

THE I.R.E.: FROM ACORN TO OAK

BY

ALFRED N. GOLDSMITH AND JOHN V. L. HOGAN

REHEARSAL OF A DISCUSSION TO BE GIVEN AT THE ANNUAL MEETING
OF THE INSTITUTE ON MARCH 3, 1952 DURING THE IRE NATIONAL
CONVENTION; RECORDED ON FEBRUARY 22, 1952.

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GOLDSMITH: WELL, THIS IS AN INFORMAL OCCASION DURING WHICH WE ARE JUST GOING TO CHAT FOR A HALF HOUR MORE OR LESS, WE HOPE.

HOGAN: I HOPE IT'S LESS.

GOLDSMITH: SO DO I. WE WEREN'T QUITE SURE IF IT WAS A COMPLIMENT TO BE ASKED TO TALK AS OLD TIMERS, THE THEORY BEING THAT WE HAVE REACHED OUR ANECDOTAGE, BUT NOW WE'LL START RIGHT IN AND GET RIGHT DOWN TO CASES. JACK, YOU WERE VERY PROMINENT IN THE SOCIETY OF WIRELESS TELEGRAPH ENGINEERS, WHICH IS ONE OF THE TWO ACORNS FROM WHICH THE GREAT IRE OAK GREW. WHAT DO YOU WANT TO TELL US ABOUT IT?

HOGAN: WELL, IT MIGHT BE INTERESTING.....I DON'T THINK I WAS VERY PROMINENT IN IT, BUT IT MIGHT BE QUITE INTERESTING TO KNOW HOW IT STARTED. IT WAS, I THINK, THE FIRST PROFESSIONAL SOCIETY OF RADIO ENGINEERS. IT WAS NOT THE FIRST PROFESSIONAL SOCIETY THAT WAS OPENED TO ENGINEERS ASSOCIATED WITH THE DIFFERENT COMPANIES AND SERVICES, AND SO ON. IT WAS STARTED ALONG IN 1907 -- I DON'T REMEMBER THE EXACT DATE, I THINK IT WAS EARLY IN THE YEAR -- BY JOHN STONE STONE. AND IT STARTED OFF THAT YEAR WITH 11 MEMBERS, ALL OF WHOM WERE OF THE STONE STAFF, THE STONE WIRELESS TELEGRAPH AND TELEPHONE COMPANY.

GOLDSMITH: HE WAS A GREAT MAN.

HOGAN: HE WAS A REAL RADIO PIONEER. HE WAS ONE OF THE EARLIEST THEORETICIANS IN THE FIELD. HIS WORKS NEVER SEEMED TO GET INTO THE PRACTICAL STAGE. I REMEMBER THE 15 KILOWATT SPARK TRANSMITTER OF PT AT THE OLD BROOKLYN NAVY YARD, WHICH WAS A MISERABLE FAILURE. THEY HAD TO RELY ON THE GERMANS FOR RADIO EQUIPMENT IN THOSE DAYS. WELL, ANYHOW, THE SWTE GREW OUT OF COLLOQUIUMS, OR SEMINARS AS WE CALL THEM, FROM AMONG STONE ENGINEERS. THEY FELT THE NEED FOR

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A MORE FORMAL ORGANIZATION SO THEY GOT THE THING UP AND USED TO HOLD EVENING MEETINGS. IT RAN ON WITH INCREASING MEMBERSHIP. IN 1909 I THINK IT WAS NEARLY 30 ... IT GOT UP TO 36 OR THEREABOUTS ... MAYBE 40 OR 50 FINALLY. WHEN THE FESSENDON COMPANY MOVED FROM BOSTON TO NEW YORK, OR FROM BRANTROCK TO NEW YORK, OR MORE ACCURATELY FROM BRANTROCK TO BROOKLYN, A MAJOR PART OF THE MEMBERSHIP OF THE SWTE LEFT CAMBRIDGE AND THE POOR OLD SOCIETY SUFFERED BY THAT. OF COURSE BY THAT TIME ITS ^{DOORS} ~~STORES~~ HAD BEEN OPENED TO MEMBERS OF OTHER RADIO ORGANIZATIONS. WHEN WE GOT DOWN HERE TO NEW YORK WE LEARNED MORE ABOUT THE WIRELESS INSTITUTE OF WHICH WE HAD HEARD. AND I THINK SINCE YOU WERE EDITOR OF THE PROCEEDINGS OF THE WIRELESS INSTITUTE IN THOSE EARLY DAYS, YOU MIGHT TELL THE STORY OF HOW BOB MARRIOTT PUT THAT TOGETHER, AND THEN WE CAN TALK ABOUT HOW WE PUT THE TWO THINGS TOGETHER.

GOLDSMITH: FINE. WELL, THAT VERY GRAND OLD MAN OF RADIO AND IRE, BOB MARRIOTT, WAS THE FOUNDER OF THE WIRELESS INSTITUTE, AN ORGANIZATION STARTED ON APRIL 7, 1909. HE WAS ITS FIRST PRESIDENT. AND THE VICE PRESIDENTS WERE HARRY SHOEMAKER AND ONE OF OUR PRESENT, VERY ACTIVE, VERY WELL-KNOWN MEMBERS, DR. GREENLEAF W. PICKARD.

HOGAN: PICKARD, AS I REMEMBER IT, WAS A MEMBER OF BOTH ORGANIZATIONS.

GOLDSMITH: THAT'S RIGHT, HE WAS THE ONLY ONE WHO WAS. HE WAS THE BILATERAL LINK SO TO SPEAK. THE OTHER DIRECTORS AT THE TIME WERE JOHN S. MURPHY AND RICHARD A. SOMERVILLE OF NEW YORK, SIDNEY L. WILLIAMS OF NEW YORK, AND EUGENE THURSTON OF NEW YORK.

HOGAN: THOSE WERE LARGELY UNITED WIRELESS OPERATORS AS I REMEMBER THEM.

GOLDSMITH: THAT'S RIGHT, THAT'S RIGHT. THE ORGANIZATION MEETING OCCURRED PRIOR TO THAT BUT THE ASSOCIATION REALLY STARTED AT THAT TIME. AND IT WAS QUITE ACTIVE DURING THE YEAR AND PROCEEDINGS WERE PUBLISHED.

HOGAN: INCIDENTALLY, THE SOCIETY OF WIRELESS TELEGRAPH ENGINEERS DID NOT PUBLISH PROCEEDINGS. THE WIRELESS INSTITUTE WAS ONE JUMP AHEAD OF US ON THAT.

RUSH

GOLDSMITH: WELL, APPARENTLY WE HAD SOME PEOPLE WHO WERE VERY ANXIOUS TO ~~BRUSH~~ INTO PRINT. I KNOW THAT UNFORTUNATELY I WAS ONE OF THOSE PEOPLE. I DISCUSSED RADIO TELEPHONY IN NOVEMBER 1909 AND IT MIGHT AMUSE THE MEMBERS HERE TO KNOW THAT I DESCRIBED RADIO TELEPHONY AT THAT TIME BY SAYING "WE CONSIDER THIS EVENING THE YOUNGEST BRANCH OF ELECTRICAL ENGINEERING, NAMELY, RADIO TELEPHONY. IT IS A FIELD OF MORE THAN COMMON INTEREST, EVEN TO THE LAYMAN, BECAUSE THE RADIO TELEPHONE WILL BECOME IN TIME A PART OF HIS DAILY LIFE, AND TO US IT IS OF COURSE OF THE GREATEST IMPORTANCE." I THINK I CAN REST MY REPUTATION FOR PROPHECY ON THAT ONE.

HOGAN: YES, IF YOU NEVER MADE ANY WORSE MISTAKE THAN THAT, YOU ARE PRETTY LUCKY.

GOLDSMITH: THAT'S RIGHT. WELL, GREENLEAF TALKED ON ANTENNAE IN MAY 1909, AND A LITTLE LATER THERE WAS A VERY INTERESTING PAPER ON HOW BUSINESS CAN BEST BE ~~BE~~ HANDLED IN CASE OF DISTRESS. BY THE WAY, THEY MEANT TELEGRAPH BUSINESS AND NOT FINANCIAL BUSINESS IN GENERAL.

HOGAN: THEY WEREN'T LOOKING FORWARD TO DEPRESSIONS OR ANYTHING.

GOLDSMITH: NO, THIS WAS 1909.

HOGAN: THIS WAS MARITIME DISTRESS.

GOLDSMITH: THAT WAS MARITIME DISTRESS, AND THE OTHER DISTRESS CAME TWENTY YEARS LATER OR A LITTLE MORE. BUT THIS PAPER WAS DELIVERED BY A GENTLEMAN WHO WAS ~~is~~ VERY ACTIVE IN RADIO TODAY, NAMELY, JACK R. BINNS.

HOGAN: YOU DON'T SAY.

GOLDSMITH: YES, YOU PROBABLY ALL RECALL THAT HE IS NOW PRESIDENT OF HAZELTINE CORPORATION AND STILL AN ACTIVE FIGURE IN THE FIELD.

HOGAN: YOU KNOW, IT'S A FUNNY THING HOW MANY OF THE PEOPLE WHO GOT TOGETHER BACK THERE IN 1909, 1910, AND 1912 ARE STILL VERY ACTIVE IN THE FIELD.

GOLDSMITH: OH YES, WELL WHEN YOU ONCE CAUGHT THE VIRUS THERE, APPARENTLY IT WAS MORE PERSISTENT THAN THE EPIDEMICS THIS SEASON BECAUSE IT DIDN'T LAST A

FEW MONTHS, IT LASTED SEVERAL DECADES AT LEAST. HOWEVER, TWI, WHILE IT WAS VERY ACTIVE AND DID A GOOD JOB, HAVING COME IN SEVERAL YEARS AFTER THE SOCIETY OF WIRELESS TELEGRAPH ENGINEERS, STILL HAD ITS DIFFICULTIES. MEMBERSHIP GREW SLOWLY IN THE WIRELESS INSTITUTE AND I IMAGINE NOT TOO RAPIDLY IN THE SWTE, DID IT JACK?

HOGAN: NO, THEY DIDN'T GROW VERY FAST. IT WAS ALWAYS A SMALL ORGANIZATION. OF COURSE, WE DIDN'T HAVE NEARLY AS MANY PEOPLE TO DRAW ON, AS THE WIRELESS INSTITUTE HAD.

GOLDSMITH: AND YOU HAD THE SHOCKING BLOW OF MOVING AND BREAKUP OF AN ORGANIZATION. HOWEVER, THE TIME CAME EVENTUALLY WHEN THE IRE ITSELF WAS TO BE FORMED. IT MIGHT BE INTERESTING TO KNOW WHAT THE FOUNDERS HAD IN MIND AT THAT TIME. PERHAPS YOU AND I OUGHT TO TALK ABOUT THAT. WE FELT THAT ...

HOGAN: ARE YOU SURE WE HAD ANYTHING IN MIND?

GOLDSMITH: WELL, I THINK WE DID. FOR ONE THING, THERE WAS AN ENORMOUS AMOUNT OF SECRECY IN THOSE DAYS. IT WAS VERY DIFFICULT FOR AN ENGINEER, OR AN EARNEST ENGINEER, TO GET ANY INFORMATION ON WHICH HE COULD DEPEND. FURTHERMORE, THERE WAS COMPETITION WHICH IS HEALTHY, BUT SECRECY WHICH IS NOT, AND OPPOSITION, WHICH CERTAINLY WASN'T. AND WE WANTED TO FORM AN ETHICAL ENGINEERING SOCIETY WHICH WOULD ADVANCE THE ART AND WOULD HELP INDUSTRY AND TECHNOLOGY, AND IT WAS A DIFFICULT JOB BECAUSE THE SPIRIT OF 1909, OR RATHER THE SPIRIT OF 1912, WAS CERTAINLY NOT THE SPIRIT OF 1952. OUR IDEA HOWEVER WAS TO FORM SOMETHING THAT WOULD BE A REALLY HIGH-GRADE ETHICAL ENGINEERING SOCIETY.

HOGAN: I THINK WE WANTED TO PATTERN IT MORE OR LESS AFTER THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.

GOLDSMITH: WELL WE DID INDEED.

HOGAN: AND YET HAVE OPPORTUNITY TO TAKE MORE TIME FOR RADIO OR WIRELESS, AS WE THEN CALLED IT, THAN WE COULD POSSIBLY GET IF WE HAD AFFILIATED WITH THE AIEE.

GOLDSMITH: THAT'S RIGHT. IN THAT CONNECTION JACK, WOULD YOU LIKE TO TELL US HOW THE NAME IRE WAS EVOLVED, OR SHALL I, EITHER WAY.

HOGAN: WELL, WE HAD THE SOCIETY OF WIRELESS TELEGRAPH ENGINEERS, AND WE HAD THE WIRELESS INSTITUTE, AND WE THOUGHT WE OUGHT TO PRESERVE SOMETHING OF EACH. WIRELESS WAS BEING TURNED INTO RADIO, SO WE FELT THAT ADOPTION OF "RADIO" IN THE TITLE WAS GOOD. AND WE TALKED ABOUT THE RADIO INSTITUTE AND THE AMERICAN INSTITUTE OF RADIO ENGINEERS, AND VARIOUS THINGS. AS I RECALL IT, WE DECIDED WE WOULD NOT CALL IT THE AMERICAN INSTITUTE BECAUSE WE EXPECTED TO BE INTERNATIONAL IN SCOPE, AND SO BY A PROCESS OF ELIMINATION, LIKE THE "FRESH FISH SOLD HERE" STORY, WE GOT DOWN TO THE INSTITUTE OF RADIO ENGINEERS.

GOLDSMITH: WELL, THE PROCESS WAS ONE OF SPOT WELDING. WE SPOT-WELDED THE TWO TITLES TOGETHER AND MANAGED TO GET THE NEW TITLE OF THE INSTITUTE OF RADIO ENGINEERS. THAT CERTAINLY STOOD UP. INCIDENTALLY, YOU RECALL THAT ABOUT FIVE YEARS AGO SOMEONE SUGGESTED THAT WE MIGHT EXPAND THE TITLE TO INSTITUTE OF RADIO AND ELECTRONIC ENGINEERS, OR COMMUNICATIONS AND ELECTRONIC ENGINEERS. AND IT WAS GENERALLY FELT THAT THERE WASN'T ANY REAL NEED TO CHANGE THE TITLE; WE COULD DO WHATEVER WAS NECESSARY AND SMELL JUST AS SWEET AS ROSES UNDER ANY OTHER NAME.

HOGAN: I'M GLAD THAT THEY DIDN'T MAKE A CHANGE OF THAT KIND, AND I RATHER DEPLORED THE INSERTION OF "TELEVISION" INTO THE NAMES OF THE TWO TRADE SOCIETIES, BECAUSE I THINK TELEVISION IS RADIO.

GOLDSMITH: THAT'S RIGHT, AND FURTHERMORE, IF YOU START DOING THAT, THIS MAY END UP IN TEN, TWENTY OR FIFTY YEARS WITH A LONG CATALOG RATHER THAN THE NAME OF YOUR ORGANIZATION.

HOGAN: ALL THE BRANCHES OF THE BIG ART. OF COUSE WE COULD HAVE CALLED OURSELVES THE INSTITUTE OF ELECTRONIC ENGINEERS, IF ELECTRONICS HAD BEEN MORE PROMINENT AT THAT TIME.

GOLDSMITH: YES, BUT I DO NOT THINK THE TERM "ELECTRONICS" WAS EVEN KNOWN IN THOSE DAYS. WELL, ANYHOW, WE STARTED OUT AND THE FIRST PRESIDENT OF THE IRE

DURING THE LAST SEVEN MONTHS OF 1912 WAS R. H. MARRIOTT; BOB MARRIOTT, OUR FIRST PRESIDENT AND OUR INSPIRATIONAL SOURCE OF SO MUCH ACTIVITY AND ACCOMPLISHMENT. THE 1913 OFFICERS, JUST TO LIST THEM SO THAT YOU MAY KNOW OF THEM, WERE DR. G. W. PICKARD, PRESIDENT, STILL VERY ACTIVE IN THE SOCIETY; BOB MARRIOTT, VICE PRESIDENT; EMIL J. SIMON, SECRETARY, A GENTLEMAN WHO HAS BEEN CLOSELY ASSOCIATED WITH THE INSTITUTE ALL THESE YEARS.

HOGAN: HE WAS THE MAN WHO PUT UP THE CAPITAL FOR THE MORRIS LIEBMANN MEMORIAL PRIZE.

GOLDSMITH: THAT'S RIGHT. COLONEL LIEBMANN WAS A DEAR FRIEND OF HIS AND HE PROVIDED THE FUNDS FOR ONE OF OUR MOST PRIZED AWARDS. THE TREASURER AT THAT TIME WAS JOHN HAYES HAMMOND, JR.

HOGAN: I GUESS WE THOUGHT WE COULD TRUST HIM WITH THE FUNDS, DIDN'T WE?

GOLDSMITH: YES, I GUESS WE DID. AS A MATTER OF FACT, HE TOOK GOOD CARE OF IT. AND THE EDITOR WAS YOUR PERENNIAL AND RECURRENT EDITOR.

HOGAN: YOU HAVE BEEN MOST PERSISTENT IN THAT JOB.

GOLDSMITH: YES, I'M AFRAID I'M A GLUTTON FOR PUNISHMENT. THE DIRECTORS WERE, IN ADDITION TO THE ABOVE, SOME MEN WHO ARE VERY WELL KNOWN TODAY. ONE OF THEM WAS LLOYD ESPENSCHIED, THAT GRAND OLD PIONEER DOWN AT THE TELEPHONE COMPANY; YOURSELF, AND YOU'VE BEEN ONE OF THE TRUSTY STALWARTS; JOHN STONE STONE, WHOM YOU HAVE MENTIONED; AND ROY WEAGANT, WHO WAS SO PROMINENT AS CHIEF ENGINEER OF THE OLD MARCONI WIRELESS TELEGRAPH COMPANY OF AMERICA.

HOGAN: I THINK ALL BUT TWO OF THOSE ARE STILL KICKING AROUND RADIO TODAY.

GOLDSMITH: THAT'S RIGHT, THAT'S RIGHT, THE SURVIVORS HAVE BEEN TOUGH IN THIS CASE. YOU KNOW, SPEAKING OF BOB MARRIOTT, IT MIGHT INTEREST YOU ALL TO KNOW THAT I VERY NEARLY LEFT THIS SCENE OF MY WORLDLY TROUBLES THROUGH MEETING BOB MARRIOTT. IT HAPPENED THIS WAY. I HAD AN APPOINTMENT TO MEET HIM DOWN AT THE OLD MANHATTAN BEACH STATION. YOU REMEMBER THAT

HOGAN: I REMEMBER THAT. YOU REMEMBER THE CATWALKS OVER THE SWAMPS THAT YOU HAD

TO GO OVER?

GOLDSMITH: THAT'S RIGHT. YOU HAD TO CROSS THE SWAMP ON WOODEN CATWALKS AND IF YOU FELL OFF THE CATWALKS, YOU LANDED IN THE SWAMP. BUT THAT WASN'T THE END OF ME. I REMEMBER GOING OVER THERE BY APPOINTMENT ONE EVENING, AND I GOT TO THE DOOR, KNOCKED, THE DOOR WAS VERY SUDDENLY OPENED, AND BACK OF THAT DOOR, POINTING AT ME THE BIGGEST REVOLVER I HAVE EVER SEEN IN MY LIFE, WAS BOB MARRIOTT, WITH HIS FINGER TREMBLING ON THE TRIGGER AND I TREMBLING MORE THAN HIS FINGER.

HOGAN: HE PROBABLY THOUGHT YOU WERE A MARCONI MAN.

GOLDSMITH: I DON'T KNOW WHAT HE THOUGHT. I DIDN'T KNOW WHAT HE THOUGHT AT FIRST EXCEPT THAT I WAS AFRAID I WASN'T GOING TO HAVE ANY MORE IDEAS WHATEVER. BUT, WHAT HAPPENED WAS A LITTLE DIFFERENT. IT SEEMED THAT THERE HAD BEEN QUITE A FEW HOLDUPS THERE OF THE STATION. THERE HAD BEEN SOME HOODLUMS WHO HAD BEEN TRYING TO BREAK IN.

HOGAN: IT WAS VERY ISOLATED.

GOLDSMITH: OH, IT WAS AN OUT-OF-THE-WAY PLACE, BLACK AS PITCH AT NIGHT, AND THESE HOODLUMS FROM CONEY ISLAND CAME AROUND AND HELD UP PEOPLE, STOLE CLOTHING AND MONEY AND THE NET RESULT WAS . . .

HOGAN: WHERE DID THE WIRELESS OPERATORS GET ANY MONEY?

GOLDSMITH: WELL, WHATEVER FEW PENNIES WERE LEFT AT THE END OF THE WEEK, JUST AFTER PAYDAY, I MEAN. IN ANY CASE, THEY DECIDED FINALLY TO PUT A STOP TO IT.

CONSEQUENTLY, THEY HAD THIS PERFECTLY BEAUTIFUL GUN THERE READY TO REPEL THE INVASION. THEY HAD FORGOTTEN I WAS COMING. THE RESULT WAS THAT I WAS THE FIRST BANDIT THAT WAS GOING TO BE SHOT. SO, I VERY NEARLY WAS. MARRIOTT WAS WHITE AS A SHEET AND HE SAID HE WAS NEVER SO FRIGHTENED IN HIS LIFE BECAUSE HE REALLY WAS GOING TO PULL THE TRIGGER. HE JUST RECOGNIZED ME IN TIME.

HOGAN: WELL, I THINK YOU OWE MARRIOTT A DEBT AND SO DO WE.

GOLDSMITH: WELL, THANKS, SOMETIMES I THINK THAT'S TRUE. IN ANY CASE, THAT WAS QUITE A STATION. YOU KNOW THEY WORKED SHIPS RIGHT OFF PANAMA IN THOSE DAYS. THEY HAD TO WAIT FOR NIGHT TO FALL. BUT THEY ACTUALLY WERE ABLE TO WORK SOME 1900 MILES OR SO DIRECTLY FROM MANHATTAN BEACH DOWN TO PANAMA ON THOSE OLD SPARK SETS, AND I WANT TO TELL YOU THAT WAS AN ACCOMPLISHMENT IN THOSE DAYS.

HOGAN: YOU KNOW, WE DIDN'T KNOW MUCH ABOUT SKY WAVES BUT WE DID KNOW THAT AT NIGHT ON THE FREQUENCIES IN USE FOR MOORING COMMUNICATIONS WE COULD HEAR SIGNALS FROM GUANTANAMO, CUBA AND COLON, PANAMA -- SPARK STATIONS ON THE ORDER OF 25 KILOWATTS -- AND COPIED THEM IN NEW YORK CITY.

GOLDSMITH: WELL, OF COURSE THE INTERFERENCE PROBLEM IN SPITE OF HIGH DECREMENTS OF WAVES WASN'T QUITE AS ACUTE AS IT IS NOW.

HOGAN: WELL, THERE WASN'T QUITE AS MANY STATIONS OPERATING.

GOLDSMITH: HARDLY, HARDLY . . .

HOGAN: WELL, I MIGHT INTERRUPT YOU ALFRED TO SAY THAT THE FIRST AUDION I EVER SAW WAS NOT A GRID AUDION BUT IT WAS CALLED AN AUDION. LEE DEFOREST SHOWED ME DOWN AT THAT SAME MANHATTAN BEACH STATION. HE HAD IT IN OPERATION DOWN THERE. HE HAD THREE TYPES: ONE WAS A TWO-ELECTRODE TUBE, CATHODE AND ANODE; ONE WAS THE SAME TYPE OF TWO-ELECTRODE TUBE WITH A COIL OF WIRE WOUND AROUND IT THROUGH WHICH THE OSCILLATIONS WERE PASSED; AND THE THIRD HAD A SHEET OF TINFOIL OR ALUMINUM FOIL AROUND THE OUTSIDE. THAT WAS BEFORE HE HAD FOUND THE GRID.

GOLDSMITH: WELL, HE WAS ON THE TRACK, ALL RIGHT.

HOGAN: HE WAS.

GOLDSMITH: WELL, WE HAD TO FIND MEETING PLACES FOR IRE AND THAT WAS NOT TOO EASY. WE HAD OUR EDITORIAL HEADQUARTERS, AND SECRETARIAL HEADQUARTERS ALSO FOR A WHILE, AT THE COLLEGE OF THE CITY OF NEW YORK, THEN COLUMBIA UNIVERSITY,

AND THEN DOWN AT THE MCGRAW-HILL BUILDING AT 42ND STREET.

HOGAN: THAT WAS SOMETIME LATER.

GOLDSMITH: YES, THAT WAS LATER, CONSIDERABLY LATER. AND THEN WE CAME UP HERE TO 79TH STREET ONCE AND FOR ALL.

HOGAN: YOU REMEMBER THE FAMOUS STANDARDIZATION COMMITTEE MEETINGS DOWN ON FULTON STREET?

GOLDSMITH: OH, YES.

HOGAN: WHYTE'S RESTAURANT AND SWEET'S RESTAURANT, AND I ALWAYS ENJOYED THE JUXTAPOSITION OF THOSE TWO NAMES OF WHYTE'S AND SWEET'S ON FULTON STREET.

GOLDSMITH: THAT'S RIGHT. THEY HAD GOOD FOOD THERE IN THOSE DAYS AT PRICES THAT WOULD HORRIFY PEOPLE TODAY.

HOGAN: HORRIFY IS HARDLY THE WORD.

GOLDSMITH: YES, GRATIFY IS PROBABLY BETTER. THE OLD IRE SYMBOL WAS BORN ABOUT THE SAME TIME THE INSTITUTE WAS FORMED, AND A CURIOUS THING ABOUT IT -- IT WAS INTENDED TO MEAN, OF COURSE, THE ELECTRIC AND MAGNETIC FORCES AND THEIR NORMAL RELATIONSHIP AND . . .

HOGAN: TAKING A LEAF OUT OF MAXWELL.

GOLDSMITH: THAT'S RIGHT, IT WAS BORROWED, OF COURSE, FROM THE SCIENCE.

HOGAN: THEN, OF COURSE, IT GOT TRIANGULAR BECAUSE THERE WERE THREE LETTERS IN THE NAME.

GOLDSMITH: THAT'S RIGHT, AND THE SYMBOL LENT ITSELF TO THE NEAT TRIANGULAR FORM WHICH WAS RATHER UNIQUE AND INTERESTING.

HOGAN: THERE HASN'T BEEN ANY NOTION TO CHANGE THAT, HAS THERE?

GOLDSMITH: NEVER. A CURIOUS THING ABOUT IT IS THAT IN THESE FORTY YEARS THERE HAS NEVER BEEN ANY COMMENT ON IT, EITHER FAVORABLE OR UNFAVORABLE, SO I SUPPOSE THE OPPOSITION IS WEAK AND THE COMMENDATION IS MISSING.

HOGAN: I THINK THE COMMENDATION IS THERE EVEN THOUGH SILENT. I BROUGHT ALONG THE OLD SYMBOL OF THE SOCIETY OF WIRELESS TELEGRAPH ENGINEERS.

GOLDSMITH: WHAT IS ON THAT, JACK?

HOGAN: I HAPPENED TO REMEMBER THAT I HAD MY OLD PIN LEFT. WELL, IT WAS SYMBOLIC ALSO. IT SHOWS IN THE CENTER A HERTZ DUMBBELL OSCILLATOR WITH FOUR SPARKS. I DON'T KNOW WHY THE FOUR SPARKS JUTTING OUT IN FOUR DIRECTIONS, EXCEPT THAT IT IS A FOUR-SIDED PIN, BECAUSE THE SOCIETY OF WIRELESS TELEGRAPH ENGINEERS HAD FOUR INITIALS IN ITS NAME. IT'S CURIOUS HOW GEOMETRY FOLLOWS PHILOLOGY, SHALL I SAY.

GOLDSMITH: THE WIRELESS INSTITUTE HAD A BADGE ALSO WHICH AS I REMEMBER HAD A CIRCULAR HERTZIAN OSCILLATOR IN IT.

HOGAN: I DON'T REMEMBER THAT.

GOLDSMITH: I THINK THAT'S RIGHT.

HOGAN: YOU KNOW WHAT, IT MIGHT HAVE BEEN ANOTHER CASE OF SPOT WELDING THEN. IF THERE WAS A HERTZ LOOP IN THE WIRELESS INSTITUTE AND A HERTZ DUMBBELL, WE WOULD HAVE SEEN THE COMBINATION OF ELECTROMAGNETIC AND ELECTROSTATIC FORCES WITHIN THE PERPENDICULAR PLANES, AND IT MIGHT HAVE BEEN ANOTHER CASE OF SPOT WELDING. YOU HELPED DEVELOP THAT ONE, DIDN'T YOU?

GOLDSMITH: YES, WELL AS A MATTER OF FACT THE LINE OF REASON BEHIND THE SYMBOL OF THE ELECTROMAGNETIC FORCES WAS THIS: IT WAS DESIRABLE, OF COURSE, TO AVOID ANY PARTICULAR FORM OF APPARATUS WHICH WOULD BECOME OBSOLETE IN TIME, AND THE ONE THING THAT SEEMED TO BE PERMANENT IN THE ART WAS THESE ELECTRIC AND MAGNETIC FORCES.

HOGAN: THAT SEEMS REASONABLY PERMANENT.

GOLDSMITH: WE ARE BOUND TO AGREE WITH THAT, UNLESS WE GET SOME NEW SORTS OF WAVES FOR TELEPATHY AND PUT RADIO OUT OF BUSINESS.

HOGAN: THAT WOULD BE INTERESTING.

GOLDSMITH: VERY INTERESTING. WELL, WE HAD A REAL PROBLEM OF ENGINEERING SECRECY IN THOSE DAYS AS OPPOSED TO FREEDOM OF PUBLICATION. IN FACT, IT IS

AN OPEN SECRET THAT THERE WERE SOME VERY MAJOR ORGANIZATIONS IN THE FIELD AT THAT TIME WHO WERE MUCH OPPOSED TO ANY PUBLICITY OF THEIR ENGINEERING WORK. THEY DIDN'T EVEN PERMIT THEIR ENGINEERS TO REVEAL ON WHAT THEY WERE WORKING. AN ENGINEER, IF YOU MET HIM IN THOSE DAYS AND SAID "WHAT ARE YOU WORKING AT," WOULDN'T EVEN MENTION THE FIELD OF HIS ACTIVITY, MUCH LESS THE PARTICULAR PROJECT.

HOGAN: THAT GAVE RISE TO A VERY COSTLY DUPLICATION OF EFFORT TOO, WHICH IS SOMETHING THE INSTITUTE HELPED TO CURE.

GOLDSMITH: AND IN THAT CONNECTION, WE OF COURSE RAN INTO A PROBLEM WHICH IS STILL WITH US FORTY YEARS LATER, NAMELY THE COST OF PUBLICATION.

HOGAN: AS A MATTER OF FACT, ALTHOUGH SWTE DID NOT HAVE AN OFFICIAL PUBLICATION, AND THE WIRELESS INSTITUTE DID, I THINK, IF I AM CORRECT, I THINK BOTH ORGANIZATIONS WERE BROKE AT THE TIME THEY MERGED AND FORMED THE INSTITUTE.

GOLDSMITH: THAT'S RIGHT. THEY EACH HAD ABOUT 25 MEMBERS AND ABOUT \$25 IN DEBTS, OR ABOUT AS MANY MEMBERS AS DOLLARS DEBTS.

HOGAN: WELL, THE MEMBERSHIP HAS GROWN SOMEWHAT.

GOLDSMITH: HUH, OVER 30,000?

HOGAN: AND I THINK THE INSTITUTE IS SOLVENT THESE DAYS.

GOLDSMITH: WE TRY TO KEEP IT THAT WAY, ALL OF US. THERE IS SOME DIFFICULTY BECAUSE I CAN WELL REMEMBER WHEN THE COST OF PUBLICATION OF A PAGE OF PROCEEDINGS, SAY OF THE WIRELESS INSTITUTE, WAS A FEW DOLLARS. TODAY IT IS CLOSER TO \$100. AND . . .

HOGAN: LIKE BUTTER.

GOLDSMITH: LIKE BUTTER. YES, I SUPPOSE WE CAN LOOK FORWARD TO EVEN GREATER COSTS PER PAGE AS THE MEMBERSHIP INCREASES, BUT IN ANY CASE, WE HAVE ALWAYS FACED THE PROBLEM OF THE COST OF PUBLICATION. THAT BRINGS UP THIS POINT. WE ALWAYS NEED GOOD MANUSCRIPTS, CLEAN DRAWINGS AND A VERY CAPABLE AND COOPERATIVE PRINTER, AND THAT WE FORTUNATELY HAVE.

HOGAN: WELL, I THINK THE INSTITUTE CAN BE PROUD OF ITS PUBLICATIONS, ALL OF THEM, AND I THINK IT WILL BE TRUE OF THE NEW TRANSACTIONS FOR THE GROUPS. I THINK THEY WILL ALL BE HIGHLY REGARDED JUST AS THE PROCEEDINGS ALWAYS HAVE BEEN.

GOLDSMITH: WELL, WE FACE A PUBLICATION QUESTION THERE THAT IS RATHER INTERESTING. YOU SEE, WE HAVE 20 GROUPS NOW AND IT IS ENTIRELY POSSIBLE THAT EACH OF THOSE GROUPS MAY PUBLISH SEVERAL HUNDRED PAGES OF TRANSACTIONS ON THE AVERAGE OF A YEAR.

HOGAN: THAT'S A LOT OF PAGES.

GOLDSMITH: SO WE MIGHT END UP WITH A COUPLE OF THOUSAND PAGES OF PROCEEDINGS AND FIVE OR SIX THOUSAND PAGES OF TRANSACTIONS AND MAYBE A TWO-THOUSAND PAGE CONVENTION JOURNAL.

HOGAN: AND IF YOU PUT OUT ANY MORE SPECIAL COLOR TELEVISION ISSUES OF PROCEEDINGS . . .

GOLDSMITH: AND I CAN TELL YOU MORE THAN THAT. THERE HAVE BEEN TWO OTHER SUGGESTIONS, ONE IS THAT WE HAVE A NEW JOURNAL OF SUPER MATHEMATICAL NATURE, IN WHICH LONG MATHEMATICAL PAPERS AND ADVANCED RESEARCH PAPERS ONLY WOULD BE PUBLISHED. PERHAPS 500 OR 1,000 PAGES OF THAT PER YEAR, SO ADVANCED AS TO BE PRACTICALLY READER-PROOF. AND WE ALSO HAVE THE SUGGESTION ON THE OPPOSITE EXTREME THAT WE PUBLISH A SORT OF IRE REVIEW, WHICH WOULD CONTAIN CURRENT EQUIPMENT DESCRIPTIONS, CURRENT PROCEDURES, HISTORICAL AND TUTORIAL MATERIAL, SOCIAL AND WELFARE MATERIAL AND BE DISTINCTLY ON THE POPULAR SIDE, OF ABOUT THE SAME LENGTH, ABOUT 1,000 PAGES PER YEAR. WHAT DO YOU THINK OF A PROJECT LIKE THAT?

HOGAN: I PREFER THE PRESENT POLICY. I THINK THAT THE PROCEEDINGS HAVE BEEN SHAKEN DOWN, I THINK THE VARIETY OF PAPERS IS EXCELLENT, I THINK THE IDEA OF STARTING OFF WITH THE LESS HEAVY, IF YOU WILL, ARTICLES AND ENDING UP WITH THE THEORETICAL ONES, I THINK IT GIVES GOOD BALANCE AND I HEAR VERY LITTLE CRITICISM OF THE PROCEEDINGS THESE DAYS.

GOLDSMITH: WELL, I HEAR VERY LITTLE TOO, BUT OF COURSE THAT MAY BE MERELY POLITENESS ON THE PART OF THE MEMBERS.

HOGAN: IT WOULDN'T BE TOWARD ME, BUT IT MIGHT BE TOWARD YOU, BECAUSE I HAVEN'T ANYTHING TO DO WITH IT.

GOLDSMITH: WELL, ONE STUDENT OF ONE OF THE UNIVERSITIES TOLD ME RECENTLY THEY WOULD APPRECIATE A TYPE OF IRE REVIEW OF THE SORT I HAVE JUST DESCRIBED, BUT I DON'T KNOW WHETHER THAT IS A PRACTICAL SOLUTION.

HOGAN: WELL, IT WOULD BE SO CLOSE TO THE TRADE MAGAZINES, AND IT SEEMS TO ME THAT THEY ARE DOING AN EXCELLENT JOB, TOO.

GOLDSMITH: I THINK THAT'S TRUE. TO GET BACK TO OUR IRE, AS YOU SAID, WE FORMED THE INSTITUTE OF RADIO ENGINEERS RATHER THAN AN AMERICAN INSTITUTE OF RADIO ENGINEERS, AND THAT HAS BEEN HIGHLY COMMENDED BY NO LESS AN AUTHORITY THAN GANO DUNN.

HOGAN: I HAD FORGOTTEN THAT. WHAT'S THAT STORY?

GOLDSMITH: HE WAS, AS YOU KNOW, A FORMER PRESIDENT OF THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, AND A VERY EMINENT GENTLEMAN IN HIS FIELD, AND AT THE TIME WE WERE CONSIDERING THE TITLE AND WANTED TO BE SURE BEFORE WE WENT TOO FAR. WE TOLD HIM THAT WE HAD PROPOSED TO CALL THIS SOCIETY THE INSTITUTE OF RADIO ENGINEERS RATHER THAN THE AMERICAN INSTITUTE OF RADIO ENGINEERS. WELL, RATHER TO OUR ASTONISHMENT, HE VIOLENTLY APPLAUDED THAT AND HE SAID IT WAS A SPLENDID IDEA, THAT SCIENCE AND ENGINEERING WERE INTERNATIONAL, THAT WE SHOULD NOT SLAM THE DOORS ON ANYTHING OR ANYBODY. IT WORKED OUT VERY WELL AS A MATTER OF FACT, BECAUSE WE NOW HAVE AS INFLUENTIAL A GROUP OF OUR MEMBERSHIP IN CANADA AS IN ANY OTHER PLACE, HUNDREDS IN ENGLAND AND HUNDREDS IN THE ARGENTINE, SO IT IS JUST AS WELL THAT WE ARE NOT THE AMERICAN INSTITUTE OF RADIO ENGINEERS.

HOGAN: I THINK IT WAS A WISE POLICY.

GOLDSMITH: WELL, WE HAD OTHER CONTACTS WITH THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS IN THOSE DAYS. WE HAD THE THOUGHT, SOME OF US, THAT PERHAPS THE TWO INSTITUTES SHOULD BE CONSOLIDATED, AND AS A MATTER OF FACT, PROFESSOR A. E. KENNELLY, WHO WAS AT THAT TIME PRESIDENT OF THE AIEE, WAS VERY

ENTHUSIASTIC ABOUT THE IDEA OF CONSOLIDATION. BUT UNFORTUNATELY IT WAS IM-
POSSIBLE TO PERSUADE THE AIEE THAT THEY OUGHT TO GIVE THIS TINY CHILD, RADIO,
AN ADEQUATE AMOUNT OF TIME AT MEETINGS, AND IN THEIR PUBLICATIONS, SO THE
THING FELL THROUGH. I BELIEVE EVERYONE HAS REGRETTED THAT SINCE.

HOGAN: I THINK WE WOULD HAVE HAD TO BE A SECTION OR SOME SMALL SUBDIVISION
BECAUSE WE WERE A PRETTY LITTLE FROG IN A PRETTY BIG POND.

GOLDSMITH: AND IT WOULD NOT HAVE MET THE REQUIREMENTS OF WHAT IS NOW THE
COMMUNICATIONS AND ELECTRONICS FIELD.

HOGAN: THAT'S RIGHT.

GOLDSMITH: IT WORKED OUT WELL AS A MATTER OF FACT, AS IT HAPPENED. BUT IT WAS
INTERESTING TO SEE THAT ON SEVERAL OCCASIONS THERE WAS AN ATTEMPT AT CONSOLIDATION.

HOGAN: KENNELLY WAS A MEMBER OF BOTH ORGANIZATIONS. HE WAS VERY HELPFUL TO
IRE TOO.

GOLDSMITH: WELL, HE WAS DISPLEASED WITH THE WAY IN WHICH HIS OWN BOARD OF
DIRECTORS IN AIEE REACTED TO THE PROPOSAL OF CONSOLIDATION, AND BECAME SO EN-
THUSIASTIC REGARDING IRE THAT HE BECAME ITS NEXT YEAR'S PRESIDENT, AS A MATTER
OF FACT, WHICH IS AN INDICATION THAT HE, AT LEAST, HAD CONSOLIDATED VERY THOROUGHLY.

HOGAN: THAT WAS A COMPLIMENT.

GOLDSMITH: THOSE WERE THE DAYS WHEN VERY PROMINENT MEN IN THE FIELD, LIKE
KENNELLY, WERE ACTIVE IN THE IRE, AND IN THAT CONNECTION I MIGHT ADD SOMETHING
THAT VERY FEW OF YOU MAY KNOW, NAMELY, THAT IN 1915 TO 1917, THE SECRETARY OF
IRE WAS A GENTLEMAN OF WHOM YOU MAY HAVE HEARD, NAMELY, DAVID SARNOFF.

HOGAN: HE IS ANOTHER ONE WHO IS STILL FAIRLY ACTIVE IN RADIO.

GOLDSMITH: I UNDERSTAND THAT HE IS STILL IN THE FIELD AND SOMEWHAT ACTIVE.
SOME OF YOU MAY NOTICE THAT WE ARE RECORDING OUR COMMENTS IN THE THOUGHT THAT
IT MIGHT BE CONVENIENT TO HAVE THEM AVAILABLE LATER, AND THAT IS CARRYING FORWARD
A RATHER OLD TRADITION. AS A MATTER OF FACT, THE EDITOR OF THE INSTITUTE USED.

AMERICAN POULSEN TELEGRAPHONE WITH WIRE RECORDING FOR ALL CORRESPONDENCE, DISCUSSIONS AND THE LIKE, RIGHT FROM THE BEGINNING OF THE DAYS OF THE IRE, FOR MANY YEARS UNTIL THE OLD MACHINE FINALLY GAVE UP THE GHOST AND BECAME DECREPID. SO THAT THIS IS REALLY A CONTINUANCE OF A TRADITION.

HOGAN: I REMEMBER THAT MACHINE OF YOURS. IT WAS THE FIRST MAGNETIC RECORDER OF THE TYPE THAT I HAD EVER SEEN, AND YOU HAD IT UP AT CITY COLLEGE UP IN YOUR LABORATORY AND OFFICE. WELL, I THINK MAGNETIC RECORDING IS PROBABLY COME TO STAY.

GOLDSMITH: YES, IT'S A GREAT CONVENIENCE AND PART OF OUR TECHNOLOGY OF TODAY. YOU KNOW, SOME OF YOU MAY NEVER HAVE SEEN THE OLD PROCEEDINGS OF THE IRE AT THE VERY BEGINNING, SO I TOOK A COPY OF VOLUME 1, PART 1, OF THE PROCEEDINGS OF THE IRE, FOR JANUARY 1913, AND WENT OVER IT TO SEE WHAT I COULD FIND IN THE WAY OF PAPERS OF INTEREST TO US HERE. NOW, THAT ISSUE INCLUDED PAPERS BY MICHAEL I. PUPIN ON "EXPERIMENTAL TESTS OF THE RADIATION LAW OF ANTENNAE". THAT WAS PROFESSOR PUPIN OF COLUMBIA UNIVERSITY.

HOGAN: HE WAS ARMSTRONG'S MENTOR.

GOLDSMITH: THAT'S RIGHT. HE WAS ARMSTRONG'S INSTRUCTOR AND WORKED WITH ARMSTRONG IN MANY THINGS. AND HE HIMSELF WAS THE ORIGINATOR OF THE LOADING COIL THAT MADE LONG DISTANCE TELEPHONY POSSIBLE BEFORE THE DAYS OF THE AMPLIFIER-REPEATER.

HOGAN: THAT'S FUNNY, ISN'T IT, THAT IN THAT SAME PART THERE SHOULD ALSO HAVE BEEN A PAPER BY LEE DEFOREST, WHO ALSO MADE A CONTRIBUTION TO LONG DISTANCE TELEPHONY.

GOLDSMITH: THAT'S RIGHT. WELL, HE DESCRIBED A GROUP OF WEST COAST AND SOUTHERN 40 KILOWATT POULSEN ARC STATIONS OPERATING BETWEEN SEATTLE AND SAN DIEGO TO REACH OVER TO EL PASO, EVEN TO CHICAGO. NOW, THE SIGNALING THEN WAS BY SHIFT TO THE FREQUENCY OF 100 KILOCYCLES, THAT IS ABOUT 5%, FOR TELEGRAPHY, SO YOU

HAVE HERE LEE DEFOREST DESCRIBING A METHOD OF SIGNALING WITH FREQUENCY MODULATION.

HOGAN: OF A KIND.

GOLDSMITH: OF A KIND. WELL, SELECTIVE FADING WAS EXPERIENCED ON THOSE SIGNALS AND WAS WELL EXPLAINED BY MULTIPATH TRANSMISSION AS WE NOW UNDERSTAND IT. YOU DISCUSSED THAT PAPER VERY CAPABLY, IF YOU REMEMBER.

HOGAN: I HAD FORGOTTEN THAT.

GOLDSMITH: OH YES, YOU DISCUSSED IT. I TOOK A MINOR PART IN THE DISCUSSION AND EDITORIALIZED ON IT LATER. AND THEN SOME PROMINENT WORKERS, SUCH AS LLOYD ESPENSCHIED, PROFESSOR PUPIN, BOB MARRIOTT, J. MARTIN, E. J. SIMON, ROY WEAGANT, YOURSELF, HALLBORG, DR. PICKARD, GUY HILL, DR. KOLSTER, ALL DISCUSSED THAT PAPER. YOU KNOW, THE ENGINEERS IN THOSE DAYS WERE ASTONISHINGLY COMPETENT AND WELL INFORMED CONSIDERING THE EARLY STAGES OF THE ART.

HOGAN: WELL, WE DIDN'T HAVE AS MUCH TO KNOW.

GOLDSMITH: THAT'S RIGHT. AND MOST OF US WERE IN A POSITION TO KNOW A RELATIVELY LARGER PROPORTION OF THE THEN SMALL TOTAL.

HOGAN: THAT'S RIGHT. YOU SEE NOW IT HAS GOTTEN TO THE POINT WHERE A MAN CAN SPEND HIS WHOLE LIFE DESIGNING GRIDS OR SOMETHING LIKE THAT.

GOLDSMITH: THAT'S RIGHT. YOU RUN INTO A MAN WHO IS A SPECIALIST ON A PARTICULAR FORM OF TRANSFORMER LAMINATIONS AND THAT MAKES A RELATIVELY CRIPPLED CAREER. IN ANY CASE, WE HAD TO LEARN RADIO, WITHIN OUR LIMITS OF COURSE. NOW, THE SECOND PART OF THE PROCEEDINGS IN APRIL 1913 CONTAINED A PAPER BY MARRIOTT ON "RADIO OPERATIONS BY STEAMSHIP COMPANIES". I THINK I OUGHT TO QUOTE FROM THAT BECAUSE HE PRESENTED A VERY FINE GROUP OF IDEALS FOR BOTH ENGINEERS AND THE IRE. HE SAID, "MISREPRESENTATION CONCERNING RADIO APPARATUS AND RADIO COMPANIES HAS BEEN, AND UNFORTUNATELY STILL IS, A DAMPER ON THE ADVANCEMENT OF THE RADIO SCIENCE AND ART. ONE OF THE MOST COMMONLY

PREVALENT METHODS HAS BEEN TO PROVIDE AN ABLE PRESS AGENT WITH A COMPANY OWNED OR CONTROLLED PUBLICATION, AND WITH THE PRIVILEGE OF INSERTING SUCH STATEMENTS AS MAY SUIT HIS FANCY IN ACQUIESCENT NEWSPAPERS. MANY MYSTERIOUS AND HERO-WORSHIPPING EXAGGERATIONS HAVE THUS FOUND THEIR WAY INTO THE PRESS. THUS THE PUBLIC HAS BEEN AT TIMES WOEFULLY MISINFORMED. SUCH A MISLEADING POLICY IS DIRECTLY OPPOSED TO THE SPIRIT OF THE INSTITUTE. WHAT IS WANTED ABOUT RADIO APPARATUS AND ENGINEERS IS THE SIMPLE TRUTH." THUS THE IDEALS OF THE IRE UTTERED BY ONE OF ITS FOUNDERS RING CLEARLY ACROSS THESE FORTY YEARS.

HOGAN: YES, AND HE COULD TALK WELL TOO.

GOLDSMITH: VERY WELL. HE WAS A MAN OF REAL THOUGHT AND ABILITY. DR. PICKARD TALKED ON ENGINEERING ETHICS, DR. KOLSTER ON "THE EFFECTS OF DISTRIBUTED CAPACITY OF COILS USED IN RADIO TELEGRAPHIC CIRCUITS", AND DR. AUSTIN ON "THE RELATION BETWEEN EFFECTIVE RESISTANCE AND FREQUENCY IN RADIO TELEGRAPHIC CONDENSERS."

HOGAN: I GUESS THAT WAS BEFORE HE GOT INTO HIS PROPAGATION WORK, WASN'T IT?

GOLDSMITH: THAT'S RIGHT. HE HAD NOT GOTTEN INTO THAT AT ALL. HE AND COHEN LATER GOT INTO THAT WORK. WELL, PICKARD, OF COURSE, WAS ALREADY FAMOUS FOR HIS WORK ON CRYSTAL DETECTORS AND LOOP RECEIVERS, AND DR. AUSTIN HAD ALREADY BECOME NOTED FOR HIS PROPAGATION MEASUREMENTS AND LAWS. WELL, WE COULD GO ON ALMOST INDEFINITELY ABOUT THIS. IN THE THIRD PART OF THE PROCEEDINGS, JULY 1913, THERE WERE SOME IMPORTANT PAPERS ALSO. ONE WAS QUITE EPOCH MAKING, IT WAS BY A. E. KENNELLY. IT WAS CALLED "THE DAYLIGHT EFFECT IN RADIO TELEGRAPHY". THAT WAS THE PRECURSOR OF THE FAMOUS KENNELLY-HEAVISIDE LAYER THEORY. IT WAS LIKE COMING TO THE OPENING NIGHT OF A GREAT SHOW BECAUSE THERE WAS WHERE THE KENNELLY-HEAVISIDE LAYER WAS FIRST MENTIONED. BY THE WAY, THAT PAPER WAS DISCUSSED VERY FAVORABLY BY PROFESSOR J. A. FLEMMING IN LONDON. THEN YOU PRESENTED A PAPER - AND AN EXCELLENT ONE, I WELL REMEMBER IT - "THE HETERODYNE RECEIVING SYSTEM AND NOTES ON THE RECENT ARLINGTON-SALEM TESTS". AT THAT TIME YOU WERE QUITE LEARNED ABOUT THESE THINGS. YOU MENTIONED THAT THE GREEK WORD

"HETEROS" MEANT "OTHER", AND "DYNAMIS" MEANT "FORCE", AND CONSEQUENTLY THIS WAS THE "OTHER FORCE" SYSTEM. IN YOUR EXTRAORDINARILY CLEAR AND COMPLETE PAPER YOU PRESENTED ALL THE INHERENT ELEMENTS OF ANY HETERODYNE RECEPTION SYSTEM AND THE MODE OF USE OF THEM, THEIR THEORY AND THE RESULTANT ADVANTAGEOUS EFFECTS.

HOGAN: BY THAT TIME WE HAD THE RECTIFIER HETERODYNE AS AGAINST THE MECHANICAL HETERODYNES, AND WE UNDERSTOOD THE EFFECTS OF LINEARITY IN THE DETECTOR AND HOW AMPLIFICATION COULD BE HAD BY USING A LARGER LOCAL SOURCE ENERGY THAN SIGNAL ENERGY.

GOLDSMITH: WHAT YOU BROUGHT OUT BY IMPLICATION IS THIS: THERE WAS A REAL THRILL IN THOSE DAYS IN ONE RESPECT. EVERYTHING YOU DID WAS NEW. YOU HAD TO BLAZE EVERY TRAIL, YOU HAD TO INVENT EVERY PRINCIPLE OR LAW OR PROCEDURE. THERE WAS NO GUIDE, NO PRECEDENT, AND IT WAS MUCH MORE DIFFICULT THAN IT IS NOW WHEN THERE IS SUCH A LARGE BODY OF AVAILABLE MATERIAL.

HOGAN: WELL, IT WAS HARDER, ALTHOUGH WE DID HAVE SOME PRETTY GOOD REFERENCE WORKS, FLEMMING, ²JENNICK AND SOME OF THE OTHERS.

GOLDSMITH: THAT'S RIGHT. BY THE WAY, THE PAPER THAT I JUST MENTIONED WAS DISCUSSED AMONG OTHERS BY PROFESSOR FLEMMING, AND INCIDENTALLY BY H. R. ZEAMANS, WHO IS OUR PRESENT LEGAL COUNSEL.

HOGAN: ANOTHER ONE STILL WITH US.

GOLDSMITH: ANOTHER WITH US. CAPTAIN BEHR OF THE COAST ARTILLERY CORPS, UNITED STATES ARMY; AUSTIN CURTIS; PROFESSOR GEORGE PEGRAM, WHO IS NOW DEAN PEGRAM OF THE AMERICAN INSTITUTE OF PHYSICS.

HOGAN: HE HAS BEEN VERY PROMINENT IN ATOMIC WORK TOO.

GOLDSMITH: OH YES, VERY PROMINENT. AND JULIUS WEINBERGER, DR. LEWIS COHN . .

HOGAN: WEINBERGER IS STILL WORKING AROUND TOWN.

GOLDSMITH: OH YES, VERY ACTIVE.

HOGAN: I THINK HE IS DOWN AT THE RCA LICENSE LAB, ISN'T HE?

GOLDSMITH: THAT'S CORRECT. IN THE FOURTH PART OF THAT YEAR OF THE PROCEEDINGS THERE WAS THE WEAGANT PAPER ON "SOME RECENT RADIO SETS OF THE MARCONI WIRELESS TELEGRAPH COMPANY OF AMERICA" WHICH WAS BEGINNING TO BECOME OF SOME IMPORTANCE IN THE FIELD AT THAT TIME. NOW, EVEN IN THE EARLY DAYS OF IRE WE DECIDED THAT STANDARDIZATION WAS VERY NECESSARY AND THERE WAS A STANDARDIZATION COMMITTEE WHICH PUBLISHED ON SEPTEMBER 10, 1913 A PRELIMINARY REPORT. MARRIOTT WAS CHAIRMAN. THE MEMBERS WERE YOURSELF, KENNELLY, PICKARD, WEAGANT AND MYSELF. YOU REMEMBER HOW HESITATINGLY WE OFFERED THAT PARTICULAR REPORT?

HOGAN: I CERTAINLY DO. WE WERE REALLY SCARED, BUT WE THOUGHT THE WORK OUGHT TO BE DONE, WE THOUGHT IT WAS NEEDED, WE HOPED IT WOULD BE ACCEPTED AND, AS I RECALL IT, WE PUT THE PRELIMINARY REPORT OUT WITH A TEAR-OFF PAGE, ASKING EACH OF THE MEMBERS WHO RECEIVED IT TO SEND BACK HIS COMMENT AS TO WHETHER IT WAS A GOOD THING OR NOT. AND I THINK WE WERE PRETTY WELL ENDORSED ON THAT. I DON'T IMAGINE THE STANDARDIZATION WOULD HAVE KEPT UP IF WE HAD NOT BEEN.

GOLDSMITH: WELL, AS A MATTER OF FACT, STANDARDIZATION EXPANDED TO THE POINT WHERE WE PUBLISH HALF A DOZEN MAJOR STANDARDIZATION REPORTS EACH YEAR, AND WE DO NOT HAVE AS MANY DOUBTS ABOUT THEM AS WE HAD IN THOSE DAYS. MAYBE WE SHOULD HAVE, BUT WE DON'T.

HOGAN: IT HAS BEEN PRETTY HELPFUL AND PRETTY WELL ACCEPTED.

GOLDSMITH: IN THE SECOND YEAR OF THE PROCEEDINGS WE WENT RIGHT AHEAD ON OUR EPOCH MAKING PUBLICATION SCHEDULE. WELL, THERE WAS A PAPER BY DEFOREST ON A SUBJECT WHICH YOU MAY HAVE ALL HEARD OF LATER, NAMELY "THE AUDION--DETECTOR AND AMPLIFIER" AND THERE HE VERY VERY CLEARLY DESCRIBED THE TRIODE CONSTRUCTION AND LISTED THE FACTORS CONTROLLING THE PLATE CIRCUIT CURRENT. AMONG THEM, OF COURSE, THE INSTANTANEOUS GRID POTENTIAL, THE AMPLIFYING RELAY NATURE OF THE DEVICE, HIGH INPUT IMPEDANCE, AND GREAT SENSITIVITY WERE STRESSED.

INCIDENTALLY, THE AUDION WAS ALSO MENTIONED AS AN AMPLIFIER FOR SOUND RECORDING AND REPRODUCTION, EVEN IN THAT EARLY TIME. THEN THERE WERE PAPERS BY MARRIOTT, BY ALEXANDERSON ON "DIELECTRIC HYSTERESIS AT RADIO FREQUENCIES"; MELVILLE EASTHAM ON "THE HYTONE RADIO TELEGRAPH TRANSMITTER", JOHN STONE STONE ON "THE RESISTANCE OF THE SPARK AND ITS EFFECT ON THE OSCILLATIONS OF ELECTRICAL OSCILLATORS", AND BY DAVID SARNOFF ON "RADIO TRAFFIC". YOU KNOW, IT WOULD BE DIFFICULT TO EXAGGERATE THE ENTHUSIASM OF THOSE EARLY WORKERS FOR THE INSTITUTE. YOU CAN REMEMBER THAT VERY WELL I AM SURE, JACK.

HOGAN: YES, I DO. IT SHOWED UP IN MANY CASES. THERE WAS TERRIFIC INTEREST, THERE WAS DESIRE TO HELP THE INSTITUTE, DISCUSSIONS OF PAPERS WERE QUITE EXTENSIVE, SOMETIMES SOMEWHAT HEATED, AND VERY PLEASANT. I AM SURE THAT ALL LED TO THE GROWTH OF MEMBERSHIP THAT WE EXPERIENCED. I THINK IT WAS THE ENTHUSIASM AND THE WORK OF THE MOST ACTIVE PEOPLE AT THAT TIME. THE INSTITUTE'S NEVER HAD ANY TROUBLE IN GETTING LOTS OF PEOPLE TO WORK FOR IT.

GOLDSMITH: YOU KNOW IT'S BEEN AMAZING. I SUPPOSE THE TOTAL NUMBER OF ENGINEERING MAN DAYS DEVOTED TO THE INSTITUTE ANNUALLY NOW ARE SIMPLY STUPENDOUS. YOU HAVE SOME FIGURES I BELIEVE ON THE MEMBERSHIPS OF THE COMPONENT SOCIETIES, SWTE AND TWI, AND OF THE IRE WHICH SHOW PRETTY CLEARLY WHAT HAPPENED BEFORE AND AFTER THE CONSOLIDATION.

HOGAN: YES. IF YOU TAKE THE YEARS BEGINNING WITH 1907 FOR THE SWTE, AS I THINK I SAID, IT STARTED WITH 11, THE NEXT YEAR IT HAD 17, 1909 IT HAD 27, 1910 36, THE SAME IN 1911, 43 IN 1912. AND THE WIRELESS INSTITUTE STARTED OFF IN 1909 WITH 14, THE NEXT YEAR IT HAD 81, IN 1911 IT HAD 99. IT WAS TWICE AS LARGE AS THE SWTE EVER WAS. BUT STRANGELY ENOUGH IN THE YEAR 1912 IT DROPPED BACK TO 27. AND WHEN WE CAME IN FOR THE IRE, WE STARTED WITH 50, WITH PRACTICALLY THE WHOLE 27 OF THE WIRELESS INSTITUTE AND ABOUT 25 OF THE SWTE MEMBERS, THE NEXT YEAR WE HAD ABOUT 100, 1914 WE HAD ABOUT 200 OR 250,

AND WE RAN ON INTO MARCH 1914 WITH A TOTAL OF 271. THAT 'S RATHER SMALL COMPARED TO WHAT WE LOOK AT TODAY.

GOLDSMITH: YES, IT IS. BUT STILL THAT WAS A RAPID RATE OF GROWTH, THREE TO ONE, IN A YEAR OR TWO.

HOGAN: THAT'S CORRECT.

GOLDSMITH: AND IF WE MAINTAIN THAT RATIO, WE WILL HAVE TO INCLUDE THE POPULATION OF THE UNITED STATES.

HOGAN: I THINK THOSE FIGURES TEND TO TAPER OFF ON A PERCENTAGE BASIS ALTHOUGH THEY TEND TO RUN UP PRETTY WELL IN MERE NUMBERS.

GOLDSMITH: YOU KNOW, AS AN EXAMPLE OF THE COMPARATIVE SIZE OF PUBLICATION, THE ENTIRE YEAR'S PROCEEDINGS OF THE IRE IN ITS EARLY DAYS WOULD BE RELATIVELY LITTLE MORE THAN ONE ISSUE OF THE PROCEEDINGS OF TODAY. IN OCTOBER 1951, TO TAKE AN EXAMPLE OF AN EXTREME CASE, IRE PUBLISHED IN ONE MONTH A 720-PAGE IRE DIRECTORY AND A 400-PAGE COLOR TELEVISION ISSUE OF THE PROCEEDINGS OF THE IRE, WHICH IS A TOTAL OF 1120 PAGES, WHICH CONSTITUTES, I BELIEVE, SOME SORT OF A LONG DISTANCE RECORD FOR ANY ENGINEERING SOCIETY IN A MONTH IN ANY CASE.

HOGAN: HAVE YOU ANY IDEA OF APPROXIMATELY HOW MANY PAGES FORM THE ENTIRE ANNUAL VOLUME FOR, SAY, 1913, THAT YOU REVIEWED A WHILE AGO?

GOLDSMITH: WELL, IT WAS A DIFFERENT SIZE PAGE, BUT I WOULD SAY . . .

HOGAN: IT WAS A MUCH SMALLER PAGE.

GOLDSMITH: YES, ABOUT 200 PAGES, AND THAT WOULD BE ABOUT THE EQUIVALENT OF 80 PAGES OF THE PRESENT PROCEEDINGS, WHICH IS RATHER LESS THAN THE EDITORIAL TEXT OF A SINGLE ISSUE.

HOGAN: WE DIDN'T CARRY ADVERTISING THEN, THOUGH.

GOLDSMITH: NO, WE DID NOT, BUT OF COURSE ADVERTISING TO THAT EXTENT HAS BEEN A GREAT BENEFIT TO THE INSTITUTE BECAUSE IT HAS ENABLED US TO PUBLISH MORE MATERIAL AND MATERIAL OF VALUE WHICH OTHERWISE WOULD BE BEYOND OUR MEANS.

HOGAN: WELL, WHERE DO YOU THINK WE ARE GOING TO GO, EXCEPT OUT OF THIS ROOM?

GOLDSMITH: WELL, IT IS CLEAR THAT OUR MEMBERSHIP IS GOING TO RISE. COMMUNICATIONS AND ELECTRONICS HAVE EXPANDED ENORMOUSLY AND THAT HAS BEEN REFLECTED IN THE FORMATION OF THE PROFESSIONAL GROUPS. IT WOULD NOT ASTONISH ANY OF US, I THINK, IF BY 1965-1970 WE HAD A MEMBERSHIP OF BETWEEN SIXTY TO ONE HUNDRED THOUSAND IN THE IRE. AND WE CERTAINLY WILL HAVE SOME TWENTY OR THIRTY PROFESSIONAL GROUPS WITH MEMBERSHIPS RUNNING INTO THE THOUSANDS. OUR PUBLICATIONS WILL PROBABLY BE OF THE ORDER OF A COUPLE THOUSAND PAGES OF PROCEEDINGS, FIVE OR SIX THOUSAND PAGES OF TRANSACTIONS OF THE PROFESSIONAL GROUPS, ANNUALLY IN EACH CASE, AND POSSIBLY ADDITIONAL PUBLICATIONS OF ONE SORT OR ANOTHER AS THE NEED ARISES. MORE IMPORTANT THOUGH THAN THE QUANTITATIVE ASPECTS, NAMELY, JUST HOW MUCH WE PUBLISH, OR HOW BIG WE ARE, OR HOW MANY BUILDINGS OUR HEADQUARTERS OCCUPY, OR HOW LARGE OUR STAFF MIGHT BE . . .

HOGAN: YOU MIGHT TAKE OVER THE UNITED NATIONS BUILDING THEN.

GOLDSMITH: BY THAT TIME WE WOULD BE ABOUT READY TO DO IT. BUT THE IMPORTANT THING IS THAT WE REMAIN YOUNG, VIGOROUS, DO A GOOD JOB, AND MAINTAIN HIGH ETHICAL STANDARDS. YOU KNOW, I STILL HAVE THE FEELING THAT IRE IS VERY YOUNG. DON'T YOU?

HOGAN: I CERTAINLY DO, AND I THINK ALL OF US ARE. I SUGGEST THAT BECAUSE I KNOW I HAVE ENJOYED THIS LITTLE COLLOQUY WITH YOU AND I HOPE YOU HAVE WITH ME - PROBABLY WE BOTH LIKED IT BETTER THAN THE AUDIENCE HAS - ANYHOW, I SUGGEST WE HERE AND NOW MAKE A DATE TO DO IT AGAIN IN 1965.

GOLDSMITH: SHALL WE MAKE IT 1962, SO AS TO MAKE IT THE 50TH ANNIVERSARY?

HOGAN: ALL RIGHT, THAT WILL BE OKAY.

GOLDSMITH: VERY WELL, WE WILL BE SEEING YOU ALL THEN IN 1962, AND WE WILL HAVE SOMETHING TO TELL YOU, WE HOPE, THAT WILL BE MIGHTY GOOD.

HOGAN: I HOPE SO.