

Thank you Reinhard – it’s absolutely surreal that this is already my third and final talk with the Society of Fellows. It feels like I just moved in yesterday. I wanted to begin by especially thanking my fellow fellows who have been around long enough to see this project go through several different phases and offer their feedback and support along the way.

And I also wanted to begin with a disclaimer. When I was a kid, I had a bike accident and lost a couple teeth in the front. This past weekend, I was playing basketball and lost a replacement tooth. What I have now is a very provisional stopgap – quite literally a stopgap – so, while we’re going along, if anything falls out or if I sound like a ten year old who just got his first retainer... it’s because I just got my first retainer.

So we’re here to talk about Hugo Gernsback and science fiction.

General exams anecdote.

Instead, all I could find was universal dismissal and derision:

Malcolm J. Edwards: HG “bestowed upon his creation provincial dogmatism and an illiteracy that bedeviled US SF for years.”

Reputation: “a disastrous (if not a pernicious) figure, a man whose stultifying vision and lack of literary taste led to the establishment of a literature that for too many years was considered a laughingstock, that emphasized other elements than literary quality, and, perhaps worse of all, that paid the majority of its writers badly.”¹

¹@grossman_hugo_2011

We'll set aside the fact that the author loses track of his pronouns throughout that passage, but this is an attitude that is in certain ways understandable. It took a long time for science fiction to be included on university syllabi, and works of literary merit or stylistic significance were of course given preference.

But on my hunt to find that definition, it took me down a rabbit hole of not just an editor of SF, but an inventor, and theorist of emerging media. And I began to think about how those two parts of Gernsback's career are part of a continuum.

The result is a critical edition of Gernsback's writings, *The Perversity of Things*, which makes available texts that were foundational for both science fiction and (as I found) the emergence of media studies. This collection of Gernsback's editorials, blueprints, short fiction, literary critical essays, and media histories have been out of print since their original run between 1905 and 1933. Together, they show how his publications evolved from an electrical parts catalog into a fully-fledged literary genre. Not only was Gernsback an active inventor and advocate for the importance and rights of the amateur, he developed a means of describing and assessing the cultural impact of new media long before it was an academic discipline.

It's a project that demanded a scope I hadn't at all anticipated when I began. It now includes 80 essays, marked up with an extensive editorial apparatus, but I've had the good fortune of an editor at the University of Minnesota Press who has given me the time and space to take the book where I want it.

I'm also excited to say that it will be one of two pilot projects for a Mellon-funded interactive books platform that Minnesota Press is developing, called "Manifold Editions."

DEBATES IN DH

Built off of the Debates in DH platform that some of you may have seen.

So today, I'm going to present work from the in-progress Introduction to this book, the last hump before I'm able to submit the complete manuscript to the press, some time, hopefully, later this month.

Apologize in advance, I have a *ton* of images that I want to share with everyone, so if I start going too fast just yell at me to stop and we can look at something and talk about it.

TELMCO RECIEIVER

It's the summer of 1906 in downtown Manhattan and Louis Coggeshall hovers over a bucket of dimes in the back room of the Electro Importing Company's retail store, filing them down to a coarse powder. Sitting amid shelves of electrolytic detectors, circuit switches, ammeters, and Geissler tubes ready for sale to the city's growing community of amateur experimenters, he lets the metal filings fall into a small cardboard box at his feet. Making a coherer, one of the earliest forms of radio receiver, required a certain amount of culinary improvisation in order to find the proportion of metals that would produce the strongest signal possible. At the time, dimes were minted on ninety percent silver, so Coggeshall's next steps were to mix the filings with the perfect ratio of iron powder and finally to pour that mixture into a small glass vial. When a radio frequency wave comes into contact with this coherer, the metal filings cling together, allowing a signal to flow between electrodes connected to either end of the vial and, depending on how long the telegraph key on the transmitting end of that radio wave is depressed, produce a *dot* or a *dash* in Morse code. Mounting this final element onto a wooden base dotted with other handmade components, Coggeshall completes the construction

of another one of the Electro Importing Company's flagship products: the Telimco wireless telegraph set, a portmanteau of the company's name and one of the first fully-assembled radio sets ever sold to the American public.

(A replica of the Telimco receiver made by Gernsback for the Ford Museum in 195.... The coherer is the glass tube mounted between the two binding posts next to the bell. Other components include the spark gap and the large cylindrical battery.)

TELIMCO AD

Meanwhile in the offices upstairs, the founder of Electro Importing Hugo Gernsback writes increasingly breathless advertising copy for the Telimco, promising it to be a means of professional success and economic mobility. In one issue of the *Electro Importing Company Catalog*—a mail-in marketplace that provided access to “Everything for the Experimenter”—Gernsback claimed that with the Telimco, “We give you the opportunity to tick yourself up to the head of a future wireless telegraph company as did Marconi, De Forest and others.” Priced at \$7.50, the set was an attractive proposition from a company who claimed to be “the largest makers of experimental Wireless Material in the world”, requiring little more than a working knowledge of Morse code in order to get started. First advertised in the November 25, 1905 issue of *Scientific American*, the Telimco appeared thereafter every two weeks, quickly becoming one of Electro Importing's best selling items. In order to reach a wider public, Gernsback – a twenty-one year old Jewish immigrant from Luxembourg who at that point had been in the United States for only two years – visited retailers around the city like Macy's, Gimbels, Marshall Field's, and FAO Schwartz, giving demonstrations of the device to incredulous salespeople who had no conceptual framework through which to understand “wireless.” And for good reason: not only was wireless still in its infancy and largely unknown to the public, it was a technology whose success-

ful transmission of information through the air wasn't fully understood even by the scientific community. From the physical substrate of metal filings to an entirely new means of communication that would soon be in every home, Gernsback and his colleagues were in the process of transubstantiating one medium into a medium of another kind.

AMAZING COVER

This is the story of a literary genre's emergence. But it's not one that many are familiar with. Hugo Gernsback is remembered today as the founding editor of the first science fiction magazine, *Amazing Stories*, a large-format title printed on thick pulp paper that debuted on newsstands in early March 1926. *Amazing Stories* gave a name to fiction treating the speculative and the otherworldly through a systematically realist lens: scientifiction. And it established a forum for fans of the genre to debate and influence the future of its development. In recognition of this legacy, Gernsback's name adorns the awards given out each year to the best works in the genre, the Hugo Awards, and many scholars use the launch of *Amazing Stories* in 1926 to date the invention of modern science fiction. This book is devoted to the idea that the project of science fiction as Gernsback understood it in fact had its origins in an earlier context: as a series of interlinking devices, debates, and visions shared by a community of tinkerers that formed around Gernsback's electrical supply shop and technology magazines. Largely thanks to the iconographies and standardized plots codified by *Amazing Stories*, the term *science fiction* today conjures up images of bug-eyed monsters, ray guns, and starships. But in the opening decades of the twentieth century, before the accretion of a hundred years' worth of narratives, images, and clichés, that which was not yet called science fiction consisted of a number of concrete practices all geared toward a reckoning with technological revolutions in the fabric of everyday life. Before it was a particular kind of story or plot, science fiction was a way

of thinking about and interacting with emerging media.

XMAS SUGGESTIONS

What began with the *Electro Importing Catalog* and its miscellany of strange devices like the Telimco soon expanded into a number of companion magazines for the amateur tinkerer like *Modern Electrics* (first published in 1908), *Electrical Experimenter* (1913), and *Radio News* (1919). In these richly illustrated magazines, one could find blueprints for a home-brewed television receiver (well before the technology was feasible) alongside a literary treatise on how scientifiction stories should be structured. Giving equal space to the soberly technical and the wildly utopian meant that Gernsback's translation of an influential German handbook titled *The Practical Electrician*, for instance, could run alongside a speculative article on what it would take to provide a global system of free electricity powered by ocean currents. Each issue showcased designs submitted by readers, their own personal "wrinkles, recipes, and formulas" that would be taken up and debated by others through letters printed in subsequent issues, much like the famous letter column in later science fiction magazines. Long before Gernsback founded *Amazing Stories*, these magazines and their readers used speculative thought to find a language suited to the analysis of emerging media like radio, television, or the more exotic osophone and telegraphone. While Gernsback for better or worse has been enshrined as science fiction's founding figure (fans refer to him as "Uncle Hugo"), less well known are the ways in which he is "the father of American electronic culture," in the words of Franz Pichler, curator of a recent exhibit on Gernsback at the ZKM (Center for Art and Media Technology).^[^bwbp] In order to come to terms with the place from which both of these nascent discourses emerged, scientifiction and media culture, we have to see them as part of a continuum.

One of the challenges in recovering an understanding of science fiction *avant*

la lettre is the fact that many of the variables its stories revolve around – science, media, and technology – the very subjects and objects of scientifiction, were concepts still very much in flux. Science as it was understood in the public sphere was a highly variable entity, and had no settled explanations for the accomplishments of new technologies like wireless telegraphy. These technical media were only just beginning to be understood as *media* in the modern sense of mass communications, and even the term *technology* itself wasn't used in the American English vernacular until the 1920s, as we will see later.² The essays in this book, therefore, represent a media theory in the making, in which *media* are addressed not primarily as mass-cultural forms like cinema or television news, but as the affordances of and possibilities inherent in the smallest individual components: the selenium-coated plate, the tungsten lamp, the chromic plunge battery. In his monthly editorials, feature articles, and short fiction, Gernsback pioneered a kind of writing that combined hard technical description with an openness to the fantastic. Using interleaving descriptive and narrative frameworks to describe a particular device, experience, or vision of the future, Gernsback followed the smallest of technological developments through to their most logical, and sometimes extreme, conclusions: the increased availability of a light-sensitive alloy implied that the coming of visual telephones was near, and the number of amateurs sending in their own designs for primitive television receivers only served to confirm the immanence of this new mode of communication.

SI SLEEP COVER

It's perhaps this penchant in his work to dwell in the extremes of both technical detail and fantastic speculation that accounts for Gernsback's absence in the pages of both science fiction studies and the history of technology. For the former, he is too obsessed with material details and as an editor and

²@guillory_genesis_2010. @marx_technology:_2010.

writer merely produces stylistically bland lists of technological marvels, what are dismissively referred to as “gadget stories.” For historians of technology, Gernsback’s inventions and technical writings are never able to back up their promises, being far too concerned with future contingencies to merit serious attention. But it’s precisely the novel coexistence of these diametrically opposed modes throughout Gernsback’s work – radically practical and radically speculative – that led to the explosive popularity of his ideas in several different forums. Across the thirty year period covered by this book, the reader will find technical precision and utopian speculation in varying proportions, and articles that toggle from one extreme of this spectrum to the other with ease.

What I plan to do here today is introduce you to Hugo Gernsback himself, show you some of the gadgets he invented, and then talk a bit about how he invited participation from readers in an ongoing process of collaborative tinkering.

YOUNG HUGO

Born Hugo Gernsbacher in 1884, the third son of Jewish German émigrés to Luxembourg, Gernsback was raised in Hollerich, a tiny suburb of the nation’s capital. His parents, Moritz and Bertha Gernsbacher, raised him in comfortable circumstances thanks to Moritz’s successful wine wholesaling business. Growing up off the grid (Hollerich wasn’t yet connected to Luxembourg City’s new electricity network), the young Gernsback’s passion for technology began with the battery after a handyman employed by his father taught him at six years old how to wire a series of electric bells to a Leclanché cell. Gernsback recalls being instantly enchanted by the bell “ringing amid a shower of wonderful green sparks,” and would soon acquire a reputation for

wiring homes and businesses in the area with telephones and these ringers. According to a story he often told later in life, Gernsback received special permission from Pope Leo XIII when thirteen years old to enter the Carmelite convent of Luxembourg City to install a series of electric call bells for the nuns there.

Though this story is partially verifiable through a certificate of thanks from the Convent found by Luxembourg's national literary archive, it's worth pointing out here that the portrait of Gernsback's life we are left with in the historical record consists largely of a series of self-propagated stories that border on braggadocio: that a police officer intruded on the Electro Importing Company offices to interrogate them for fraud with the Telimco set in 1906, for "no wireless combination could be sold at this low price"^[Reportedly, the officer shot back after the demonstration: "I still think youse guys is a bunch of fakers. This ad here says that you are selling a *wireless* machine. Well, if you do, what are all them wires for?";

WIRELESS LEGISLATION

(other claims:) that his recommendations were incorporated "word for word" into the Radio Act of 1912 (though Gernsback was a big proponent for the rights of the amateur broadcaster, and the content of his recommendation was, the exact wording wasn't).

TV TELEPHOT

that Gernsback coined the term "television" in his December 1909 editorial **Television and the Telephot** (he didn't).

Once the influential science fiction historian and Gernsback's friend Sam Moskowitz recorded these stories in his many profiles of Gernsback, they became established as gospel truth, with Moskowitz playing the apostle to Gernsback's prophecies. Evidence contrary to or even in excess of the re-

ceived doxa is hard to come by, with many press and literary critical accounts barely rephrasing Moskowitz's prose, even still today. ((So it's been a very strange biographical record to work off of))

We do know that despite the precociousness of his youth, Gernsback was by most measures a terrible student, falling at the bottom of his class at an industrial school near home from the ages of twelve to fifteen. When he left to attend the Technikum in Bingen, Germany from seventeen to eighteen, he regularly skipped classes and received poor grades in all subjects save electricity and physics. It was during these teenage years that Gernsback acquired a penchant for gambling with the money he earned doing various electrical jobs in poker games, though his tendency to be cleaned out by older players seemed to keep him from falling too deep into this habit. Outside of school, Gernsback was drawn to American culture from an early age. He was a fan of John Philip Sousa's military marches and even composed his own patriotic Luxembourgish piece in the style of Sousa titled *Röd, Wêis, Blo* that continued to be performed by the Military Band at the Place d'Armes in Luxembourg into the 1930s. He was a devoted reader of cowboy stories and was such a fan of Mark Twain that he wrote a now-lost novel of his own at seventeen, *Der Pechvogel*, under the name Huck Gernsbacher. But it was stories of the otherworldly that truly fired his imagination. Reading the astronomer Percival Lowell's book *Mars* at the age of nine, with its fusion of the hard sciences and speculation about alien life, served as Gernsback's introduction to the literature he would later come to think of as a distinct genre of sciencefiction. He dove headfirst into the work of Jules Verne and H.G. Wells, claiming to have nearly memorized many of their novels while still very young.

Hugo-Gernsback.jpg

Despite his predilection for journeys into unknown frontiers, whether the

American West or Martian canals, Gernsback remained tied to his home even after leaving, if not physically – there is no proof he ever returned – then through a meticulous self-fashioning. Gernsback cultivated a distinctively (one might say distinctively unique) Luxembourgish identity throughout his life. Though raised by German parents, he grew up in Luxembourg at a moment in which the tiny country’s national identity was becoming more developed than ever before. The anti-German sentiments of Gernsback’s editorials and short fiction published during World War I (especially in a story titled **The Magnetic Storm**) largely echo the growing importance already sensed by “a good part of the Luxembourgish people at the end of the Nineteenth century to demarcate between [Germany and Luxembourg] when faced with the more or less well marked pan-Germanic designs of Germany.” But the many identities attributed to Gernsback throughout his life – he is described variously in the press as Prussian, German, Belgian, French, a “multilingual dandy” – also seemed to allow him a kind of ambiguity that he relished.

As one associate recalled:

In the era of tie-dye and sandals, Gernsback continued to dress like a visiting dignitary. For evenings on the town, he favored formal wear, including spats, an opera cape and an expensive silk homburg. He even affected a monocle, though he didn’t really need it.³

TV GLASSES

Hiding just beneath this severe exterior, according to Sam Moskowitz, was a sharp sense of humor: “The truth is that Gernsback socially is a man of almost rapier-like wit, with a mischievous gleam in his eyes and with the rare

³@stashower_dreamer_1990.

ability to joke about his own misfortunes.”⁴ Throughout his life, friends and colleagues noted Gernsback’s relentless energy and the way that it seemed to sweep up everyone around him. Visions completely out of step with his surroundings seemed to fall out of him wherever he went. A distant relative recalls a 1910 visit from Gernsback on his way to Chicago to purchase new equipment for Electro Importing. When a ringing telephone interrupted one of his many stories of “robot doctors, retirement colonies on Mars, domed cities orbiting Earth,” Gernsback (who had arrived in a horse-drawn carriage) reminded his seven-year-old niece as she ran toward the receiver, “Hildegarde, fix your hair. It won’t be long before the caller can see your face over the telephone wires.”

Throughout his youth, Gernsback’s parents never approved of his interest in electrics, and especially didn’t see it as a viable career choice for him. But when Moritz died in 1903 at the age of 57, Gernsback sensed that it was time to branch out on his own. With either his share of the family’s savings, he booked a first class ticket to the United States, a fare that was prohibitively expensive for most.⁵ In February 1904, he arrived in New York by himself at the age of 19, in an elaborate three piece suit. Perhaps inspired by his first experiences with that Leclanché cell as a boy, Gernsback carried with him the design for a new kind of dry cell battery whose electrolytic paste could replace the inefficient liquid of wet cells like that of the Leclanché. Having been denied patents in both France and Germany for the battery, Gernsback decided to try his luck in the United States. A year later, he began publishing on his ideas, with his first printed article appearing in *Scientific American* again under that most American of names, “Huck” (**A New Interrupter**). He was able to sell his battery technology to the Packard Motor Car Company, who ended up using the device in their ignition systems.

⁴@moskowitz_explorers_1963, 235.

⁵@gernsback_old_1938

eico_store.png

With the profits of his sale, Gernsback formed the Electro Importing Company, an importer of specialized electrical equipment from Europe and one of the first mail-order radio retailers in the country. Through their catalog and retail store at 84 West Broadway, the company provided access to specialized wireless and electrical equipment not found anywhere outside of Europe. Electro Importing catered to a diverse clientele, first manufacturing the Telimco in 1905 for their novice users, and providing their more advanced amateur experimenters with the first vacuum tube offered for sale to the general public in 1911.

After several issues of their mail order catalog and a growing subscription list, Electro Importing began including features, editorials, and letters to the editor. Between 1906 and 1910, the catalog evolved into a monthly magazine for the wireless homebrewer, *Modern Electrics* in 1908. The transition from the mail-order catalog to the monthly magazine format was a smooth one, evidenced by the fact that the third and fourth editions (1907 and 1908) of the Electro Importing catalog bears the title of the new full-format magazine, “Modern Electrics.”

me_catalog1907_jim.png

The offshoot Experimenter Publishing Company, founded in 1915, published expanded how-to manuals, pamphlets, and complete books like *The Wireless Telephone*, *One Thousand and One Formulas*, and *The Wireless Course*. While *Modern Electrics* still advertised the equipment Electro Importing offered for sale in a familiar grid layout with ordering instructions, it also included feature articles detailing the latest research into experimental media technologies in America, throughout Europe, and in Gernsback’s own company offices. Each 36-page, 6 x 9.5” issue sold on newsstands for ten cents and contained regular reports from E.I. Co. employees like Harry Win-

field Secor and René Homer, who would contribute to Gernsback titles for years to come. Some freelancers attributed their decision to pursue science as a profession to their experiences with *Modern Electrics*, as did Donald H. Menzel, astrophysicist and later director of the Harvard Observatory, who earned money for college by writing for the magazine.⁶ Celebrity guest contributors like Lee De Forest, and later Thomas Edison and Nikola Tesla in the pages of *Electrical Experimenter*, raised the profile of the magazine among a readership hoping to emulate the success of these famous inventors.⁷ Regular dispatches and photographs printed on the magazine's slick paper from the unnamed Paris, Berlin, and Brussels Correspondents kept readers informed on developments in television, wireless telephony, and the use of novel electrical apparatuses in film and theatrical productions, each of which would go into a great degree of technical detail.

me_cover_mumford.jpg

What's unclear to the modern reader is just how many of these technical details are factually accurate, which are purposefully embellished, and which are just provisional because the writer has no idea what he's talking about. This has been one of my challenges as an editor trained in literary studies and only kind of moonlighting as a historian of technology, because it's exactly these little details that are so important in understanding the larger development of science fiction and media studies in these pages. So what I tried to do throughout the book is have my annotations serve as a kind of narrative through-line:

⁶@oneil_amazing_1963.

⁷Tesla first published his autobiography in serial installments in *Electrical Experimenter*, a book that was recently republished by Penguin Classics. @tesla_my_2011.

TREATISE

For instance, once the reader learns about the difficulties amateurs had in obtaining the necessary materials (silicon, molybdenite) to build a successful crystal detector by reading “A Treatise on Wireless Telegraphy” (1913), she will then have a greater appreciation of the claims behind Gernsback’s so-called Radioson Detector published the following year.

RADIOSON

Is the Radioson real or fictional? How does science fiction later learn from this kind of fantastic embellishment of technical detail? What does that process have to offer current conversations on new materialisms and the media ecology of unseen rare-earth minerals that go into (and come out of) the gadgets we now use every day?

Writings that begin with seemingly dry engineering specifications don’t take long to spin out into wondrous possibilities, futures that seem to proceed organically from the most minuscule of details. The Telimco, for instance, was not exactly the revolutionary device that first brought radio to the masses Gernsback later liked to claim it was. Though its advertisements claimed the set was “guaranteed to work up to one mile,” the Telimco was notoriously finicky.⁸ As it was sold, the outfit had a range of merely 300-500 feet and could only receive signals from further distances when a large antenna was hooked up. Further, it was highly susceptible to any kind of electrical interference, such as the elevator motor in the Electro Importing Company building, which caused difficulties during in-store demonstrations of the apparatus. The Telimco’s untuned circuits, which would produce a high degree of interference for any nearby radio station, would soon be outlawed by federal legislation. For these reasons, its metal filings coherers “had all but disappeared from commercial work in 1910” according to historian of early

⁸@_wireless_1905

radio Thomas White.⁹ From this perspective, the Telimco seems less a practical means of communication than a proof of concept for a growing group of “electrics” hobbyists.

In essence, it was little more than a gimmick, a parlor trick: press a button and a bell in another room would ring without the need for any intervening wires. But the Telimco was a rough prototype, an aggregate of handmade components that encouraged and enabled a conversation on what the wireless medium may look like in the future. The technical limitations of the device as it then stood didn’t stop Gernsback from publishing instructions in 1908 on connecting a telephone mouthpiece to the transmitting end of the Telimco and an engine to the receiving end, so that the “power” of the human voice could be used to start that engine (**The Dynamophone**). Or in the following year, describing how thousands of perfectly synchronized home wireless sets would be capable of sending a message to the aliens that surely must be listening for us on Mars (**Signaling to Mars**). Or months later, laying out in great detail how it would be possible to send and receive motion pictures over the airwaves using currently available equipment (**Television and the Telephot**).

The Telimco was one of countless artifacts profiled in the Gernsback magazines that blurred the lines between the real and the imaginary.

TEETH1

This is one of my favorite examples, the Osophone, for which Gernsback was awarded a patent in 1923, a “simple and practical means by which hearing may be effected by sound vibrations transmitted directly to the osseous tissue

⁹@white_pioneering_1996

of the body; a small, compact and handy instrument which can easily be carried about and used without attracting undue attention.” So this is a finished, consumer-ready device that allows the user to hear sound that no one else is hearing, by conducting impulses through the teeth, to the jaw, to the auditory nerve. Google Glass actually used similar technology.

TEETH2

Seven years earlier, Gernsback published this idea as a home experiment, recommending that the reader try biting a sewing needle tightly between his teeth and holding the sharp end of the groove to a phonograph record.

With a little practise one will become proficient in moving the head at the same ratio of speed as the ordinary reproducer arm is moved from the outside of the record towards the inside. As soon as the needle touches the record with sufficient pressure, the inside of the head will be filled immediately with music exceedingly loud and clear.

(I was actually planning on testing out this experiment when... alas... I lost my chompers. But if you go home, try it, and get hurt, don't say it was me who told you to do it.)

TEETH ESP

In this very same issue as the sewing needle experiment, Gernsback also publishes the next monthly installment of his serial novel *The Scientific Adventures of Baron Münchhausen*, in which the protagonist visits Mars and realizes that the Martians were communicating through some form of extra-sensory perception, listening...

not with their ears. They were listening with their brains! The two reddish plates pressing against the bare temples are made of

two metals unknown on earth, and the metals are distributed over the surface of the plate in honeycomb fashion without touching each other. Now if the two plates are pressed against the temples and when wireless waves are passing through them, the waves are translated into vibrations of a certain frequency. It has been found that if these vibrations reach the conscious sense of hearing which is located in the *Temporal Lobe* of the brain, sounds can be impressed upon the brain without requiring the ear and its auditory nerve. In other words, the sound is “heard” directly within the brain without the agency of the ear’s mechanism.

The example of the patented Osophone illustrates how tinkering with something as simple as available household materials became the starting point for new inventions, both functional and fictional. Projecting out from these available materials and describing their experience in the future was a means of aiding design practice.

While some of Gernsback’s devices were awarded patents and others were available for sale, others seem more like branding exercises or rallying calls for a community of active amateur experimenters to run with the as-of-yet unrealizable idea. More often than not, these above categories bleed into one another. Gernsback gives names to these ideas like Aerophone (a name for wireless audio transmission, rather than merely telegraphic code)...

ee_cover_telephot.jpg

...Telephot (an early conceptualization of the videophone), and Hypnobioscope (an automated thought transcription and playback machine).

Regardless of how advanced the devices detailed in the pages of the *Electro Importing Catalog* seemed – solar cells, automobile mounted radiotelephones, electric keyboards powered by vacuum tubes – Gernsback and his staff reported on them as if they only required a combination of already existing electrical principles and components. These new media appeared as little more than the sum of individual building blocks that one could pick and choose from of the pages of the *Catalog*. Even the long-term projections like thought wave recorders and videophones were described as handicraft futures that would come to pass with just a little more tinkering.

((Samuel R. Delany has written on this period:))

The new American SF took on the practically incantatory task of naming nonexistent objects, then investing them with reality by a host of methods, technological and pseudotechnological explanations, embedding them in dramatic situations, or just inculcating them by pure repetition.¹⁰

These gadgets appeared so frequently and in such diverse contexts – as props in short stories, as homemade designs in letters to the editor, as profiles of similar developments across Europe – that one gets the sense paging through the magazines that they are all part of a coherent fictional world, built up across many years and many issues. Given the pace of technological change in the early twentieth century, it seemed as if any one element of this fictional world could bleed into everyday life at any moment.

((In many ways I've organized this book so that it can be read as a coherent work of science fiction in its own right, developed over the course of thirty years as a coherent, single project))

¹⁰@delany_critical_2009.

But if you'd ask Gernsback, all of these intangibles, thought projections, and open-ended questions were simply a matter of "science."

From the earliest of the Gernsback titles, we find science configured as an instrumentalized form of technological achievement that bore little relationship to what was happening in laboratories. Contrary to the common division between the purely theoretical nature of the sciences and their application in the development of new technologies, Gernsback argues that science and invention are part of a continuum in a later editorial for a magazine of that title:

S&I COVER

The word *Science*, from the Latin *scientia*, meaning knowledge, is closely related to *Invention*, which, derived from the Latin *inventio*, means, finding out. There is little in Science that did not at one time require some inventive powers, while conversely most of the world's inventions are based upon one or more of the sciences. (**Science and Invention**)

This article is a key of sorts for the many valences *science* can take throughout the Gernsback magazines. Science is the sum of its many products progressively connecting the modern world, a hybrid of science and technology that saw no distinction between theories and their application. It is defined as what the average person understands of its growing presence in their daily life: "science no longer is the sombre book closed with seven seals. Quite the contrary, it is the public that popularizes science—not our scientists" (**Science and Invention**). It is even configured as a form of belief when Gernsback argues that skepticism is an entirely unscientific attitude:

But our *real* scientists are as backward as in Galileo’s times. The public applauds and instantly believes in anything new that is scientific, whereas the true scientist scoffs and jeers, just as he did in Galileo’s times when that worthy stoutly maintained that the earth moved and did not stand still.

BLANK

In many ways, this starry-eyed fanaticism for science as the sum of its progressive advance in the material world reflects the way in which the public discourse was shifting on a larger scale as science entered mass market newsstands, corporate research facilities, and public school classrooms. As John Rudolph has argued, it was during this period that the “scientific method” emerged not among professional or academic researchers but as a product of secondary school pedagogy:

while the manner in which practicing scientists went about their work (the research strategies they used, their modes of inquiry, norms of argumentation, etc.) changed relatively little if at all from the 1880s to the 1920s, portrayals of the scientific method in American schools underwent a marked transformation.¹¹

If science was a highly variable concept for Gernsback, discourse surrounding its application was just as muddled. *Technology* was a word largely unknown to the English speaker, which should also complicate the way we read these essays. So, for instance, when Gernsback writes in 1922 that “steam, electricity, and up-to-date technic have completely altered not only the face of the globe, but our very lives as well,” the usage of the word *technic* where we might expect something like *technology* reflects an important terminological

¹¹@rudolph_epistemology_2005.

confusion at the time (**10,000 Years Hence**). In nineteenth-century English, according to Eric Schatzberg, *technology* referred to “a field of study concerned with the practical arts; except in anomalous usage, [it] did not refer to industrial processes or artifacts.” Just as sociology names the study of society, technology was the science of technique or making. Somewhere around 1930, Schatzberg argues,

new meanings derived primarily from the writings of American social scientists who imported elements of the German discourse of *Technik* into the English term technology, thus shifting the latter from its original definition as the science or study of the useful arts to a new one that embraced the industrial arts as a whole, including the material means of production.

This is all to say that when Gernsback reports on recent developments in “science,” it’s a decidedly weird science.

By this point the American magazine reading public *was* familiar with the idiom of popular science reportage. While nineteenth-century scientific periodicals in the United States took the form of highly specialized *Proceedings* or *Transactions* or *Reports* of academic research organizations, the *fin de siècle* saw a proliferation of titles aimed at a much broader audience. *Scientific American* for instance, the best known of these publications and one that still runs today, attracted a readership that included credentialed researchers, industrial manufacturers, an interested general public, as well as a “nebulous community of inventors (ranging from the local tinkerer to manufacturer and professional inventor/technologist).” Science in these new magazines was made accessible to a growing number of readers seeking to

educate themselves or simply desiring to remain informed about recent developments. But while Gernsback's magazines may seem familiar to us today through their progeny such as *Wired*, *Popular Science*, and *Popular Mechanics* (the latter two of which are the direct successors to Gernsback titles through mergers and buyouts) in many ways they bear more in common with a deeper tradition of popular science that blurred the lines between illusion and truth, skepticism and belief. As many historians of science have recently shown, from medieval displays of the natural world's wondrous curiosities to nineteenth-century phantasmagoria and other audiovisual spectacles, "the positive sciences and the fantastic arts [have been] linked in a dialectic of doubt and certainty."¹² Unseen forces were at work in the miracle of wireless telegraphy, a literally unbelievable technology that meant disembodied thoughts from around the world could be skimmed from the air in the comfort of your home. If this miracle were possible, what else might be?

For Gernsback and his staff, rapid developments in the electrical arts made the speculative sciences of antigravitation and "thought waves" seem within reach. From a belief in the presence of the luminiferous ether, to an argument that gravity is an electrical phenomenon, to the suggestion that humans may be able to tap into the so-called sixth senses of animals, or that the earth's core is made of radium and drives recurring cycles of life's evolution, Gernsback's purportedly "scientific" titles reveled in the fantastic. And while competing magazines like *The Wireless Age*, *QST*, and *Popular Science Monthly* were gradually opening up the specialist orientation of the sciences to a wider public through sober reportage, Gernsback addressed a growing readership who found the products of science to increasingly form a bewildering part of their everyday lives, addressing them from this perspective.

ILLUSIONS COVER

¹²@tresch_prophet_2011

“As time goes on it becomes more apparent that our senses are becoming more and more involved directly due to scientific progress,” he wrote. Listing a miscellany of sensory illusions that had become commonplace, from “blazing names being written out in the night sky” by moving electric signs, to the “radio illusion” of reproduced sound, to the simulated effects of motion in new carnival rides, Gernsback warns that “We should never trust our senses too much in these latter days of scientific progress.”¹³

But for Gernsback, projections of the future, or progress and its wonders, were never simply bewildering, they were the occasion for a material education in the way things worked.

FICT VS FACT

He writes: “Beauty is a groping of the emotions towards realization of things which may be unknown only to the intellect” (**Fiction Versus Facts** – one of these stylistically unique passages of his, where you can’t tell if their quirks come from the pulp speed of publication or the fact that English was HG’s third language. REPEAT LINE).

The behavioral archaeologist and historian of radio Michael Schiffer refers to Gernsback and his writers as “techno-mancers,” arguing that their depictions of wide-ranging futures created a “cultural imperative” for inventors, engineers, and scientists to make these dreams a reality.¹⁴ And in a sense, this is true, with many speculative ideas as described by Gernsback retrospectively seeming like “predictions” of modern technologies.

WHAT TO INVENT

But what makes sense as a neat, two-step model for literature as a source of inspiration and invention was actually a much messier process in practice,

¹³@gernsback_modern_1927.

¹⁴@schiffer_portable_1991, 136

like a melody played so fast that the notes become indistinguishable. The Gernsback titles were unique in their willingness to tackle fantastic topics that other publications wouldn't, and did so through the lens of hands-on technical know-how. Behind the gadgets of **Ralph 124C 41+**, Gernsback's famous serial novel of 1911, was a marketplace of evocative objects, a forum for amateurs experimenting with these strange new things, and an emerging consensus vision of their possible applications. Over the course of long-running serial novels and the exchange of reader correspondence, the material basis of scientifiction's marvelous futures was gradually refined. These were handicraft futures that seemed so seductive because they were futures that you, the reader, could build yourself. With practice and experience, the amateur experimenter could pick up any object and sense its affordances, participating in this iterative process of making.

This particular skill is a sensitivity to what Gernsback called "the perversity of things," or the innate capacity of objects to elicit unique responses in users, skilled or novice. In other words, objects exert an influence on thought.

PERVERSIITY COVER

In the title essay to this collection, he writes:

It took the human race several million years to construct an automobile. The material, the things, existed for millions of years long before the human race was heard of; it was not for lack of things the first automobile was not built sooner. It was for the lack of man's intelligence. To-day, the same man with a little acquired intelligence and a little acquired experience turns out several thousand automobiles each working day.

This was a recurring topic throughout Gernsback’s career, the process by which “new things” come into the world, and the special forms of creativity that emerge when an inventor draws equally upon science and the arts to design a technology. In many ways, he was ahead of his time in proposing several frameworks for understanding invention, even if they were underdeveloped. It wouldn’t be for many years that the social and historical study of technology would be accepted as a serious academic pursuit, as Hugh Aitken writes in the 1976 prologue to his magisterial, two-volume history of radio:

If the ‘new things’ of science, technology, and economic life often seem overwhelming and uncontrollable, the reason may well be that we have, in modern societies, created highly efficient structures for the generation of new knowledge without seriously attending to the processes by which new knowledge is put to use. . . . historians of the future will find it strange that so few social scientists of the twentieth century could bring themselves, in their work, to treat science as one of the great social institutions of the time.¹⁵

This is of course no longer the case. But it’s important to note here that the questions raised by Gernsback in a pulp publishing context wouldn’t have sufficient answers even among academic historians and sociologists of technology for many decades to come.

Gernsback’s views on these issues evolved over the years thanks in part to the debates, suggestions, and questions he and his staff printed in lively correspondence sections like *The Oracle* and *Patent Advice*. Questions from readers ranged from the factual (how many feet come in a pound of No. 12 triple-braided weather proof wire?) to the experimental (might two lead

¹⁵@aitken_syntony_1976, 9. Aitken is citing here @merton_priorities_1957.

plates submerged in sulphuric acid make a better storage battery?). It was important for knowledge to be freely shared among readers, contributors, and editors, since the construction of wireless sets involved many different forms of expertise.

STUDENT COVER

“A radio set builder,” wrote Gernsback in a 1925 editorial, “must be a carpenter, an electrician, a metal worker, a tinsmith, and a radio engineer, all rolled into one.”¹⁶

Initially, Gernsback argued that such impressively skilled inventors were born, not made. While many could learn to be “mechanical” inventors, or those “who are suddenly confronted with a certain device that to their minds seems imperfect, whereupon they will bend their energies towards improving the existing device,” true inventors were hard to come by (**The Born and the Mechanical Inventor**).

WHY BUILDER COVER

Eventually, Gernsback began to shift his views on invention so that they were more in line with the educational goals of his magazines. In **Why The Radio Set Builder**, we begin to understand that the biggest contributions to this community of makers were not necessarily made by its most broadly educated members. To the contrary, the most important things that an experimenter needed to know would emerge organically from the process of tinkering, in a dialogue between a person and an inanimate object. Gernsback advocated making things by hand not just as a hobby, a means of diversion or release after the working day is over, but as a complete education in tools, materials, and techniques:

HANDICRAFT

¹⁶@gernsback_radio_1925.

If, for instance, you are making an elaborate radio console for your living room, you will get more information on the subject than you could possibly get from the best text-books. You will, first of all, become familiar with the various tools necessary to fashion the wood, and if you own a woodworking lathe you will learn quite a good deal about the operation of wood-turning and the tools to be used for this particular purpose. You will learn what it means to sandpaper, you will learn to recognize the different kinds of wood, and you will know the difference between green and kiln-dried variety of woods. You will soon know how to use glue, and what kind. You will study the various fillers, and, last but not least, you will get a thorough education in varnishes and paints, and the use of all of these.¹⁷

For Gernsback, the know-how that emerges from making things is cascading: hands gradually feeling their way along an interlocking series of dependent skills and material properties. As we see in **The Perversity of Things**, objects only ever seem like frustrating “obstacles” in the way of a good idea when we don’t fully understand the proper affordances of those objects. “It is not the things that are perverse, it is ourselves who make them seem perverse.” With enough experience, barriers and constraints begin to look like creative opportunities. Gernsback refers to this capacity to see finished form in raw materials as a “knack” or an “intuition.” It’s what allows one of his readers to build a vacuum tube from scratch, that ultimate symbol of inscrutable corporate complexity, by learning glassblowing.¹⁸ Or another to make the first ever permanent recording of a radio broadcast by modifying his phonograph player so that it could register the signals from his wireless set.¹⁹

¹⁷@gersnback_handicraft_1927

¹⁸@reed_unterrified_1916.

¹⁹@apgar_amateur_1915.

The more experience an experimenter had with a wide variety of materials and techniques, the better attuned his intuition would become when it came to making new devices.

HOW TO

Today, the intense material specificity of the technologies as they were described to the readers of these magazines is highly impressive. In Gernsback's writings, one is struck not only by the romance of communicating in private through secret codes and the intimacy of a headset, but also by the exotic materials that made this experience possible. Pieces like **The Dynamophone** and **A Treatise on Wireless Telegraphy** address a readership with an already impressive material awareness of their apparatus, and introduce new possibilities each month to the wireless medium's construction and operation. Thanks to these mineral proficiencies, a rural midwestern reader would know that news from New York may become audible if only he could find some molybdenite, or a supplier willing to ship him the nitric acid needed to try out a new electrolytic detector. The sheer alchemy that went into the construction of these apparatuses – glass light bulbs filled with argon gas, impure silicon crudely fused into thin wafers, influential experiments conducted by an employee of AT&T with the contents of a “Minerals of Maine” souvenir box – makes the effects they were able to achieve seem all the more wonderful.

Details such as these seem especially poignant in light of recent calls for a critical awareness of the rare earth minerals used in the production of today's increasingly complex digital devices, as well as the environmental toll of the electronic waste these devices leave behind once we inevitably acquiesce to their fragility by replacing them with the latest release. In an article on the dust produced during the manufacture and disposal of hardware, Jussi Parikka writes of a “persistence that lingers across scales from minerals and

chemical elements to the lungs and organic tissue.”²⁰ Timothy Morton refers to these persistent objects, often produced and disposed of under appalling working conditions in China and countries across Africa, as “hyperobjects”: manufactured materials or devices that “do not rot in our lifetimes. They do not burn without . . . releasing radiation, dioxins, and so on.”²¹

That gadgets like smartphones and tablets today are described as “magical” or like “touching the future” should come as no surprise. Not only are they black boxes that with every passing year become increasingly difficult to modify, repair, or tinker with, they are completely abstracted from the labor practices and material conditions that go into producing them. But we encounter a very different kind of moment through Gernsback’s writings. Of course the emerging technology of wireless was pure magic: it allowed people to skim disembodied voices from the air. But wireless was magical to Gernsback’s readers not because they didn’t understand how the trick worked, but because they did. That elemental, raw materials could produce such effects was absolutely fantastic, and provided an endless source of fascination.

Ultimately, *The Perversity of Things* seeks to provide a reappraisal of both the “hard” technical roots of American science fiction and the highly speculative orientation toward media technologies that was prevalent during this period. Science fiction in its early days wasn’t just a literary form, it was a mode of interacting with and understanding emerging media.

This isn’t the story of an Edison or a Jobs, inventors whose creations for better or worse have changed the way we inhabit the world. Gernsback’s

²⁰@parikka_dust_2013.

²¹@morton_ecological_2012, p. 130.

career instead left us with a way of participating in that change, imagining its possible futures, and debating which future it is that we should live in.