Legacy: Gerald Westheimer transcript

0:00:21.605,0:00:22.000
[Music]

0:00:22.000,0:00:25.120
I'm
really happy to introduce Gerald

0:00:25.120,0:00:27.920
Westheimer
who is one of the reasons I came to

0:00:27.920,0:00:32.240
Berkeley
Gerald's been at Berkeley for almost 60

0:00:32.240,0:00:35.520
years
and longer?

0:00:36.560,0:00:42.000
61. Gerald's been at Berkeley for 61
years

0:00:42.000,0:00:48.240
who's counting, right?
and Gerald

0:00:48.240,0:00:54.320
has been continuing after having
retired officially in '94 when I first

0:00:54.320,0:00:57.200
arrived
 he's been continuing to be an active

0:00:57.200,0:01:01.200
researcher,
 teacher, participant in our

0:01:01.200,0:01:06.160
neuroscience community.
 You know, I what I'll say

0:01:06.160,0:01:09.520
applies really across the board to all
of the neuroscientists at Berkeley: we

0:01:09.520,0:01:13.920

look up to Gerald
 we view him as being one of the

0:01:14.560,0:01:21.680
inspirations, really, as scientists and as
someone who brings physics

0:01:21.680,0:01:27.760
and mathematical thinking
to biology in a very very inspiring way.

0:01:27.760,0:01:29.920
So Gerald,
it's great it's great to be able to

0:01:29.920,0:01:39.840
interview here today

0:01:50.560,0:01:53.840
I'm really happy we're getting a chance
finally to do this together.

0:01:54.640,0:02:01.840
You opened with a few bars
on the violin of what I think

0:02:01.840,0:02:08.080
many people will recognize as Kol Nidrei.
Tell me about it

0:02:10.480,0:02:18.000
 Yeah, I started the violin
 about I was about 10.

0:02:18.000,0:02:21.840
The reason why it's the violin is
because

0:02:22.480,0:02:28.160
I grew up in a Berlin
middle-class Jewish household

0:02:29.680,0:02:33.920
in the beginning of the Hitler regime
and it became quite clear

0:02:34.560,0:02:38.400
to my parents that at some stage there
had to be emigration

0:02:39.120,0:02:43.440
and the violin was selected as my
instrument because it was portable

0:02:43.440,0:02:46.640
well the piano you never know whether
you could

0:02:47.280,0:02:52.480
put your hand on the piano. So this is
why I had been playing the violin now

0:02:53.120,0:02:57.200
ever since
and I've been practicing for half an

0:02:57.200,0:03:01.280
hour a day
pretty regularly and the quality of my

0:03:01.280,0:03:04.000
playing is reflected by the fact that it
was only half

0:03:04.000,0:03:07.040
an hour instead of two or three hours a
day, okay?

0:03:09.840,0:03:16.480
So you know the the goal
today; the aim that we have is to

0:03:16.480,0:03:19.760
bring you to Berkeley and
find out what it was like when you first

0:03:19.760,0:03:22.640
arrived and
and what your experience was like in

0:03:22.640,0:03:25.280
Berkeley. You know, many people
come

0:03:25.280,0:03:28.800
to Berkeley from different places and
one of the richest things is knowing

0:03:28.800,0:03:33.760
what those places are and

and what the pathway was. You just

0:03:33.760,0:03:36.400
mentioned
starting in Berlin. I think it would be

0:03:36.400,0:03:41.120
really great to learn more.
I was nine

0:03:41.760,0:03:48.640
when Hitler came to power and I remember
hearing in the radio the speeches

0:03:49.360,0:03:53.520
and one of the formative moments in my
life was hearing

0:03:53.520,0:04:00.960
the book-burning in Berlin, when Goebbels
spoke and said: I consigne the

0:04:00.960,0:04:07.120
works of Thomas Mann to the flames.
That was in 1933

0:04:08.560,0:04:12.400
and my parents for some reason had
been German

0:04:12.400,0:04:16.480
been living in Germany for hundreds of
years -- they've traced it back

0:04:16.480,0:04:22.640
to 1600 --
 on both sides of family. Both my

0:04:22.640,0:04:26.640
father
and his brothers and my mother's father

0:04:26.640,0:04:29.600
served for the kaiser in the first world
war

0:04:30.400,0:04:37.040
uh just the same they understood that
there was a difference between being

0:04:37.040,0:04:42.240
german and being
a german jew and they somehow

0:04:42.240,0:04:42.740
u

0:04:46.080,0:04:50.880
-- I don't know how -- got the idea that
sooner or later they had get out.

0:04:50.880,0:04:57.520
Anyway in the middle 1930s,
'36 '37, they started thinking about

0:04:57.520,0:05:01.280
leaving.
They had two boys I was the younger of

0:05:01.280,0:05:05.840
two
and they

0:05:05.840,0:05:12.320
did not want to stay in Europe.
America would have been the first

0:05:13.040,0:05:18.080
preference but you had to have special
family connection to get in, the German quota

0:05:18.080,0:05:21.680
already been taken up. It turned out
that Australia

0:05:22.640,0:05:28.960
was open to a few
uh European immigrants so they applied

0:05:28.960,0:05:32.400
and we got
accepted to go to Australia and we

0:05:32.960,0:05:40.400
left Germany in 1938 arrived in Sydney.
I was 14 my brother was 16 with very

0:05:40.400,0:05:44.480
little money
almost no money but intact; we were

0:05:44.480,0:05:48.240
personally not bothered in Germany it's
just

0:05:48.240,0:05:55.040
the environment. Only later
did the uh real uh

0:05:55.040,0:06:00.400
Holocaust start. So I arrived in
Sydney in 1938

0:06:00.400,0:06:04.320
age 14. Because I was 14 I could start
work already

0:06:04.320,0:06:08.560
so I didn't ever go to school there you
got to permit to work

0:06:09.120,0:06:13.760
and I enrolled in the high school
equivalent course at night

0:06:14.720,0:06:18.720
and got my high school certificate.
In Sydney in those days

0:06:19.280,0:06:25.920
the tertiary education was in two tiers
one of them was the University of Sydney

0:06:25.920,0:06:30.720
which is a
very elite institution, very few students

0:06:30.720,0:06:33.840
just three thousand in a population of
several million

0:06:34.480,0:06:38.320
and the second tier was the Sydney
Technical College

0:06:38.880,0:06:41.840
which was a training

0:06:44.080,0:06:52.480
college for technical personnel

architects, engineers, chemists and so on.

0:06:52.480,0:06:56.400
And optometry was one of the programs in
the

0:06:56.960,0:07:00.400
Technical College. I had always been
interested

0:07:00.400,0:07:08.000
in astronomy, optics, and the eye
even as a student, as a

0:07:10.000,0:07:12.000
pupil in the schools

0:07:13.360,0:07:17.520
in Berlin. Because it turned out that among
the technical

0:07:18.240,0:07:23.280
programs at the college was optometry,
I enrolled the technical college

0:07:23.280,0:07:26.880
in optometry. And one of the conditions
was that you had to work

0:07:27.440,0:07:33.280
in the field and so
the courses were part-time, evenings

0:07:34.080,0:07:37.520
uh and afternoons, and you had to get a
job

0:07:37.520,0:07:44.000
in the field and so I got a job
with an optometrist as sort of an intern

0:07:45.040,0:07:53.200
 and studied did rather well in it.
It was an excellent environment

0:07:53.200,0:07:56.960
because
the people there were not highfalutin

0:07:56.960,0:08:00.640

these were
Aussies, Australians who had

0:08:02.800,0:08:09.040
working for a living, from the middle
middle class, lower middle class. There was

0:08:09.040,0:08:13.600
no upper class in Australia in those
days. Okay so I graduated in optometry

0:08:14.160,0:08:18.880
and the person I worked for and I got on
so well that he made me a partner

0:08:19.920,0:08:24.320
so at a very young age I became a
partner in the clinical practice of

0:08:24.320,0:08:28.720
optometry
which I maintained for several years.

0:08:29.600,0:08:35.600
But I wanted to be a scientist so I
enrolled in Sydney University part-time

0:08:36.160,0:08:40.240
to get a degree in science majoring in
mathematics

0:08:40.240,0:08:47.280
and physiology and then later in physics
with a view to doing research in vision

0:08:47.280,0:08:54.960
science so my whole training
my whole professional career was focused

0:08:54.960,0:09:01.120
on the eye and vision starting from the
time I started in optometry school in

0:09:01.120,0:09:08.000
1940, practicing optometry,
doing my degree, a science degree

0:09:08.000,0:09:11.840
with a view to knowing more about
vision.

0:09:12.560,0:09:18.560
so by the late 1940s
I could Australia had nothing more to

0:09:18.560,0:09:22.560
offer
me as far as education; there was no

0:09:23.680,0:09:27.040
graduate program there were no grants
programs in Australia

0:09:28.160,0:09:31.840
 I was doing well in clinical
optometry

0:09:32.400,0:09:38.240
I had all the background sciences
in physics mathematics physiology

0:09:39.040,0:09:45.360
uh psychology to do research and vision
but there was no way of doing it so I

0:09:45.360,0:09:50.960
wrote to various programs to get
into a PhD program in

0:09:50.960,0:09:54.720
America I wrote to Columbia, Chicago
Berkeley

0:09:54.720,0:10:02.640
none of them would accept me u
so here because I was a sort of unusual

0:10:02.640,0:10:07.600
kind of student. Who had ever heard
of an Australian optometrist wanting to

0:10:07.600,0:10:08.800
go to graduate school?

0:10:11.280,0:10:19.040
However the man who did accept me
was the at Ohio State University

0:10:19.680,0:10:24.960
he uh said if you can show

documentary evidence that what you're

0:10:24.960,0:10:29.360
saying is right
you can come over, start

0:10:29.360,0:10:33.520
your PhD program
and we will pay you 1200 a year

0:10:34.160,0:10:37.840
as a TA uh which was a lot of money in
those days.

0:10:38.400,0:10:44.080
um and so I
left everything I had in Australia

0:10:44.080,0:10:51.360
bought a one-way ticket
across the pacific visited Berkeley -- on

0:10:51.360,0:10:56.720
the way to
Ohio -- where I met various people

0:10:56.720,0:11:00.640
who told me that I could have easily
gotten into

0:11:00.640,0:11:03.520
the graduate program if I had written
more

0:11:04.160,0:11:07.280
detailed letters and appeals or
something.

0:11:07.280,0:11:12.480
I didn't realize that that in
America there was a certain flexibility

0:11:12.480,0:11:16.560
in academic life, that prerequisites
aren't necessarily

0:11:17.120,0:11:24.240
uh set in stone.
Anyway I went off to Columbus Ohio

0:11:26.400,0:11:33.440
and the story about Columbus Ohio is
very detailed and I don't want to go

0:11:33.440,0:11:36.880
into it it is
not the happiest experience except for

0:11:36.880,0:11:40.960
one
respect. Dr Fry my graduate advisor

0:11:40.960,0:11:46.240
was otherwise
not a particularly um helpful person but

0:11:46.880,0:11:52.320
in one respect he was helpful he eased
my way through graduate school

0:11:52.320,0:11:57.200
so I didn't have to so I immediately
took the language examination.

0:11:57.200,0:12:00.720
I think you will remember that you

0:12:00.720,0:12:07.760
had two language examinations and I
got a start on my research program.

0:12:08.320,0:12:13.600
 I came across
the most the person who was probably

0:12:13.600,0:12:18.160
most influential
in my scientific career and that is a

0:12:18.160,0:12:23.840
man by the name of Paul Fitts who was
a um

0:12:24.960,0:12:28.240
psychologist and experimental
psychologist

0:12:28.240,0:12:33.280
who in 1951 taught the course which I
attended

0:12:33.280,0:12:40.480
in which he featured the work of
uh Shannon of Norbert Wiener,

0:12:40.480,0:12:46.880
cybernetics, systems theory and so on.
So I was exposed within a year or two of

0:12:46.880,0:12:50.320
the development
of information theory and cybernetics to

0:12:50.320,0:12:53.600
this way
and it reverberated my mind perfectly

0:12:53.600,0:12:57.360
because I had
already done the physics and mathematics

0:12:57.360,0:13:02.560
and I had realized
that we needed a way into the visual

0:13:02.560,0:13:07.440
system
to analyze it. So in my PhD thesis,

0:13:07.440,0:13:12.880
done against the advice of
my advisor,

0:13:15.040,0:13:21.200
I did a what is now called
a systems analysis of eye movements

0:13:21.760,0:13:28.480
 -- this was in 1952.
The eyes were moving right and left

0:13:28.480,0:13:33.920
in pulse, step, sinusoidal motion,
you fitted the second order differential

0:13:33.920,0:13:36.880
equation,
got the damping coefficients for the

0:13:36.880,0:13:41.120

whole thing.
By the way that thesis,

0:13:41.120,0:13:46.640
Dr Fitts was on the committee
and he took the thesis and sent it

0:13:46.640,0:13:51.360
around
to various people in America

0:13:51.360,0:13:54.320
which later on was extremely helpful.
Anyway,

0:13:55.200,0:14:00.320
s I was ready and then the question was:
return to Australia or not?

0:14:00.880,0:14:07.440
There were all these openings in
American academia at that time because

0:14:07.440,0:14:11.520
it was just the
beginning of the growth of science in

0:14:11.520,0:14:17.440
America.
So I accepted a job teaching optometry

0:14:17.440,0:14:20.720
students
optics and vision science to optometry

0:14:20.720,0:14:24.800
students
while I was doing research. I was

0:14:24.800,0:14:29.520
very fortunate in that
Dr. Fitts sent my thesis around to the

0:14:29.520,0:14:33.280
various people.
I got a letter or

0:14:34.240,0:14:37.840
inquiry from the Office of Naval
Research

0:14:37.840,0:14:40.880
ONR (Office of Naval Research)
that they were willing to support

0:14:40.880,0:14:42.080
my research.

0:14:42.080,0:14:48.240
In those days NIH didn't exist
and you got your research funds not from

0:14:48.240,0:14:52.400
the universities ---
university had very small research funds

0:14:52.400,0:14:55.600
not that very much research funds were
needed in those days.

0:14:56.160,0:15:02.560
Anyway we've got the the research fund:
the on us that the office of naval

0:15:02.560,0:15:08.080
research is willing to support you
so in 1955 I got 10 000

0:15:08.720,0:15:15.280
a year from ONR
to do my research and from then

0:15:15.280,0:15:19.360
on until I retired -- till well under my
retirement --

0:15:19.360,0:15:25.120
I had external funding for my research.
I never had to worry about the funding

0:15:25.120,0:15:28.400
that was available
to me from university in other soures.

0:15:28.400,0:15:32.240
First it was from ONR
for about 10 15 years and then NIH.

0:15:32.240,0:15:37.760
That was very important 'cause your loyalty

when it came to research

0:15:37.760,0:15:45.200
was not to the university but to the
community that spent the money,

0:15:45.200,0:15:53.040
the NIH and so on, and so you kept
your all communication open in that respect.

0:15:53.600,0:15:58.240
So here I was teaching in our
optometry school at Ohio State,

0:15:58.240,0:16:05.520
in my middle 1950s, writing routinely
one or two papers a year on the

0:16:05.520,0:16:10.080
optics of spectacle lenses,
contact lenses, telescopic lenses,

0:16:10.080,0:16:15.600
magnification properties of microscopes,
 what always interested me from the

0:16:15.600,0:16:18.960
time I was a school boy
and still interests me -- I have a

0:16:18.960,0:16:23.360
couple of papers in press now
on that subject -- for all these years

0:16:23.360,0:16:26.080
I've been
so I've been writing just because it was

0:16:26.080,0:16:28.960
interesting to me
there was something that

0:16:30.960,0:16:37.200
appealed to me, um
it came and in a moment I'll tell you

0:16:37.200,0:16:41.520
how that
played out. But while I was teaching

0:16:42.080,0:16:44.480
at Ohio State I got tenure – another
thing that

0:16:45.120,0:16:52.400
America did to me. In 1957
I got tenure, associate professor with

0:16:52.400,0:16:56.800
tenure at Ohio State.
So here I was, in my early 30s

0:16:57.760,0:17:04.800
uh early into the 30s with tenure,
with guaranteed research funds, so I

0:17:04.800,0:17:08.720
could think about
becoming a scientist.

0:17:10.000,0:17:15.920
But I was not satisfied with what I
could do myself; there was very little

0:17:15.920,0:17:21.120
going on
at Ohio State that influenced me.

0:17:22.400,0:17:24.480
So I applied and I got a

0:17:28.160,0:17:34.800
slot in Steve Kuffler's
program at Woods Hole. Steve KufFler and

0:17:34.800,0:17:39.760
couple of others started a
nerve–muscle program at Woods Hole

0:17:40.400,0:17:44.960
which has been going on a long time. I
was in it for its first year, 1957.

0:17:44.960,0:17:52.240
I spent the summer of 1957 learning
neurophysiology with Tectronics scopes,

0:17:52.880,0:18:01.200
and amplifiers and electrodes and
and so on. Listening to the many visiting

0:18:01.200,0:18:04.720
lecturers
uh Lowenstein, Eccles,

0:18:05.360,0:18:09.520
bernard Katz, who came to Woods Hole, so I
was

0:18:09.520,0:18:14.000
really saw the opening of what
was

0:18:14.000,0:18:19.520
going to happen, what could be done.
So when I got back to Ohio State at the

0:18:19.520,0:18:23.840
end of the summer of '57
I decided I'm going to take a research

0:18:24.400,0:18:29.280
leave. They didn't have sabbatical
there but they allowed you to take a

0:18:29.280,0:18:32.960
year off
at the third salary or something every

0:18:32.960,0:18:36.320
few years.
And again Dr. Fry was helpful there
.
0:18:37.840,0:18:44.400
I wrote to Cambridge and I was
and I became a postdoctoral fellow in

0:18:44.400,0:18:50.640
the Physiological Laboratory
of Cambridge University starting there

0:18:50.640,0:18:56.960
in 1958 and that was an interesting
experience because

0:18:58.960,0:19:02.240
it was the Mecca of neurophysiology at
that time

0:19:03.120,0:19:06.000

all the big names Adrian,
Bernard Katz were professors or

0:19:06.000,0:19:07.440
lecturers there.

0:19:07.440,0:19:10.480
Just to sit on the same to be on the
same floor

0:19:10.480,0:19:17.520
and sit in the coffee room --
the tea room -- at four o'clock, you know,

0:19:17.520,0:19:21.040
and when
uh Hodgkin came back from America and

0:19:21.040,0:19:25.440
having listened to
Dr. Land from Polaroid and just

0:19:25.440,0:19:31.920
talk of it was an immense experience.
Except that as a colonial,

0:19:33.440,0:19:38.480
both Australian and American, they didn't
have much time for you in Cambridge

0:19:38.480,0:19:42.240
Aas you know it was a Cambridge
in those days

0:19:42.800,0:19:46.640
was a elite institution,

0:19:49.040,0:19:56.800
largely people who had been to
their famous public schools and had been

0:19:56.800,0:20:01.200
themselves in
in Oxford or Cambridge and uh

0:20:01.200,0:20:08.320
spoke with an Oxonian accent,
with their own sense of humor, drank

0:20:08.320,0:20:15.200

very weak tea -- as against the strong
tea we drank in Australia -- sherry in the

0:20:15.200,0:20:19.600
afternoon,
high table, the whole thing and they did

0:20:19.600,0:20:24.000
not
um they tolerated an American who came

0:20:24.000,0:20:28.480
over,
but that's all. And there a by pure

0:20:28.480,0:20:32.560
chance
I was given the opportunity to give a

0:20:32.560,0:20:36.160
seminar
in that institution um

0:20:36.720,0:20:40.800
so I gave my PhD thesis the system's
analysis

0:20:40.800,0:20:44.400
just gave uh talked about what I was
doing

0:20:44.960,0:20:52.960
at that time and somehow it reverberated
with that elite group. Andrew Huxley

0:20:52.960,0:20:55.200
asked the question: why didn't you do
this?

0:20:55.200,0:20:58.480
to which I happen to have an answer, and
within

0:20:59.840,0:21:04.400
an hour, it was an hour, my whole status
changed.

0:21:05.360,0:21:09.120
Before they just walked past you in the
corridor, all of a sudden

0:21:09.120,0:21:12.400
Barlow comes over: let's have a
beer

0:21:12.400,0:21:17.920
in the pub, William Rushton comes and
said I hear you play the violin

0:21:17.920,0:21:21.040
you know we play quartet something like
that so

0:21:21.040,0:21:28.400
from that time on which was in '58
I became part of the inner group

0:21:28.400,0:21:36.320
of the Cambridge Physiological Laboratory
um we can figure out how that came about

0:21:36.320,0:21:38.960
and
what the prerequisites were. Anyway

0:21:39.920,0:21:44.640
 when I got back to Columbus Ohio and
having done a very nice

0:21:44.640,0:21:51.360
set of two three experiments there
using the local computer, there the

0:21:51.360,0:21:54.000
headset
in which I rubbed shoulder with

0:21:56.720,0:22:00.720
all the uh uh molecular biologists who
were

0:22:01.680,0:22:06.240
making the getting the shape of the
proteins and those that

0:22:06.240,0:22:10.480
I didn't know at that time so all we was
lining up to get

0:22:10.480,0:22:16.720

access to computer anyway
um I got back to Ohio and then

0:22:17.520,0:22:23.440
a steady stream of these Cambridge
Physiology visual physiologists came to my

0:22:23.440,0:22:27.920
lab,
two of them within a year, two of them

0:22:27.920,0:22:32.480
came
to work with me in Columbus

0:22:33.920,0:22:40.400
um which I could handle because
they didn't have any money and I had the

0:22:40.400,0:22:43.760
grants
from the NIH and from ONR

0:22:44.720,0:22:51.200
then NIH. And
then came the major moment this the

0:22:51.200,0:22:54.480
the long answer to your question
long answer to your question, Udi.

0:22:55.280,0:23:02.640
In march 1960 the phone call came
from Dean Morgan of the Berkeley School

0:23:02.640,0:23:07.760
of Optometry, okay,
he said there's an opening

0:23:07.760,0:23:11.520
teaching optics of spectacle lenses in
the Optometry School

0:23:12.320,0:23:15.680
and would I be interested. They
didn't have

0:23:16.560,0:23:20.800
search committees or selections, nothing,
the dean or chairman

0:23:20.800,0:23:27.120
called you and made the arrangement.
Simultaneously, that's also relevant to

0:23:27.120,0:23:32.400
my coming to Berkeley,
simultaneously William Rushton one of the

0:23:32.400,0:23:35.520
great Cambridge people came through
Columbus

0:23:35.520,0:23:39.440
and says he had just been at
NIH

0:23:39.440,0:23:43.920
Bethesda and they're building up the
intramural

0:23:43.920,0:23:47.520
program and there is an opening would I
want to

0:23:48.720,0:23:55.520
apply to the intramural program at um
in NIH. So within a week or so at the end

0:23:55.520,0:23:59.840
of March beginning of April 1960
I had to make the decision: do I want to

0:23:59.840,0:24:03.840
go to Berkeley
or do I want to be a permanent

0:24:04.720,0:24:11.360
researcher in
NIH and I decided to come to Berkeley.

0:24:11.360,0:24:18.640
So I in 1960
July like 16 I drove across the

0:24:20.000,0:24:23.200
country came to Berkeley first stayed in
the in this

0:24:25.760,0:24:29.920

Faculty Club which upstairs with same
rooms

0:24:29.920,0:24:34.240
there are now, and started my lab in the
Optometry School

0:24:36.320,0:24:40.160
and started then teaching Spectacle Optics
that was my

0:24:40.800,0:24:43.360
et cetera and those days you

0:24:45.760,0:24:52.560
taught you taught something like six, five
six, lectures a week. The

0:24:52.560,0:24:57.520
School of Optometry had a rather good
system which I don't disagree with

0:24:57.520,0:25:01.280
that anyone who had an optometric qualification
qualification in

0:25:02.000,0:25:06.960
would be participating in the clinical
program of the school

0:25:07.840,0:25:11.280
so I spent two afternoons a week in the
clinic

0:25:12.560,0:25:16.640
supervising for final year optometry
students while I was

0:25:16.640,0:25:22.960
doing while I was doing teaching
spectacle optics, while I was doing research

0:25:22.960,0:25:31.280
hosting a couple of people in my lab
and that went on with the steady stream

0:25:31.280,0:25:37.120
coming across there --
in which they also went

0:25:37.120,0:25:42.240
back to England with their pockets full
of electronic equipment bought

0:25:42.960,0:25:45.680
on my grant which is another thing that

0:25:48.400,0:25:50.960
was a relationship I think.

0:25:53.200,0:26:00.080
At this stage I must say that
parenthetically I was always interested

0:26:00.080,0:26:00.960
in computers

0:26:03.280,0:26:07.680
right from the first, in the early
days in

0:26:07.680,0:26:08.880
Columbus Ohio they an

0:26:12.080,0:26:18.880
IBM computer. I had been
doing optical image calculations

0:26:18.880,0:26:23.840
on the IBM computers and Berkeley always
had a very good computing lab

0:26:24.480,0:26:26.800
at that time they had mainframes you had
to

0:26:28.880,0:26:36.720
cut your own IBM cards and so on.
Much of my work in those days

0:26:38.960,0:26:42.800
centered on the what is now what you
might call

0:26:42.800,0:26:50.240
the front end of the visual system
namely how does light how does light get

0:26:50.240,0:26:55.680
from the object onto the retina

what are the optical aspects what the

0:26:55.680,0:27:00.240
diffraction effect
what are the retinal spread light spreads

0:27:00.240,0:27:04.480
and so on
so by the middle 1960s we got

0:27:05.760,0:27:10.960
pretty well we pretty well understood
how the retina

0:27:12.880,0:27:20.480
codes in in general terms how the retina
codes the information visual information

0:27:21.280,0:27:26.960
via the optics of the eye via the
photochemical transduction

0:27:26.960,0:27:33.840
which was a major subject, what
the neural transduction in the retina

0:27:34.560,0:27:38.880
so this was so we're getting ready to do
this work

0:27:39.520,0:27:42.800
and with two or three major people who
went

0:27:44.320,0:27:50.160
from England in my lab.
And all I had in that lab in the

0:27:50.160,0:27:54.240
Optometry School in
1965 was one large room

0:27:55.600,0:28:02.800
and two smaller rooms and an office.
so just starting out in uh in the 30s

0:28:02.800,0:28:07.040
right in Berlin
when you get your violin it it is

0:28:07.040,0:28:11.200
completely not
self-evident you know the the uh

0:28:11.200,0:28:14.880
your your education is interrupted you
attend gymnasium

0:28:14.880,0:28:18.080
for a few days or something uh you you
you have no

0:28:18.800,0:28:22.160
regular education when you're in
Australia and you

0:28:22.720,0:28:26.560
somehow manage you you become an
optometrist which is a trade

0:28:26.560,0:28:30.400
much more than it is you know something
that we normally think of as academic

0:28:30.400,0:28:32.640
scene
you somehow managed to get into a

0:28:32.640,0:28:36.880
graduate program that
none of it is self-evident and then the

0:28:36.880,0:28:39.760
miracle of
you know of being able to arrive at in

0:28:39.760,0:28:44.880
Cambridge at a time you know when
the titans walked the earth you know so

0:28:44.880,0:28:48.080
soon
after you know those key experiments of

0:28:48.080,0:28:52.000
Hodgkin-Huxley and
you know Fatt and Katz and uh Castillo

0:28:52.000,0:28:55.840
right it's it's amazing

and somehow it works right

0:28:57.040,0:29:01.120
amazing I think it's uh to the to the
younger people who are listening to this

0:29:01.840,0:29:04.240
it'll sound unbelievable like how that
could happen

0:29:04.960,0:29:08.400
uh somehow what I would like to return
in

0:29:08.400,0:29:13.840
a little later right to how
somehow you carried with you things

0:29:13.840,0:29:15.680
you've not yet described like Goethe and
Schiller

0:29:16.240,0:29:19.920
but first you've arrived in Berkeley now
and you're setting up your lab

0:29:21.520,0:29:26.240
where are you where's your lab situated
what does it look like

0:29:26.240,0:29:31.040
um who are the people around you what
makes the environment

0:29:31.040,0:29:35.200
uh that that made you select Berkeley
what's the experience like of setting up

0:29:35.200,0:29:37.200
their
not just as an educator but as a

0:29:37.200,0:29:44.400
scientist
okay um the comparison of the job that I

0:29:44.400,0:29:48.240
had
at Ohio State and the one at Berkeley I

0:29:48.240,0:29:55.040
transferred as associate professor from
Ohio State to Berkeley I got my salary

0:29:55.040,0:29:58.480
was about 50
higher um my

0:29:59.440,0:30:05.680
teaching was lower, the main difference
was apart from the nice

0:30:06.400,0:30:12.400
climatic environment in Berkeley
was the academic environment

0:30:12.960,0:30:20.000
is much more challenging
richer at a much higher level

0:30:21.520,0:30:24.960
as shown for example by the very fact
that

0:30:24.960,0:30:31.920
my first experience in Berkeley was the
reception for new faculty member in the

0:30:31.920,0:30:35.200
I house in the International house by the
then

0:30:35.200,0:30:39.280
Chancellor who was Glenn Seaborg so here
you know Glenn Seaborg

0:30:39.280,0:30:44.000
at Ohio State you just Ogle the picture
of Seaborg

0:30:44.000,0:30:49.840
here you get to shake his hand, very tall
man by the way, with me

0:30:50.480,0:30:54.800
um so that uh that
was made the difference

0:30:56.640,0:31:02.800
it was a free. In Columbus Ohio

if you read the New York Times you were

0:31:02.800,0:31:08.400
regarded as a communist
if you listened to the Metropolitan

0:31:08.400,0:31:11.840
Opera
that was a very far out kind of

0:31:13.120,0:31:19.200
personality that would do that.
and this is what everyone does at the

0:31:19.200,0:31:25.600
Berkeley faculty
so I so it was a it was a liberating

0:31:25.600,0:31:29.760
experience to come to Berkeley.
What was not so

0:31:30.560,0:31:34.400
positive in the optometry school was the
research atmosphere there was no

0:31:34.400,0:31:37.680
research
they did not really understand research

0:31:38.320,0:31:44.080
so I was a shoehorn
my research was shoehorned in a single

0:31:44.080,0:31:47.440
room
where like two experiments were carried

0:31:47.440,0:31:48.800
out simultaneously

0:31:51.200,0:31:58.240
and somehow we I
didn't feel constrained

0:31:59.040,0:32:04.320
until these high level people worked
with me and they pointed out to me that

0:32:04.320,0:32:06.560

you know I wasn't really treated right

0:32:08.640,0:32:12.160
The Dean of Optometry in those days
that

0:32:12.160,0:32:15.120
his name was Dr. Meredith Morgan was a
fine person

0:32:15.760,0:32:19.680
as good a dean as they had but he was
interested in

0:32:19.680,0:32:23.760
developing the optometry school as
optometry school

0:32:23.760,0:32:28.720
okay and he if research was going, all
right, all the better.

0:32:28.720,0:32:35.200
He himself had a good PhD in physiology
but that was not high priority

0:32:36.400,0:32:42.480
so so he tried to get me a room in
the engineering department and so on so

0:32:42.480,0:32:45.760
finally
I personally went

0:32:47.200,0:32:51.440
and talked to the Vice Chancellor you
can do that in those days.

0:32:52.320,0:32:56.480
the the man above my was the dean of
optometryl

0:32:56.480,0:32:59.840
then the man above him or the person I
guess man was

0:32:59.840,0:33:04.160
right in those days, uh was the Vice
Chancellor.

0:33:04.160,0:33:10.640
His name was Connick, a very tall chemist
and I you know once in a lifetime you

0:33:10.640,0:33:13.200
can
make an appointment with the Vice

0:33:13.200,0:33:18.160
Chancellor which I did.
the vice chancellor didn't believe

0:33:18.160,0:33:22.560
what I told him because in chemistry the
people at my level

0:33:22.560,0:33:26.960
had 12 thousand square foot six nine
square foot the research assistant what

0:33:26.960,0:33:30.480
not
so he went and actually looked at my

0:33:30.480,0:33:34.400
research
space after his lunching faculty club

0:33:34.400,0:33:39.760
we went over and looked
and within two weeks I was in LSB

0:33:41.680,0:33:49.520
um life sciences building
was same size as it is now but that was

0:33:49.520,0:33:52.560
all for life science except for Stanley
hall

0:33:53.200,0:33:56.960
and so they were when psychology
was in it I know

0:33:56.960,0:33:59.760
at that time psychology they were moved.
but

0:34:00.960,0:34:05.840
But they had lots of space, very good

zoology department,

0:34:07.040,0:34:11.760
botanist, bacteriologists, and the
physiology department

0:34:12.320,0:34:19.440
had been decimated because it was
part of the medical school which moved

0:34:19.440,0:34:26.320
back to San Francisco in 1959 or so
so 1915 so they always had a good

0:34:26.320,0:34:32.160
anatomy physiology
they said UCSF anatomy physiology was

0:34:32.160,0:34:35.440
taught in Berkeley between the
earthquake and like

0:34:36.000,0:34:42.720
late 1950s and they called them back
to san francisco in 1950's

0:34:42.720,0:34:45.680
eight nine something like that and the
better people

0:34:46.240,0:34:49.920
moved back. What was left were just a
few

0:34:50.720,0:34:56.080
stragglers in physiology and they joined
the department called anatomy physiology

0:34:56.080,0:34:59.680
they had a rather good biochemist with
the name of Chaikoff

0:35:00.640,0:35:10.480
and Chaikoff died in 1965 or so
leaving acres of space in the physiology

0:35:10.480,0:35:14.480
department
and several FTEs and

0:35:14.480,0:35:20.400
so the university decided to move
uh Horace Barlow who was my colleague in

0:35:20.400,0:35:25.040
the sciences
in optometry and me to the physiology

0:35:25.040,0:35:28.880
department.
I'm not sure if everybody's aware of who

0:35:28.880,0:35:31.760
Horace Barlow
was yeah and what kind of a great

0:35:31.760,0:35:35.920
fortune it was for Berkeley to have him
and you coming together at the same time

0:35:35.920,0:35:37.680
so maybe you want to tell us a little
about

0:35:37.680,0:35:43.840
about him too. Okay all right.
Among the people. As I mentioned

0:35:45.120,0:35:48.320
everyone who is anyone in vision
science

0:35:49.600,0:35:53.200
in physiology at Cambridge University
came

0:35:53.200,0:35:58.880
over to Berkeley for some time or other
from the 1960s on

0:36:00.160,0:36:04.880
one of them was Horace Barlow's who was the
great-grandson of Charles Darwin

0:36:05.760,0:36:11.040
and one of the most distinguished
scientists in the subject, who died just

0:36:11.040,0:36:16.160
a year ago at age

98. And he came over for a year

0:36:18.160,0:36:22.800
and made some very nice discovery in the
optometry school and it turns out that

0:36:22.800,0:36:28.960
uh one of the that there was an opening
in the optometry school for a scientist

0:36:28.960,0:36:32.880
so he
actually accepted the job and moved over

0:36:33.600,0:36:40.000
uh from Cambridge to Berkeley
bought a house in the hills

0:36:40.000,0:36:45.840
uh we had moved from
and we had musical evenings in his house

0:36:45.840,0:36:48.720
playing Brandenburg concertos
and so on and his

0:36:51.120,0:36:55.760
mother turned up to visit Lady Nora
Barlow

0:36:55.760,0:37:00.160
who was the granddaughter of Charles
Darwin with whom I went to

0:37:00.160,0:37:08.320
see Pavarotti in the
Greek Theater in the 1965

0:37:08.320,0:37:12.240
these are you know at those days by the
way I must mention this also

0:37:12.880,0:37:19.760
that Berkeley was a different place
until the late 1960s

0:37:19.760,0:37:22.560
it was much more genteel

0:37:24.640,0:37:25.760

softer place

0:37:28.960,0:37:32.240
and the reason was that there was
actually

0:37:32.240,0:37:37.360
quite a bit of money around the money
came from the overhead

0:37:37.360,0:37:43.280
for the rad lab and so on the
Clark Kerr, president never told the

0:37:44.000,0:37:47.920
state one that they got several billion
dollars and

0:37:47.920,0:37:53.600
overhead from the rad labs the
you know those including los alamos and

0:37:53.600,0:37:56.400
so on and they just use it for the
Berkeley

0:37:56.400,0:38:02.960
fund and that stopped
when Reagan became governor in 19

0:38:02.960,0:38:09.760
he was elected 1966 and the budgets
changed radically there were 100 FTE's

0:38:09.760,0:38:14.880
they couldn't fill and
it never recovered because governor

0:38:15.920,0:38:20.000
Reagan then we had governor brown who
was not all that enthusiastic

0:38:20.000,0:38:23.440
about university finance then the state
didn't have good

0:38:23.440,0:38:29.680
finances so we've been struggling
not struggling really but it's been not

0:38:29.680,0:38:32.240
the same
I thing. And the other thing that

0:38:32.240,0:38:36.480
happened in the 1960s where the Free
Speech Movement went

0:38:36.480,0:38:41.840
in which is a direct result of Berkeley
being soft gentle

0:38:43.200,0:38:50.240
liberal yielding
and the students uh of a different

0:38:50.240,0:38:55.520
generation
wanted they were felt they were entitled

0:38:55.520,0:38:59.920
to
things and they rebelled which we all uh

0:39:00.800,0:39:05.040
accepted the rebellion and the long
story that's a good story

0:39:05.040,0:39:12.160
which we all participated.
We are now talking at the juncture

0:39:12.160,0:39:16.640
of both Berkeley and my career out of
optometry

0:39:16.640,0:39:22.240
into physiology out of
the money

0:39:22.960,0:39:26.480
the easier money to more severe
financial

0:39:27.520,0:39:33.360
so this is this is a uh
a time it's not just a big shake-up for

0:39:33.360,0:39:37.440
society it's a it's a change in

in structure for Berkeley and it's not

0:39:37.440,0:39:42.000
the only change right because you
we we then had a realignment uh

0:39:42.720,0:39:48.480
about uh that began about 15 years later
right that changed how biology was

0:39:48.480,0:39:52.800
structured on the campus
uh what what was what was that interval

0:39:52.800,0:39:54.800
like
that you're now in the physiology

0:39:54.800,0:39:58.480
department uh
the physiology is being built up again

0:40:00.240,0:40:04.000
what is it what is it like who are the
who are the colleagues

0:40:04.000,0:40:08.000
that you interact with and how does how
does that affect your

0:40:08.000,0:40:16.000
research okay
we mentioned so Horace Barlow and I

0:40:16.000,0:40:20.080
were talking to the Vice Chancellor so
on those days about

0:40:20.080,0:40:26.160
developing neuroscience
as a discipline, neurobiology as it was called

0:40:26.160,0:40:30.800
at that time as a discipline,
and I'll come back to this later and we

0:40:30.800,0:40:34.400
couldn't
make much headway so they said:

0:40:36.320,0:40:41.680
go into physiology the have
space, the have FTEs

0:40:42.720,0:40:46.400
you go and so we said well the
physiology is not really a

0:40:46.400,0:40:51.840
elite department and they said well you
make it good.

0:40:52.720,0:40:56.080
That was a fool's errand you cannot make
a

0:40:56.080,0:40:58.000
department like that good by

0:41:01.680,0:41:06.960
putting two people into it because the
people there

0:41:06.960,0:41:12.880
where had been at Berkeley for years
uh had been post doctorals in Berkeley

0:41:13.760,0:41:20.000
um doing moderately good
research well funded you know the name

0:41:20.000,0:41:24.000
of Berkeley or something
and they just ran the physiology

0:41:24.000,0:41:26.640
department
in a very um

0:41:30.480,0:41:34.800
restricted way let me put it this way so
for as an example

0:41:35.440,0:41:42.080
so there were like 10 12
faculty in physiology and so Horace

0:41:42.080,0:41:46.880
and Barlow and I, who were
visual neurophysiologists, come into the

0:41:46.880,0:41:51.440
department with a mission
to make it a good neural to make a

0:41:51.440,0:41:56.480
neural hub in it.
so the the chairman that sounds well you

0:41:56.480,0:42:00.800
have to go and teach
respiration so I had to teach because

0:42:00.800,0:42:04.080
they were too
they were teaching their own stuff and

0:42:04.080,0:42:09.120
respiration was not covered
so I had to give three weeks lectures in

0:42:09.120,0:42:12.560
respiration
Horace had to give three least lecture on

0:42:12.560,0:42:14.160
cardio
on the um

0:42:16.640,0:42:22.000
cardiology and so on and which nowadays
would be unthinkable

0:42:22.000,0:42:29.200
but in those days was completely
standard and it was almost impossible

0:42:29.200,0:42:34.960
to budge the department. They had
one neurophysiologist in it by the name

0:42:34.960,0:42:39.280
of Walter Freeman
who was part of the old group he

0:42:40.160,0:42:43.680
had a few things going for him a few
things

0:42:43.680,0:42:48.160

against him but it didn't work
so now we are coming

0:42:50.160,0:42:54.320
to the neurobiology aspect of it

0:42:57.200,0:43:05.120
great um so the the
the neuroscience neurobiology is not

0:43:05.120,0:43:08.720
ready yet to take off
right uh it's just it's not fitting in

0:43:08.720,0:43:13.120
quite with with the Berkeley plan
uh and yet the research that you're

0:43:13.120,0:43:18.560
doing and the research that uh
Barlow is doing is groundbreaking right

0:43:18.560,0:43:21.840
uh the and the the two of you are kind
of are

0:43:21.840,0:43:24.960
unique in that you're not just
interested in

0:43:24.960,0:43:28.960
physiology of neuroscience but you're
also bringing in mathematics

0:43:28.960,0:43:35.360
and computational interests right that
that really today really are again at

0:43:35.360,0:43:39.920
the forefront
of of the way we do neuroscience uh how

0:43:39.920,0:43:43.280
does that work
and are there people in other

0:43:43.280,0:43:47.760
departments of
engineering for example uh other parts

0:43:47.760,0:43:51.840
of biology
right where where you you see a hope

0:43:52.480,0:43:56.080
of being able to have the kind of
colleagues that

0:43:56.080,0:44:03.040
could make a difference yeah um
so we're going shortly after Barlow

0:44:03.040,0:44:07.680
arrived
he insisted that we title our

0:44:07.680,0:44:14.240
we talk about a neural
sensory laboratory in the

0:44:14.800,0:44:19.120
department of optometry and then we got
together with

0:44:19.680,0:44:25.920
Stent who was
an exact contemporary of mine Gunther Stent

0:44:25.920,0:44:32.320
also born in Berlin my personal
close friend for all time I was in

0:44:32.320,0:44:36.880
Berkeley till he died
ten years ago and Gunther

0:44:37.520,0:44:41.840
was a bio originally a chemist became a
molecular biologist

0:44:42.480,0:44:46.880
was on the go on the ground floor with
all the modern molecule biology

0:44:46.880,0:44:52.640
who early in the 1960s decided
that molecular biology had been done

0:44:52.640,0:44:56.000
already

and the future was neurobiology

0:44:56.560,0:45:02.160
and he got
a couple of people interested in that

0:45:02.160,0:45:07.040
one of them was
Don Glaser who had done some work in

0:45:07.040,0:45:10.320
there was in physics department but also
was

0:45:10.320,0:45:15.920
loose a loose kind you know not a
quantum physicist although he understood

0:45:15.920,0:45:20.320
quantum physics
as well as anyone but he was mentally

0:45:20.320,0:45:24.960
loose
so in the 1965 1966

0:45:25.680,0:45:30.320
Gunther Stent organized what's called the
chancellor's advisory council or

0:45:31.040,0:45:39.200
committee on neurobiology I think
um with the mandate to decide what needed

0:45:39.200,0:45:44.080
to be done in neurobiology in Berkeley
as a future and how to do it. The

0:45:44.080,0:45:49.120
committee consisted of
people in

0:45:50.560,0:45:55.040
physics it was a
very nice person

0:45:56.960,0:46:03.600
the I can't think of his name
the um the

0:46:04.320,0:46:11.360
some zoologist and engineer
uh chemist and we all

0:46:11.360,0:46:17.520
decided after long deliberation
that there should be a department of

0:46:17.520,0:46:21.760
neurobiology which
uh the administration did not want

0:46:22.400,0:46:28.400
-- and secondly
they wanted to have a sub department in

0:46:28.400,0:46:32.320
the department of molecular biology
which is to the problem molecular

0:46:32.320,0:46:36.240
biology didn't want
because we are talking about the late

0:46:36.240,0:46:38.800
60s when molecular biology was really
going.

0:46:39.440,0:46:46.320
So the university decided to put a
focus for neurobiology in the department

0:46:46.320,0:46:50.400
of
physiology and anatomy where it

0:46:50.400,0:46:51.680
rested
and we

0:46:54.720,0:46:59.680
got the one or two FTEs out of it we
forced the university

0:46:59.680,0:47:03.440
to make an FTE not to the physiology
department

0:47:04.000,0:47:10.960
but to the to neurobiology that was Bob

Zucker so Bob Zucker 1972

0:47:10.960,0:47:14.880
was hired the FTE was given to the
neurobiology

0:47:21.200,0:47:25.760
things were going along until the major

0:47:25.760,0:47:28.560
moment as far as i'm concerned in
Berkeley

0:47:29.200,0:47:35.920
was in 1980
I had just been offered a job at Harvard

0:47:35.920,0:47:39.280
university
which I did not accept because I like

0:47:39.280,0:47:42.960
Berkeley
which also by the way should be part of

0:47:42.960,0:47:47.440
the history
I had previously been offered a major

0:47:47.440,0:47:53.360
chair in Germany a
really good jobs about

0:47:54.320,0:47:57.920
which I did not I didn't even think
because it didn't even come up that I

0:47:57.920,0:48:01.840
would go back to Germany.
Harvard, I decided I really prefer

0:48:01.840,0:48:06.800
Berkeley over Harvard
but I was bottled up the physiology part

0:48:06.800,0:48:12.240
had bottled me up as far as my
slots and everything so I decided I

0:48:12.880,0:48:20.640

wanted to use the Harvard offer
to get better so I went some reason I

0:48:20.640,0:48:25.040
said I went to Dan Koshland
said to Dan you know this is I want to

0:48:25.040,0:48:28.800
stay
in Berkeley but Mrs. Timiras is really

0:48:28.800,0:48:32.080
not
that interested me so Dan Koshland

0:48:32.080,0:48:35.280
dictated the letter
that I should write to them

0:48:37.520,0:48:40.960
it was very anyway a year later there
was a dinner

0:48:41.520,0:48:45.280
and in the parking lot where we are
going to a car

0:48:45.280,0:48:48.400
the then dean of biology by name Robert
Glaeser

0:48:49.440,0:48:53.120
now famous for his freezing electron
microscope

0:48:53.920,0:48:58.000
pulled me aside says I'm setting up a
committee

0:48:58.000,0:49:01.840
under the Chancellor to reorganize
biology

0:49:02.640,0:49:06.400
under with Dan Koshland chairman would
you be a member of it?

0:49:07.600,0:49:11.840
so in 1980 I became a member of the gang
of whatever they call it

0:49:11.840,0:49:16.320
under Dan Koshland and for the rest of
the 1980s

0:49:16.320,0:49:21.760
we all under Dan Koshland
basically reorganized biology

0:49:22.720,0:49:29.680
and we were just his minions
the most effective academic politician

0:49:29.680,0:49:33.520
I've
ever come across by by many magnitudes

0:49:33.520,0:49:40.000
now I wish I had studied under
Dan Koshland 20 years earlier I would

0:49:40.000,0:49:45.040
have been able to handle Dean Morgan
about so much better um

0:49:46.160,0:49:53.360
the and the idea then was
to thread in neurobiology

0:49:53.360,0:50:01.520
into the new reorganization
so there were big ways of doing

0:50:01.520,0:50:08.160
so first of all what Koshland did
via the Vice Chancellor Rod Park

0:50:08.720,0:50:15.760
with the acquiessence of the Chancellor
Heyman, to try to abolish all

0:50:15.760,0:50:18.240
biology departments, like 15 biologies
about

0:50:18.960,0:50:24.080
bio and it's all we need to say that
the 15 chairmen

0:50:24.080,0:50:26.320

were unanimously against that.

0:50:29.520,0:50:35.200
and so they Dan Koshland and
Beth Burnside -- by the way Dean Burnside

0:50:35.200,0:50:42.400
was made Dean of Biology
and she managed between Koshland

0:50:43.040,0:50:46.320
and Burnside and they managed
somehow

0:50:46.320,0:50:51.680
to to put the
system through. And the first thing they

0:50:51.680,0:50:56.000
did was to bring
in two professors

0:50:56.000,0:51:01.280
 Gerry Rubin and Corey Goodman
who first got they got the first

0:51:02.560,0:51:06.320
Howard Hughes professor and I remember the
Howard Hughes

0:51:06.320,0:51:10.400
people coming here explaining to us how
Howard Hughes

0:51:10.400,0:51:14.640
professors would still have to be
teaching. and so on they explain

0:51:14.640,0:51:17.920
so so then it's a part of the
construction

0:51:20.160,0:51:23.360
person but there's one of the things
that Dan Koshland

0:51:23.360,0:51:26.960
immediately said the first thing to do
to make it palatable

0:51:27.520,0:51:32.880
to the biology faculty is to have
new construction so we

0:51:34.160,0:51:36.960
build LSA we built um

0:51:39.840,0:51:45.600
rebuilt Stanley Hall
and then LSB was rebuilt

0:51:47.120,0:51:52.400
and now what's now Koshland
so a major construction costing

0:51:53.440,0:51:56.800
I think 150 billion -- million dollars you
know --

0:51:57.360,0:52:01.280
um so I don't know how they got the
money from the state and so on

0:52:01.280,0:52:05.600
so there was major construction so about
about '89

0:52:05.600,0:52:09.600
'90. In '87 they started a new
department

0:52:11.920,0:52:15.200
so you know the thing that's interesting
about about the department

0:52:15.760,0:52:20.560
so so first of all despite somehow
despite all these difficulties even

0:52:20.560,0:52:25.840
before this happens
uh vision science on the Berkeley campus

0:52:25.840,0:52:28.480
actually becomes one of the serious
places

0:52:29.040,0:52:32.400
in the world to do vision science between
optometry

0:52:33.440,0:52:37.360
physiology uh a couple of different
biologies

0:52:37.360,0:52:43.920
and uh psychology right so it
yeah it grows despite the structure

0:52:44.640,0:52:48.720
right yes yeah and yeah the reason for
that was

0:52:48.720,0:52:53.440
that so so we moved to physiology Horace
and I

0:52:53.440,0:52:57.200
we hired one or two people in our line
of work

0:52:58.240,0:53:04.960
optometry got religion and they
replaced us with one or two people and

0:53:04.960,0:53:08.640
then
made it a rule now it's standard for the

0:53:08.640,0:53:12.560
optometry department
have three or four or five vision

0:53:12.560,0:53:18.080
scientists there
always was one or two psychologists

0:53:18.080,0:53:22.080
who were vision scientists with
Brunswick

0:53:22.080,0:53:28.640
in the 1950s Cornsweet, DeValois
they always had people like

0:53:28.640,0:53:33.840
and then I was able to
thread something into the electrical

0:53:33.840,0:53:37.040

engineering department
at that time we had lunch regularly in

0:53:37.040,0:53:40.800
the faculty club
and there were people with the same age

0:53:40.800,0:53:46.080
same interest
in and so I got to know the electrical

0:53:46.080,0:53:49.040
engineers very well and I had a lot in
common with them

0:53:49.040,0:53:55.840
interesting people and I persuaded them
to make one FTE available for

0:53:57.520,0:54:02.880
bio engineering and they hired
Frank Werblin who

0:54:04.960,0:54:08.800
they tried it didn't work out quite as
well as I wanted to

0:54:09.360,0:54:15.120
because I had hoped that the person
that would they would hire would be

0:54:15.120,0:54:20.800
teaching an electrical engineering
course just a simple course in systems

0:54:20.800,0:54:23.520
theory
and do bioengineering but the people

0:54:23.520,0:54:27.520
they hired
were good bio engineers but they wanted

0:54:27.520,0:54:28.880
to do bioengineering they didn't want
to

0:54:29.440,0:54:32.320
so anyway by that time there were
pockets

0:54:33.280,0:54:39.440
of vision scientists influenced by
our interest and our input

0:54:40.320,0:54:44.160
so when the engineers hired a
bioengineer

0:54:44.160,0:54:47.120
they hired someone because we knew Frank
Werblin

0:54:48.640,0:54:55.680
and the uh um
psychology also so that's how in

0:54:55.680,0:54:59.040
optometry as I said
had two three so by that time there must

0:54:59.040,0:55:02.480
have been
up to 10 people in vision science yes

0:55:03.200,0:55:07.360
not yet neurobiology right and so and so
and now we have the

0:55:07.360,0:55:10.080
reorganization that among other things
it builds

0:55:10.640,0:55:16.560
uh LSA uh it creates
uh the department of MCB and

0:55:17.120,0:55:22.880
there's a discussion about what kind of
sub-departments or divisions MCB will

0:55:22.880,0:55:26.240
have
right and neurobiology becomes one of

0:55:26.240,0:55:29.600
them
uh but although interestingly

0:55:30.400,0:55:34.080

the area that Bob Glaeser who was one of
the people to initiate this

0:55:34.080,0:55:41.040
of biophysics uh is left out in the cold
right uh for some future events

0:55:41.040,0:55:46.720
but but but neurobiology is represented
and and at that point do you become a

0:55:46.720,0:55:50.960
member of the
MCB department and and uh of the

0:55:50.960,0:55:56.400
neurobiology division of MCB
yes so at that time there was discussion

0:55:56.960,0:56:02.880
what um kind what
what the department should be in the

0:56:02.880,0:56:07.600
biology area okay
under Dean Burnside, and they decided to

0:56:07.600,0:56:09.280
have
three departments

0:56:11.120,0:56:15.280
IB, plant sciences. and molecular cell
biology

0:56:15.280,0:56:19.920
there could have been more than MCB.
W wanted actually to have

0:56:19.920,0:56:25.440
a separate department of sort of
cellular biology physiology neuro

0:56:26.400,0:56:33.120
and another one for molecular and so on
but Gerry Rubin who was a very powerful

0:56:33.680,0:56:39.280
uh academic politician insisted on
there being a single department and a

0:56:39.280,0:56:42.480
single department
has an advantage we must still keep in

0:56:42.480,0:56:45.360
mind the single department can have
divisions

0:56:46.320,0:56:48.960
without regental approval
any degree of autonomy

0:56:49.680,0:56:53.040
and the division does not need regential

0:56:53.600,0:56:58.320
approval. A department does but a
division does not.

0:56:58.320,0:57:01.760
so if you have a large department and 90
faculty member

0:57:01.760,0:57:08.240
you can divide them into pockets,
more or less it will, without having to

0:57:08.240,0:57:11.520
go
to any higher organs. So we had at that

0:57:11.520,0:57:14.560
time
 this major

0:57:15.520,0:57:22.640
 internal MCB organization.
It was largely was largely the job of

0:57:23.200,0:57:29.040
Dean Burnside and chairman
inaugural Chairman Gunther Stent who were

0:57:29.600,0:57:37.520
very very good academic administrators,
 not selfish at all, looking at

0:57:37.520,0:57:41.520
where things had to be done and they

decided

0:57:41.520,0:57:48.320
to have six divisions
and they selected -- I think first we

0:57:48.320,0:57:52.560
wanted five and then
six -- and then they selected division

0:57:52.560,0:57:56.960
heads and
they had a council of division heads

0:57:56.960,0:58:01.040
council of
division and then the first and I was

0:58:01.040,0:58:06.640
and so neurobiology -- which we
originally wanted under Gunther Stent's

0:58:06.640,0:58:12.400
chairmanship in the 1960s
to be a department -- at least

0:58:12.400,0:58:18.720
became a division
in the department of molecular and cell biology. We had

0:58:18.720,0:58:22.400
a division
of neurobiology, we could call ourselves

0:58:22.960,0:58:27.200
professor of neurobiology, because our
job was officially

0:58:27.200,0:58:30.880
MCB professor of neurobiology, so this
was

0:58:30.880,0:58:34.720
major. I was the first division
ahead

0:58:34.720,0:58:41.520
we had about 15 people in it
it worked very well we had a very good

0:58:41.520,0:58:45.040
relationship and I also worked rather
well

0:58:45.680,0:58:49.840
with the other division heads you know
with Gerry Rubin um

0:58:50.480,0:58:53.760
uh Randy Scheckman um

0:58:56.400,0:59:00.400
so so we had on chairman Gunther Stent,
division head,

0:59:00.400,0:59:03.840
so the department in its initial 10 15
years

0:59:04.800,0:59:08.400
worked very well we had the new
buildings we got the equipment

0:59:09.040,0:59:16.160
so uh things where now the division of
neurobiology was in the department

0:59:16.160,0:59:20.800
molecular
cell biology leaving out a lot of

0:59:20.800,0:59:26.000
neurobiology yes
so it's interesting what it left out I

0:59:26.000,0:59:28.240
mean I also have to say it's kind of
ironic

0:59:28.240,0:59:35.120
to have uh Gunther right
who has declared uh years earlier that

0:59:35.120,0:59:39.440
molecular biology
was dead it finished and now it was time

0:59:39.440,0:59:43.600
for neurobiology
being the inaugural chair of a

0:59:43.600,0:59:50.560
department of molecular and cell biology
right uh and and yet you know somehow

0:59:51.600,0:59:55.520
molecular biology wasn't dead the way he
thought it was but he was right about

0:59:55.520,0:59:58.960
one thing and that is that he I think
saw way ahead

0:59:59.600,1:00:03.360
and that in the future neurobiology
really is

1:00:03.360,1:00:06.720
going to be such a big challenge you
know for us all for the

1:00:06.720,1:00:10.960
for the whole scientific community.
Yeah well, Gunther you see you have to

1:00:12.960,1:00:16.160
uh recognize was of the old school, he did
his job

1:00:16.160,1:00:20.480
he was an honest sincere person
genuinely interested

1:00:20.480,1:00:26.000
in the development of science and if it
required he understood that molecular

1:00:26.000,1:00:28.480
knowledge still needed to be done he
didn't

1:00:29.040,1:00:35.760
realize that just knowing the DNA
is not enough. but that was difficult to

1:00:35.760,1:00:40.080
realize in 1965 okay
but he didn't realize that then. He was

1:00:40.080,1:00:44.800

forward looking and
uh so he he

1:00:44.800,1:00:51.120
worked. We had academics
uh people in academia who did their job

1:00:51.120,1:00:55.600
they were not as selfish
as you might have thought they were. It

1:00:55.600,1:01:01.280
was their job to teach
and if the job is to teach respiration

1:01:01.280,1:01:04.320
you teach it
you look up your last perspective to

1:01:04.320,1:01:09.200
teach three weeks of respiration
that's your job okay.

1:01:09.200,1:01:14.080
Gunther was a good chairman for
all of these people because he was

1:01:14.080,1:01:18.720
honest he understood
the equipment needs the teaching needs

1:01:18.720,1:01:24.080
and so on but the problem about
neurobiology, we can finish up on this,

1:01:24.080,1:01:30.000
the problem neurobiology and that
was this: Koshland

1:01:32.160,1:01:39.040
did not like for some reason
extending neurobiology so far

1:01:40.480,1:01:44.480
to include psychology or people who are
in psychology

1:01:45.440,1:01:51.840
for some reason he stick he stay he
concentrated on the cellular

1:01:54.160,1:01:57.600
molecular not even synaptic molecular
aspect

1:01:57.600,1:02:01.440
because that was his own field yeah so
the result is that

1:02:01.440,1:02:05.200
what we built up in the neurobiology
division

1:02:05.200,1:02:09.440
of the department was a the molecular
and cellular

1:02:09.440,1:02:16.880
aspect with very little reference to
systems uh neuroscience

1:02:16.880,1:02:20.240
and you can spot you can say everything about me

1:02:20.240,1:02:26.160
because I was by far the most left-wing
neurobiologist ever in that I

1:02:26.720,1:02:34.640
was doing psychophysics and yet I was
fostering shoring up, helping the

1:02:34.640,1:02:38.640
department become
more molecular and more

1:02:39.520,1:02:46.480
cellular, okay? because we recognize
science is a large area and has

1:02:47.360,1:02:50.880
imperatives that are equivalent and
equally good

1:02:51.600,1:02:58.800
so we have so the next thing then,
we end up on this now. In

1:02:58.800,1:03:04.320
1994 I retired

because we got the golden handshake

1:03:04.320,1:03:09.200
which is very nice and
um Chancellor Tien figured out ways of

1:03:10.400,1:03:17.040
adding years to our
service and they called us professor of

1:03:17.040,1:03:22.000
the graduate school instead of
just professor emeritus and we were

1:03:22.000,1:03:27.760
promised to have as many
you can do whatever you wanted you can

1:03:27.760,1:03:31.680
teach you can research
you just change the source of your salary

1:03:31.680,1:03:34.320
instead of being paid by the
university, going to the

1:03:34.320,1:03:37.440
university
retirement system which worked very

1:03:37.440,1:03:40.320
nicely until five years later when they
said, Gerald,

1:03:40.320,1:03:43.840
you know you're not using this room
actually,

1:03:45.040,1:03:50.880
so Carla Shatz took over this room
so gradually it whittled down in this

1:03:50.880,1:03:54.880
thinking
um and at that time which is the

1:03:54.880,1:03:59.280
beginning of the Carla Shatz
era that you're in.

1:03:59.280,1:04:03.440
Just about the time I retired there was
another review

1:04:03.440,1:04:09.760
of neurobiology, an external review
which chaired by Torsten Wiesel,

1:04:09.760,1:04:13.200
Zach Hall
and Larry Squire three people came here

1:04:13.200,1:04:18.480
spent three days
um looking at neurobiology I think it

1:04:18.480,1:04:22.640
was '96
so you can look it up and they wrote a

1:04:22.640,1:04:25.600
report
that there should be a division that

1:04:25.600,1:04:31.040
should be a department of neurobiology
this is now 25 years ago and they

1:04:31.760,1:04:35.760
handed the report to the chancellor on a
Saturday morning

1:04:36.800,1:04:39.840
by Monday and then they went home and by
Monday or Tuesday

1:04:40.560,1:04:46.320
somehow they found that the Helen Wills
bequest had been sitting in the

1:04:46.320,1:04:52.160
university for decades
with millions of dollars no one ever

1:04:52.720,1:04:57.440
  -- Gunther Stent had been uh headed
committee on neurobiology, I had been

1:04:57.440,1:05:01.040
division head,

no one ever told us we didn't know to

1:05:01.040,1:05:04.240
ask;
Do you have any slush funds? that we

1:05:04.240,1:05:08.640
didn't so.
All of a sudden '95 '95-67

1:05:08.640,1:05:16.560
they had a Helen Wills
bequest which was then taken over by

1:05:16.560,1:05:21.520
Carla Shatz
the rest is history. okay well listen uh

1:05:21.520,1:05:24.080
Gerald this is this is wonderful to get
this

1:05:24.720,1:05:30.640
uh this way of bringing us uh
here at the the point at which you're

1:05:31.360,1:05:35.280
now concluding when when you went into
retirement which was a very much a

1:05:35.280,1:05:38.720
non-retirement retirement because you
you remained

1:05:38.720,1:05:42.400
very active in research you know for
many years you

1:05:42.400,1:05:47.120
would go to Rockefeller uh on an annual
basis right to do experiments

1:05:47.680,1:05:51.440
the and you've been you know involved as
much as anybody else

1:05:51.440,1:05:55.440
in the department right in in in the
division

1:05:55.440,1:05:58.800
of neurobiology and there's there's no
there's no

1:05:58.800,1:06:03.040
faculty meeting or seminar that you
don't attend and participate in

1:06:03.040,1:06:06.160
you know it's been wonderful for us all
that the point in 94

1:06:06.160,1:06:09.920
right when you retire that's that's
exactly when I

1:06:09.920,1:06:14.960
arrive and and it's because of Koshland
right who says you know come here sit

1:06:14.960,1:06:17.200
down in this chair probably the same
chair

1:06:17.200,1:06:20.640
in which he dictated to you the letter
that you had to write right the one with

1:06:20.640,1:06:22.800
the spring sticking into your tourists
right

1:06:22.800,1:06:27.040
that's where he had me sit right in
order to explain to me what neurobiology

1:06:27.040,1:06:29.600
really was
and from his point of view it was

1:06:29.600,1:06:32.720
exactly as you say he thought
he thought he was a neurobiologist

1:06:32.720,1:06:36.960
because he was studying
uh you know these bacteria and how they

1:06:36.960,1:06:40.240
sense

chemicals some of them are very close to

1:06:40.240,1:06:42.400
neurotransmitters right in their
environment

1:06:42.400,1:06:46.240
and that should be the beginning end of
what neurobiology was right

1:06:46.240,1:06:50.000
but the good thing about him and and and
the whole system was how it supported

1:06:50.640,1:06:55.040
people who were working like you in in
very different areas and that could seed

1:06:55.040,1:06:59.600
what happened next
so um I think this is great I to just at

1:06:59.600,1:07:05.200
the at the end here in conclusion
just bring us back uh way back

1:07:06.080,1:07:09.040
to something that when when you you left
Germany

1:07:09.680,1:07:13.120
right uh you brought with you your
German accent

1:07:13.760,1:07:16.640
you brought with you aspects of your
upbringing

1:07:17.200,1:07:18.560
you know like um

1:07:22.080,1:07:24.400
right yeah yes

1:07:25.440,1:07:32.080
and
yes right okay you know and and

1:07:32.080,1:07:35.920
by the way this this is uh this is just

because I did a little reading in

1:07:35.920,1:07:38.480
advance
about things that you've written before

1:07:40.160,1:07:43.200
right yes these these sit on on your
shelf

1:07:43.920,1:07:46.480
right uh but unlike me who can't read
them

1:07:47.200,1:07:50.560
uh partly because you know my german is
not very good and

1:07:51.120,1:07:55.040
and the gothic writing is makes it
impossible

1:07:55.040,1:08:01.280
uh but you you can right and you
you brought with you that

1:08:01.280,1:08:06.160
that embedded in you how to say
say something about that what what does

1:08:06.160,1:08:11.760
it mean around Goethe
yeah okay my

1:08:14.240,1:08:20.960
most interesting article I read was by
a lady by the name Atina Grossman

1:08:21.600,1:08:28.000
who dealt with people like me
and she described them as that we are

1:08:28.000,1:08:32.320
carrying
our own horizon

1:08:33.520,1:08:41.360
with us so she said people like me
I think it's a good example of what she

1:08:41.360,1:08:45.600
meant is from
grew up in Germany with a German-Jewish

1:08:45.600,1:08:49.680
household
German but also Jewish. I know Hebrew

1:08:49.680,1:08:53.360
better than most of the
American Jews and also all the

1:08:56.160,1:09:01.840
religious observances also read all
Germans can read German fluently

1:09:02.400,1:09:06.800
went to Australia, accultured to a British
colonial

1:09:08.480,1:09:14.640
environment, which has its own
dynamics not bad at all, you know

1:09:15.200,1:09:18.240
straightforward people very decent
people

1:09:18.800,1:09:19.840
are uncomplicated

1:09:22.480,1:09:30.000
good very good tertiary education,
came to America first to the midwest

1:09:30.000,1:09:34.640
with its very narrow political attitudes
and biases

1:09:35.360,1:09:39.840
and then came to Berkeley so in each of
these environments

1:09:40.480,1:09:46.880
I uh experienced and then
accepted and internalized what,

1:09:47.600,1:09:51.200
according to Grossman, what I felt was the
most

1:09:52.000,1:09:59.280
relevant thing so my mental
or cultural horizon, is is a creation

1:10:00.320,1:10:03.760
of all these various influences okay
which are

1:10:03.760,1:10:11.200
unique no one else has that same and
since i'm still an alert to this thing I

1:10:11.200,1:10:16.080
utilize them so when it comes to the
history of neuroscience

1:10:16.080,1:10:23.360
I can read von Kries in 1901
and can find that he already predicted

1:10:23.360,1:10:27.120
various things,
I can read what Helmholtz thought and so

1:10:27.120,1:10:29.840
on
in and what were the cultural

1:10:30.640,1:10:34.080
and intellectual antecedents of them
like

1:10:34.080,1:10:37.840
if someone talks to me about Goethe's
color vision I can do that okay

1:10:38.640,1:10:43.600
uh and having had to um
having good musical education or you

1:10:43.600,1:10:47.040
know I could so
uh um this is what

1:10:47.920,1:10:53.600
uh has this has done to me
or I did to it okay

1:10:54.960,1:11:00.800

I take no credit for it but it's just an
experience that and it

1:11:02.000,1:11:05.760
the great thing about Berkeley and I
have to say many positive things but

1:11:05.760,1:11:08.880
Berkeley has always been open to this
kind of thing

1:11:10.160,1:11:15.680
for 100 years ago they accepted people
that would not have been accepted in

1:11:15.680,1:11:20.720
Yale and Harvard
uh bought books that they didn't have

1:11:20.720,1:11:25.360
that time
50 years ago they did it 30 years ago

1:11:25.360,1:11:29.600
20 years ago so um all of this is part
of

1:11:29.600,1:11:33.440
uh the Berkeley environment in which i'm
still positive

1:11:33.440,1:11:36.800
over 60 years having lived in the
Berkeley hills for sixty years

1:11:38.240,1:11:41.520
well Gerald listen this is a this is a
wonderful place

1:11:41.520,1:11:45.120
to conclude uh you know I I think that
uh

1:11:45.120,1:11:49.120
this is the legacy project of a piece of
the legacy project you know I think that

1:11:49.680,1:11:56.320
what it says about Berkeley legacy
and about you and about how

1:11:56.320,1:11:59.200
Berkeley is a place that enriched by you
and you

1:12:00.000,1:12:02.640
are the perfect fit right to make
Berkeley

1:12:03.440,1:12:09.920
this intellectual uh hub right
that draws people in and uh

1:12:10.560,1:12:13.920
and and enables them to be themselves is
fantastic

1:12:13.920,1:12:17.200
so really i'm i'm really glad I could I
could do this with you

1:12:17.200,1:12:20.320
I don't my only problem with this is
that I feel like

1:12:20.320,1:12:23.680
it's very hard to live up to that legacy
but

1:12:23.680,1:12:35.840
we'll have a deal okay
thank you Gerald oh good goodbye

1:12:56.320,1:12:56.820
you