATIONSHIP WITH THE IEEE HISTORY CENTER

A. Michael Noll, Ph.D.: Senior Life Member

As an IEEE student member beginning in 1959 and a current IEEE Senior Life Member, A. Michael Noll has had a long history with IEEE, beginning in the early 1960s. In addition to publishing papers in such journals as *IEEE Communication and Electronics*, *IEEE Spectrum*, and *IEEE Student Journal*, IEEE Eta Kappa Nu awarded him Honorable Mention as an Outstanding Young Electrical Engineer in 1970.

After serving on the staff of the Science Advisor to the President in the 1970s and then as a marketing executive at AT&T and Professor of Communications/Dean at the USC Annenberg School for Communication and Journalism, California, US, Noll's path connected back to IEEE in the early 2000s as he worked to archive the papers of Dr. William O. Baker, past pres-



A. Michael Noll (right)

ident of Bell Labs and an influential advisor on scientific matters to five U.S. presidents. Dr. Baker introduced him to Dr. Michael Geselowitz, Senior Director of the IEEE History Center, initiating both a strong professional and trusted relationship that resulted in Noll writing a number of articles that were posted on the History Center's Wiki site.

"I've been impressed with and appreciative of the educational and professional work the

IEEE History Center performs in terms of documenting, preserving, and presenting the history of both electrical engineering and IEEE," shared Michael Noll, who added that the History Center and its staff were collegial to him in his own research. Confirmed Michael Noll, "I've been pleased to contribute to the IEEE Foundation to support the History Center."

BOOKS IN OUR FIELD

NEW YORK POWER

by Joseph J. Cunningham
published by the IEEE History Center

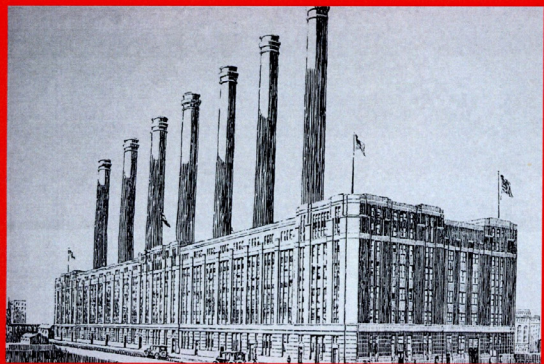
New York City's density placed unique constraints on its electric light and power supply. Electrification began during the 1880s, but many innovations were required to supply urban service at a cost that would make possible large-scale consumption.

New York Power tells the story of the electrification of the one of the densest electrical load areas in the world, it was also where alternating current challenged and then ultimately vanquished the original direct-current system.

Author Joseph J. Cunningham has consulted a variety of historical sources to bring us the story of the massive and sustained effort to develop New York City's electric utility system. He has researched and authored numerous articles and books on topics such as industrial electrification and electric rail transportation, and has taught widely on the history of electric power systems and consulted on numerous electro-technology projects and television productions. Lionel Trains has consulted him on the historical details of its model trains.

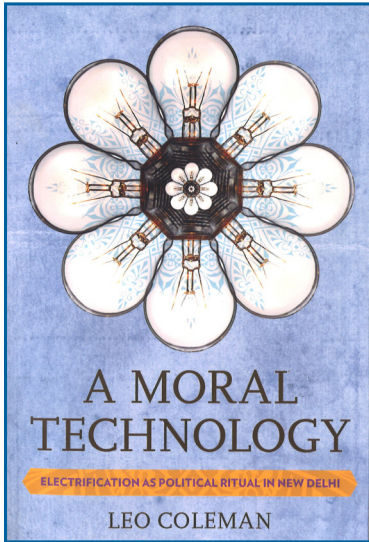
Available from http://www.amazon.com/New-York-Power-Joseph-Cunningham/dp/1484826515/ref=sr_1_1?s=books&ie=UTF8&qid=1383598253&sr=1-1&keywords=cunningham+new+york+power in hard copy and on Kindle.

NEW YORK POWER



Joseph J. Cunningham

COLEMAN, LEO,
A Moral Technology,
Cornell University Press, 2017



India was not always the technological powerhouse that it is considered to be today. The road to electrification of the country was in no way a small feat, rather it was a long process that fought through a number of political eras with varying political leaders. Leo Coleman, Professor of Anthropology at Hunter College in New York City explains the endeavors and triumphs of India throughout its struggle for electrification. Coleman raises the question can the electrification of India, or of any coun-

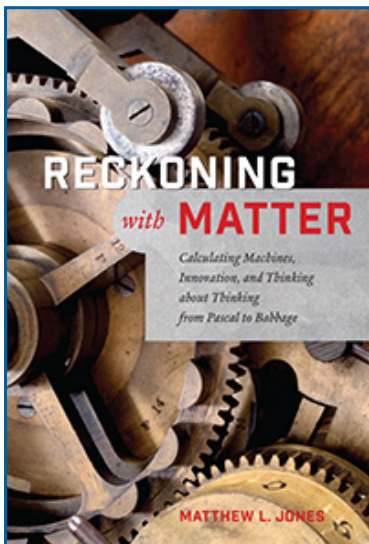
try for that matter, be considered moral? Coleman emphasizes the theme that technology and its material presence could not be kept away from its moral presence along with the idea that the only way that one group would gain the upper hand over the other would be at the expense of the other group.

The book is split into three sections based on different political eras and legislative laws.

Part One, *Imperial Installations*, focuses on the Durbar hosted by viceroy Nathaniel Curzon in 1903 to celebrate the succession of Edward VII and Alexandra of Denmark. A temporary city of tents occupied the commercial center of Delhi, where roads were freshly paved and electric lights were everywhere to show off to the world that India was not far behind other nations. Part Two, *National Grids*, centers on the Prime Minister, Jawaharlal Nehru, and his vision of bringing technology to the city of New Delhi. At the time, there was political turmoil over how technology could be managed. Debates would begin in the 1940's over democratic involvement, and how best to govern the new fast-growing capital of New Delhi. Part three, *Urban Transformations*, deals with the problems of the privatization of electricity throughout New Delhi and the struggle of the middle class citizens of India concerned about rising electricity rates, management of the privatized power grid, and problems with the new electric meters causing high bills.

The story ends with questions of what will happen in the future to help the citizens of India, and whether or not citizens of New Delhi will gain access to power 24/7. Coleman writes extremely well and knowledgeably about the topic and packs an extensive amount of information about the electrical revolution that has occurred in India for over a century, and that the struggle for electrification is not yet truly complete.

JONES, MATTHEW, L.
Reckoning with Matter: Calculating Machines, Innovation, and Thinking from Pascal to Babbage,
University of Chicago Press, 2016



Matthew Jones' *Reckoning with Matter* sets out to reveal the contributions of artisans, the people who put the inventions and devices together, which are often hidden from historians. Bringing a new invention from conception to working prototype is often extremely difficult. Without the skilled artisans who can build what the inventor has drawn or described, innovation would stall. Often, great creativity and ingenuity was needed from the artisans, as well as from the inventor. The importance of

the shape of the teeth of the gears becomes a metaphor for the importance of detail matching the breadth of vision in the inventive process. Jones sees the inventive process as coordinating the processes of obtaining funding, coordinating manufacture, and exerting legal protections and marketing privileges in addition to

conceiving the device in the mind. Alas, not all inventors appreciated (nor even promptly paid) their artisans. Charles Babbage, who developed his Difference Engine for the British government, lacked clear understandings with his engineer, Joseph Clement, regarding ownership of the design of tools used to build the Difference Engine. He also lacked clear contracts with the government which was funding him.

Central to the development of calculating machinery was the extreme difficulty of inventing a reliable carry mechanism to convey the value to the next ten, hundred or thousand. Jones uses the carry mechanism as the thread of his narrative from Pascal to Babbage. The period of history of the development of calculating machines corresponds to the rise of the value placed on intellectual property and its protections in early modern Europe. Patents, privileges, and protections evolved, as did the markets and the governments in funding and rewarding inventors. There were distinctions between protecting methods of manufacture versus the intellectual property. Governments needed to assure inventors that "their projects, glory, and economic interests would be protected," while at the same time, governments needed to be protected from half-baked schemes and inventions that existed only in the mind.

Reckoning with Matter is written with academic rigor and detail, with many illustrations and diagrams. In addition to being technological history, it gives the reader a good grounding in the often difficult dance between inventor, state, and market.

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