

Excerpts of Address
Prepared for Delivery By
Senator Hubert H. Humphrey (D., Minn.)
At Conference Sponsored by
Northwestern University/ Bio-Medical
Engineering Research Center
At Sheraton-Chicago Hotel,
Chicago, Illinois
March 29, 1963, 7:00 p.m.

OPPORTUNITIES IN
BIO - MEDICAL ENGINEERING
FOR CHICAGO - AREA
INDUSTRY

*Presidential
Candidate*

*Dr Young
Dr Godin
Dr Norton Long
Mr Kreml
Dean Gottle (So DAK)*

AN OPENING "ABSTRACT"

As this audience is aware, for a number of years, the Senate Reorganization Subcommittee has been recommending improved ^{indispensable} abstracting of scientific information.

Let's start right off, therefore, with an "abstract" of the principal points which will be submitted to you this evening. They are:

#1 ^{Point} ~~Part~~ Number One. We are at ~~just~~ the dawn of a dramatic era of Bio-Medical Engineering.

^{Point} Aerospace Medicine, alone, has hardly begun to yield its fantastic potential for us earth-bound civilians.

#2 ^{Point} ~~Part~~ Number Two. In this era, to move ahead, as rapidly as possible, will require:

- Advancement of the state-of-the art in many

individual disciplines.

and ~~The~~ teamwork of all interested disciplines.

Here, I refer to the individual and combined efforts of

Teamwork

- medical science;
- the physical and engineering sciences;
- Agencies of the U.S. Government;
- the Universities ~~of our land~~, particularly their Colleges of Engineering, Schools of Medicine and Teaching Hospitals;
- private American industry;
- professional and trade organizations.

Each has an expanded role to play. Each must function at its highest level of efficiency.

I shall concentrate as I know you would wish, on what the Federal Government should be doing with you and ~~on~~ what you can do in conjunction with ~~the~~ *the federal govt.*

~~Point~~ ^{Point} Number 3. The path ahead - rewarding as it is and will ultimately be - will not be easy - scientifically, technically, or, indeed, financially. Optimism is necessary, but so is realism as to the practical obstacles ahead.

Now, let's turn to each of these phases in turn.

~~THE VAST OPPORTUNITIES~~

I have had 5 years of contacts and correspondence with bio-medical engineers in the United States and throughout the world. What they have said and written confirms in my judgment this fact: Bio-Medical Engineering offers some of the most ^{exciting and rewarding} ~~profound~~ opportunities for human service to be found anywhere in health science.

Bio-Medical Engineering offers, ^{also} ~~too~~, some of the most inspiring opportunities for the American economic system to demonstrate ~~something~~

↳ its sense of public service;
↳ its creativity and efficiency;
↳ its awareness that there is profit to be made
in leading the world ~~to~~ ^{to} meeting tomorrow's needs with
tomorrow's answers.

American industry is moving rapidly ahead into
the "automation era." Industry knows that "systems
engineering" is the key to that era. And, "systems
engineering will be the crux of tomorrow's health
services, tomorrow's hospitals, tomorrow's laboratory
research into organ systems.

↳ Bio-Medical Engineering, moreover, offers
particular opportunities for ~~us~~ of the Midwest and the
Upper Midwest, provided we ~~aggressively grasp these~~ ^{reach out to grasp}
these opportunities.

↳ For a layman who still marvels at the miracle of
flight, what is being done in electronics today seems

incredible: Miniaturized instrumentation - radio "pills"
devised many years ago to relay information from inside
the human body...successful cardiac pacemakers...
heart-lung by-pass machines...the almost unbelievable
range of existent uses of ultra-sound and infra-red,
among other elements of the electro-magnetic spectrum.

And more marvels, ^{with} further applications are on the
way such as -

↳ the development of physiological monitoring
systems, particularly for intensive post-operative
patient care in the Nation's hospitals.

↳ The development of electronic instrumentation
which may one day enable the blind to "see", the
deaf to "hear," as already the mute are being enabled
"speak."

- The development and refinement of additional
artificial internal and external organs, to replace

diseased or amputated organs.

- The simulation of biological phenomena by analog computers, leading to increased understanding of the nature of living processes.

- Specifically, the development of bold new systems concepts for understanding that most fantastic of all instruments - the human brain - how it learns, how it remembers, how it thinks, how it sleeps.

↳ The use of digital computers for the mass input, "massaging", evaluation, output of bio-medical data of unheard-of complexity - ^{Concerning} ~~about~~ a single individual or a million or ten million individuals;

- and other applications, too numerous to even highlight.

TEAMWORK NECESSARY

↳ Yesterday's achievements of this type have taken sweat and some tears; and so will tomorrow's.

Never before have individual scientific disciplines been called upon to develop faster and to collaborate more closely with other disciplines.

The Ph.D. and the M.D., the bio-physicist and the bio-chemist, the electrical engineer and the neurosurgeon - these and a vast number of other types of teams will be communicating with one another, working with one another as never before.

Traditional "compartments" between disciplines have now been shattered by inter-disciplinary break-throughs.

Tele-metering developments, alone, from orbiting space satellites and Man-to-the-Moon rockets have altered and will revolutionize old sciences and engineering.

THE TASKS OF MANY ORGANIZATIONS

It behooves every discipline, every organization, every industry, to appraise its past, present, and future

role.

Medical science, in particular, will have to revise both its under-graduate and post-graduate medical education.

L The physical sciences and engineering will have to improve their curricula. And they, like the life sciences, will have to increase the numbers of their future specialists, as well as their generalists.

Business, trade, professional and ~~other not for~~ ^{the} *so-called Non-Profit* ~~profit~~ organizations must re-examine their present services in terms of tomorrow's needs.

L Fortunately, there is abundant indication that this is being done, particularly by professional groups.

I need only cite the forward-looking plans of, ~~and~~ ~~cite~~ but 3 groups -

(1) ✓ - the Engineering Joint Council Research
Committee;

(2) ✓ - the Institute of Radio Engineers and its
long-established Professional Group on Medical Electronics;

(3) ✓ - the work by the International Federation of
Medical Electronics, among others in this category,
and the work of the Foundation for Medical Technology in
other not-for-profit areas.

In all of this concurrent effort, the Federal
Government has special obligations.

Tasks of the Executive Branch
TASKS OF THE EXECUTIVE BRANCH

No one need be reminded in detail that your
Government is spending in the order of ^{#15} \$14.7 billion
a year for research, development, testing and evaluation.

a large
~~The overwhelming~~ proportion of that total

(\$7.4 billion) is, of course, for military objectives,
with civilian Space, nuclear energy and medical activi-
ties the three largest components thereafter.

Let me submit 4 tasks of the Federal Agencies, as I see them, in this area:

(1) to act in concert with one another so as to expedite the progress of bio-medical engineering.

~~(I emphasize in concert like an orchestra and not chaotically like a motely collection of trombone players, violinists and pianists, playing different melodies and at different tempos.)~~

↳ We need more inter-Agency planning on bio-medical engineering, and more inter-Agency funding of projects of common interest, more inter-Agency consistency in *Scholarship* fellowship and other education programs.

↳ NASA, the Atomic Energy Commission, the Department of Defense, the National Institutes of Health, the National Science Foundation, the Federal

Aviation Agency - are only beginning to realize common programming.

~~NO EASY AUTOMATIC "SPIN-OFF" FROM SPACE SCIENCE~~

(2) The Federal Agencies must act further to help convert military and space science and technology into civilian technology. There was a day when some folks assumed a "spin-off" of civilian by-products would occur "automatically."

Fortunately, the National Aeronautics and Space Administration is now more realistic. It is aware that "miracles" of adaptation of Space devices to users -

here on earth - are not going to occur by themselves.

An aggressive, ~~aggressive~~ ^{premeditated} effort to assist universities and private industry in civilian-type application is essential.

President Kennedy, has, as you know, ~~sounded~~

proposed a Federal Engineering Extension Service

Such a Service would enable the great Colleges of

Engineering of our land to serve as local "packagers"

of information so as to meet the special needs of local

industry. Engineering Colleges should then, in effect,

parallel the magnificent job which has been done down

through the years, by Colleges of Agriculture. By

means of the vast County Agent system, the Department

of Agriculture and the Land grant Colleges have revo-

lutionized American farming and made its productivity

the envy of the world. Similarly, any company in the

Chicago area, or in any other area, should be able to

get the benefit of the counsel of its Engineering

Schools. They, in turn, should be able to draw upon

the sum total of Federally-sponsored ^{research and} information, and,

to the extent feasible (without impairing proprietary

rights) of privately-sponsored ^{research and} information.
A

(3) Information and Communication are, in my judgment, the key.

L There is no single greater task, as I see it, than for each Federal Agency to put its information and communication "house" in order and for all Federal Agencies to put their mutual Federal information "house" in order.

L In this way, you in ^{Illinois} ~~evansville~~ and your counterparts anywhere in the 50 States should be able to learn promptly, easily about anything and everything (not classified for military reasons) which you have paid ^{for} as taxpayers.

L Right now, there may be as many as 150,000 Federally-supported research and development ^{projects} ~~tasks~~ underway. Perhaps 1/6 of them are in electronics alone.

You're paying the bill for these projects. You, personally, should be able to "tap" into the vast "bank" of information about non-classified projects - present and past.

In my view, a scientist or an engineer (whether at Northwestern University, or any private company) should be able - by telephone, by letter, by telegram, by visit - to draw upon "an automated network" of Federally-sponsored information resources in every region of our country.

In the same manner, when you and I make a telephone call from Chicago or Evanston, (or anywhere else in the United States) we tap into a system of local, regional, National and international switchboards. Most of the switching of our signals - from our house, office, or laboratory - to a person one mile or 3,000 miles

away, is done automatically and in a matter of seconds or minutes.

h The day should not be long distant when, in a similar manner, any individual can receive swiftly "signals" ^{information} from the scientific repositories of the earth.

h He may want to receive these "signals" by ear, or by sight - e.g. through a print-out from the world's "pool" of library and other information centers, or to have the information magnified from micro-film or micro-form, displayed visually on a TV-like console at his desk.

h If that sounds "Buck Rogerish," I can assure you that the makings of this system are actually already in existence - in bits and pieces.

~~DON'T BE BASHFUL ABOUT YOUR INFORMATION NEEDS~~

h You of the world of University and Industry have

a right to expect that your Government will serve you.

Do not hesitate to acquaint Federal Agencies with your specific information needs. Tell them what you want and the way you want it. Don't be bashful.

I have found that, for too long, even our leading private citizens and companies have tended to resign themselves to poor Federal information service. The information that they wanted came in too slowly, or they were flooded with irrelevant information which was totally useless in terms of their particular request.

↳ Sometimes the poor service was relatively unavoidable because Federal service was under-financed and under-manned. ~~But now~~ there is no excuse for any Agency's failing to provide taxpayers with information which you need and want and which is useful to our free enterprise system and to the service of human health.

REORGANIZATION SUBCOMMITTEE HEARING

↙ Last September, the Subcommittee of which I am Chairman, held a 5-hour Hearing, at which representatives of the Bureau of the Budget and of every ~~single~~ major science Agency in the United States Government testified.

Perhaps the most remarkable and enlightening testimony was that given by the able Deputy Secretary of Defense, Roswell Gilpatric.

Mr. Gilpatric readily conceded that the Defense Department has not begun to perform the information service which our Subcommittee has long urged upon it.

↙ He promised to improve the management of Defense information. He has been true to his word. In the last 5 months, there has been a whirlwind series of

actions within the Defense Department and within
what has heretofore been known as the Armed Services
Technical Information Agency ~~in particular~~. My hope
is that out of these actions and out of the new ^uDefense
Documentation Center ^u will come the first systematic
management and dissemination of Army, Navy, Air Force
and Advance Research Projects Agency information.

Following our hearing, there has been vigorous
follow-through from the President's Office of Science
and Technology. *Dr. Jerome Wiesner* Two landmark reports have just
emerged from the President's Science Advisory Com-
mittee - one from its Panel on Information, one from
its Panel on Life Sciences. Both reports provide
valuable impetus to bio-medical information advances.

~~OUR REGIONAL OPPORTUNITY~~

thus far We have considered National efforts and studies.

Midwest needs

Now, what of the needs of the Midwest?

Here is a fourth phase of Federal obligation, but it is also a phase involving our own responsibility.

I refer to this
~~You are probably familiar with the fact that for some time now, there have been taking steps to help correct what I regard as a very disturbing imbalance in the geographic distribution of Federal contracts for research and development.~~

The Mid-West and the Upper Mid-West have been getting the "short end of the stick" not deliberately, but because of a combination of non-deliberate, non-

unplanned developments. Government decision after government decision - apparently unrelated - have created a condition in which nearly half of all the Defense

procurement is on the West Coast, and another ~~with~~ one fourth
on the East Coast.

Midwest

↳ These areas have earned much of this support, in part through their superb graduate centers in research and technology. They were in early, and they are reaping the fruits of early labors.

and the teamwork of industry and university

↳ But they have no monopoly or near-monopoly in industrial or university skill---far from it.

It is not just a matter of regional pride when I point to the magnificent untapped human + physical resources and know-how in our own region...It is in the national national interest to Coordinate the human resources of the Midwest with those of the West and East Coasts.

↳ We of the Midwest have some of the greatest Medical Resources in the world. We have some of the finest engineering and industrial resources.

(K)

The harmonious "marrriage" of Midwest engineering ~~and technology~~,
science, industry, and medical resources is essential.

The talent and know-how of all ~~these~~ ^{four} must be
refined, polished, sharpened and matched to tomorrow's
Federal and private requirements.

UPGRADING SKILL THROUGH EDUCATION

Everyone in this audience must be on the alert
to learn what our citizens and what Uncle Sam will
need and want, and to upgrade our ability to fulfill
those needs and wants.

Excellence in education - under-graduate and
post-graduate - is the indispensable foundation for
upgrading our regional skills.

And that is, of course, precisely what North-
western University's magnificent Bio-Medical Engineering
Research Center will offer.

The world will "beat a path" to Northwestern's "door", because Northwestern is determined to "beat a path" to frontiers of man's knowledge.

↳ Meanwhile, I welcome the recent establishment in Bloomington, Indiana of the Aerospace Research Application Center, partially supported by NASA, but having strong private support, as well. ↗ note, too, that Midwest Research Institute at Kansas City in a recent pilot project found around 50 commercial applications for space technology. But this is only the beginning of what we of the Mid-West must do to identify opportunities and equip ourselves to fulfill them.

~~ECONOMIC DIFFICULTIES AHEAD~~

And, now, a word of caution. I have mentioned the potential profits from this vast new field.

Make no mistake. There are potential losses,

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North Star
Research
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as well, in endeavoring to serve both the Federal and the private market.

The files of our Subcommittee contain letters from many electronic and other companies, telling of their difficulties in selling more than a few prototype models of their most advanced instrumentation.

The American ^{Doctor} ~~H.S.~~ and the American hospital are not the easiest customers to sell; nor should they be. Where human life is involved, every effort has to be made to minimize avoidable risk when new techniques or instruments are proposed. Inevitably, modern science will prove cautious about installing new devices until there has been careful basic and applied research and inadequate clinical trial. This takes time, money, skill, and standards.

↳ We must always carefully balance our zeal for the new with respect for the old. We must always respect

the right of the M.D. to demand the most solid scientific proof of the safety and efficiency of new instrumentation.

There are over 6,500 hospitals in our Nation. Potentially, they offer a great economic market, but in actuality, the hospitals of our Country have some of the severest financial problems ^{facinating of our} ~~of our~~ community institutions. Selling new instrumentation to them in large quantities has proven an enormously difficult task for even the largest, best established electronic and other companies.

And so, although I am happy to speak of the promise ahead, I do also want to sound this note of realism.

Industry will need its most careful marketing surveys, maximum engineering efficiency, and great patience and perseverance, if it is to serve this unusual

and difficult market.

But always remember, it is a market worth serving.

The Federal Government can and should help you,
insofar as possible.

But each of you must also shoulder your own
burdens.

CONCLUSION

An old Chinese proverb reads that "if every man
would sweep in front of his own doorstep, the world
would soon be clean." Yes, we are all enlisted in the
struggle to cleanse the world of disease and disability.
The world indeed, stands on the threshold of a new day
in diagnostic, preventive, curative, and restorative
medicine.

I know that this great intellectual community of
the Chicago area has a tremendous part to play in the
fashioning of that new day.

(END)



From: Julie

Here is Northwestern's Release, based on what I sent them at Win's and Pat's direction.

(2-20-63)

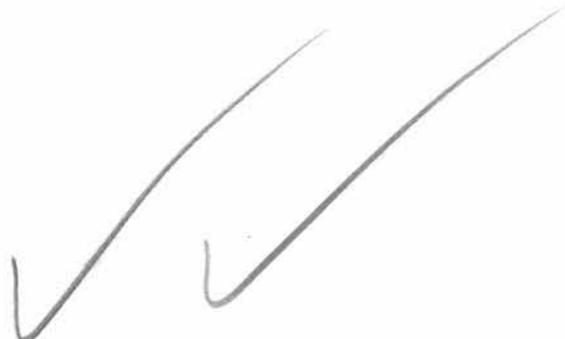
news service

NORTHWESTERN UNIVERSITY

Office of Information Services
EVANSTON, ILLINOIS

FROM: Ned Godfrey, UN 4-1900, Ext. 659

FOR: Immediate Release



SENATOR HUMPHREY

EVANSTON, Ill.--U.S. Sen. Hubert H. Humphrey (D. Minn.) will be featured speaker at the conference on "Opportunities in Bio-Medical Engineering for Chicago-Area Industry," in Chicago March 29 and 30.

Humphrey will speak on the promise of this young field at the 8 p.m. banquet Friday, March 29, at the Sheraton-Chicago Hotel.

It was Humphrey who introduced the amendment in Congress which provides the money for two "special resource centers" in bio-engineering. The only center so far announced is Northwestern University's new Bio-Medical Engineering Research Center.

One key idea behind the federal impetus for this new field is to get more commercial and non-military business from federal research and development.

The federal government is spending \$12.3 billion this fiscal year on R&D. Included is about \$2 billion for electronics research, largely defense. Another important segment is \$843 million being spent for health-related research.

But there has been comparatively little "cross-fertilizing" between such fields as military electronics and medical electronics.

-more-

add 1
senator humphrey
northwestern

Federal-financed R&D has yielded big gains in instrumentation, electronic and atomic techniques, data processing and applied mathematics. Now is the time to apply these major gains in the physical sciences to life science research, according to Humphrey.

What will be the benefits? Two likely examples: much wider use of artificial organs, and automatic patient-monitoring equipment in hospitals, to cut rising health costs, predicted Humphrey.

And the bio-engineering research centers will play key roles in this cross-fertilizing, both in conducting research and training more specialists.

Humphrey recommended such further action as setting up more such special resource centers as Northwestern's, and training more bio-medical engineers.

Too, he suggested a big buildup in information-exchange channels in this field. He has recommended setting up an Expert Panel on Medical Electronics, to advise the National Institutes of Health, similar to its present Advisory Committee on Computers in Research; holding scientific seminars, symposia and conferences, financed by N.I.H.; and setting up a clearing house for medical instrumentation information.

Conference sponsors are the state of Illinois and Northwestern. Purpose of the conference is to capitalize on the new research center and the Chicago area's strength in medicine and electronics. Hoped-for result: industrial growth and more job opportunities.

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(RADIO-TV CONTACT: John Horton, UN 4-1900, Ext. 270)

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news service

NORTHWESTERN UNIVERSITY

Office of Information Services
EVANSTON, ILLINOIS

FROM: Ned Godfrey, UN 4-1900, Ext. 659

FOR: Immediate Release

BIO-TECHNOLOGY

EVANSTON, Ill.--Five experts will outline federal needs in bio-medical technology in the space, military and civilian sectors, on Friday morning, March 29, at the conference on "Opportunities in Bio-Medical Engineering for Chicago Area Industry."

The conference is co-sponsored by the State of Illinois and Northwestern University.

The five federal speakers:

Dr. J. H. U. Brown, chief of the special research resources branch, National Institutes of Health, Bethesda, Md. Brown's office recently awarded \$1.3 million to Northwestern to establish the nation's first Bio-Medical Engineering Research Center.

Lt. Col. Donald L. Howie, chief of the medical research branch, U.S. Army medical research and development command, Washington, D. C.

Dr. H. M. C. Luykx, chief of the biometrics division, office of the surgeon general, U.S. Air Force, Washington, D. C.

Dr. Roger D. Reid, director of the biological sciences division, Office of Naval Research, Washington, D. C.

Dr. Orr E. Reynolds, director of bio-science programs, National Aeronautics and Space Administration, Washington, D. C.

-more-

Federal money finances about 60 per cent of U.S. research-development spending, said Norton Long (2039 Orrington), a member of the conference committee and Illinois Gov. Otto Kerner's economic advisor. And the National Aeronautics and Space Administration is budgeting about 25 per cent of its research money for life science.

Long suggested that Illinois industry could "kill two birds" by getting federal bio-technology contracts. They would help industry to build its research strength in this field. And the contracts should have important "fallout" later in commercial business.

For example, take lessons learned in building equipment for monitoring the condition of astronauts when in space. This same capability could be adapted to building a commercial business in hospital patient-monitoring equipment.

The average hospital operating room may soon require \$100,000 in patient-monitoring equipment, predicted Dr. John E. Jacobs (624 Lincoln), professor of electrical engineering at Northwestern, conference chairman, and director of Northwestern's new research center. There are about 7,000 hospitals in the United States. In addition, Jacobs estimated a potential market of \$1,000 per hospital bed in patient monitoring equipment.

Medical electronics, only one portion of bio-medical technology, represents a great growth area of electronics, Jacobs believes. He cited figures showing that health costs are the fastest rising single segment in the average U.S. family's budget, with the figure above 5.5 per cent (from "Statistical Abstract," 1958).

The conference will act as a catalyst in bringing together university researchers and Chicago area industry leaders in electronics, automation, pharmaceuticals and hospital supplies. Conference purpose is to capitalize on the area's strength in medicine and electronics, in order to spur more industrial growth and job opportunities.

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"Aerospace Medicine, alone, has hardly begun to yield its fantastic potential for us earth-bound civilians.

"In this era, to move ahead, as rapidly as possible, will require advancement of the state-of-the art in many individual disciplines.

"Medical science, the physical and engineering sciences, agencies of the U.S. Government, the Universities of our land, particularly their Colleges of Engineering, Schools of Medicine, and Teaching Hospitals, private American industry, professional and trade organizations, each has an expanded role to play. Each must function at its highest level of efficiency.

"Yesterday's achievements in these areas have taken sweat and some tears; and so will tomorrow's. Never before have individual scientific disciplines been called upon to develop faster and to collaborate more closely* with other disciplines.

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Medical science, in particular, will have to revise both its under-graduate and post-graduate medical education.



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