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The 1997 Nora and Edward Ryerson Lecture

May 1, 1997

Introduction

By President Hugo F. Sonnenschein

I am delighted to introduce this afternoon's Ryerson Lecture. The Ryerson Lecture was established in 1972 in honor of University benefactors Nora and Edward Ryerson, and is given annually by a distinguished member of the University of Chicago faculty.

At its core, the Ryerson Lecture is a celebration of excellence in scholarship and the high aspirations we hold for ourselves as a community of scholars. The Ryerson Lecturer is asked to use this occasion to reflect on his or her intellectual life and work. The list of previous lecturers is impressive. It includes the inaugural Ryerson Lecturer, John Hope Franklin—renowned scholar of African-American history. It includes four Nobel Laureates. Five of the last ten lecturers have been members of the National Academy of Sciences, as is today's lecturer, Eugene Parker. And of course they are much more than members of the National Academy.

Gene is a scientist and researcher of the

greatest distinction. He is acknowledged as one of the most prominent theoretical astrophysicists in the world—a leading expert in the theory of cosmic magnetic fields. His research, writing, and expertise span an extraordinary breadth of scientific knowledge, both within astrophysics and beyond—from the environment of the Earth, to studies of active regions on the surface of the Sun, to investigations of the magnetic fields of our universe and entire galaxies.

Gene first came to the University of Chicago in 1955 as a research associate, and he joined our faculty in 1957. In 1987, he was named the S. Chandrasekhar Distinguished Service Professor in the Departments of Physics and Astronomy & Astrophysics, the Enrico Fermi Institute, and the College. He continues to hold this chair as an emeritus professor. When Gene was named to the Chandrasekhar chair, he observed how pleased he was because it was Chandra's recommendation that first brought him to the University of Chicago. In addition, Gene wrote at that time, "Chandra has been a *shining* example to me throughout my career."

I suspect the selection of the word *shining* was not a casual one—given Gene's *great interest* in the Sun. Gene is probably best known predicting and naming the solar wind (in the 1950s)—the supersonic stream of electrically charged particles emitted by the Sun's corona—before its discovery by observation. The discipline of space physics has developed around the cornerstones Gene Parker has laid down. His 1979 book *Cosmical Magnetic Fields: Their Origin and Their Activity* is the standard reference on the subject.

Gene's scientific work is marked by the highest standards of originality and excellence, and, as a result, over the course of his long career he has been the recipient of many accolades and honors. He was elected to the National Academy of Sciences in 1967. He accepted the nation's highest award for scientific achievement, the National Medal of Science from President George Bush in 1989. He received the Royal Astronomical Society's highest award, the Gold Medal in 1992. In fact, today, I am delighted to announce yet another award for Gene Parker.

I hold a letter from the Astronomical Society of the Pacific in my hand dated March 28, 1997, to Dr. Riccardo Levi-Setti, Director of the Enrico Fermi Institute. It reads, "I am happy to inform you that the Board of Directors of the Astronomical Society of the Pacific at its recent meeting selected your colleague Eugene N. Parker to be the recipient of the 1997 Catherine Wolfe Bruce Gold Medal." The letter also states that an official announcement of the award will not be made public until May 1 and to keep this information confidential until then. Thus, Thursday, May 1, is a fortunate choice of date for honoring Eugene Parker and for the Ryerson Lecture. Past winners of the medal include Eddington in 1924, Hubble in 1930, and Chandra in 1952. This medal is awarded for distinguished contributions to the field of astronomy over a lifetime.

I am honored to turn this podium over to the twenty-fourth Nora and Edward Ryerson Lecturer, the S. Chandrasekhar Distinguished Service Professor Emeritus, Eugene Parker. His lecture is titled "Probing Space through Measurements and Meditations on Your Porch."

"Probing Space through Measurements and Meditations on Your Porch"

By Eugene N. Parker

For this lecture I thought it might be interesting to go back over the study of conditions in space prior to the space age. With spacecraft journeying in all directions through the solar system, we now have extensive maps of the dynamical state of interplanetary space, and we are inclined to forget that the general picture of conditions in "empty" space was worked out from ground level prior to the direct exploration of space. For the fact is that the violent weather in space is felt here at the surface of Earth, so that measurements carried out on your porch and celestial phenomena observed from your porch allow you to deduce the state of things in space. That is to say, the effects of the weather out in space are all around us if we care to notice them. It makes an interesting detective story, and the general "porch" picture of space conditions has been verified and quantified by direct studies with spacecraft. Needless to say, the direct studies in space have turned up a host of details that could not have been anticipated from the porch. But we are concerned here with establishing the broad picture of things, and for that purpose some careful observation and hard thinking on the porch do very nicely. Front porch or back porch makes little difference. Let us imagine the back porch because of its greater privacy. No need for explanations to the neighbors for our bizarre behavior, peering at magnetic needles or watching the sky for comets.

In this lecture I will emphasize the dynamical role of force-fields in space and on your porch. You have all heard of gravitational fields, magnetic fields, and electric

fields, but probably have had no particular reason to give them much thought. The gravitational field holds you down on the surface of Earth and extends outward without limit into space. We spend our lives walking around at what we might call the bottom of the gravitational field. Then there is the magnetic field. I remind you that magnetic fields latch your refrigerator door and stick messages to that same door. The magnetic field of Earth forcibly orients the hiker's compass needle, and we spend our lives walking around in it. The magnetic field penetrates freely through our bodies, and whenever we move we experience an electric field in addition to the magnetic field. You should be aware that some textbooks treat force-fields as mathematical abstractions, convenient for calculating forces between masses, electric currents, and electric charges but otherwise without physical reality. I will walk briefly through these force-fields with you to emphasize that they are as real as the seat in which you currently sit. The essential point is that we spend our lives deep within a gravitational field and a magnetic field, and we are continually subjected to electric fields. These fields are real entities even if biological evolution had no motivation to equip us to sense them directly. The magnetic field connects out into space where it meets the interplanetary gases and magnetic fields. Hence the magnetic and electric fields on your porch are influenced by the activity in space. So recognition and careful study of the force-fields extending across your porch provide crucial information on conditions in space. And an awareness of these force-

fields should be a part of everyone's environmental catechism. Magnetic and electric fields are already part of environmental health fads and phobias.

How then do these various fields in our living quarters connect us to conditions far out in space? To begin with, the gravitational field—by far the strongest of the fields—the orbiting Moon is a direct manifestation of the gravitational field at a distance, and the quantitative determination of the continual inward acceleration of the Moon was one reason for Newton's confidence in the inverse square law of gravitation. The disturbance of the gravitational field of Earth by the mass of the Moon is the principal cause of the ocean tides. That is to say, if clouds obscured the Sun and Moon, one could deduce their presence from the nature of the ocean tides. Second, the magnetic field of Earth reaches far out into space where it is blocked and buffeted by supersonic winds. The consequent shaking of the magnetic field is sometimes strong enough to create electric fields that overpower portions of the electric power grid. The most recent power blackout produced by shaking the magnetic field occurred a few years ago in Quebec. Third, the cosmic rays that penetrate our porches and our bodies and deep into the ground are affected by the magnetic and electric fields in space. So the cosmic ray variations provide us with direct evidence of the activity of those more distant fields.

For further information on the weather in space we turn our eyes upward to the night sky where, were there not so many street lights, we would see the occasional comet whose gaseous tail acts as a wind

sock. And if we were to observe an eclipse of the Sun one clear day, we would see the awesome corona extending outward around the eclipsing Moon into the surrounding dark sky. The corona is the vast million-degree outer atmosphere of the Sun.

It was through careful study and thought about these simple effects that the general character of the conditions in space was worked out. We begin, then, with the reminder that only a little more than a century ago space between the planets and stars was considered to be empty except for starlight and sunlight. It was on exactly that basis that the famous physicist Lord Kelvin proved from basic physical principles that the activity of the Sun could have no discernible effect out here at Earth, even though it was well known at the time that vigorous flaring at the Sun was invariably followed a day or two later by bright auroral displays and strong magnetic disturbances at Earth. So if contemplation of a truly empty space leads to such an absurd notion, it is clear that the contents of empty space matter a great deal. Let us see if we can put the correct picture together.

The quest for knowledge of the extent and nature of space has been pursued by people on all the continents over thousands of years with varying degrees of success. Space, as perceived from the surface of Earth, appears to us as the heavens, defined by the sky above in the daytime and by the stars at night. The enclosing nature of the heavens is expressed in the lines "And that inverted bowl they call the sky where under crawling cooped we live and die." The heavens have been subjected to the full force

of human fantasy. Accordingly, space has been populated by spirits and gods, each cultural group constructing its own pantheon and cosmology and sneering at those of everyone else. Some cultures would place the origins of themselves in the heavens. In every culture there are individuals claiming to communicate directly with the spiritual denizens of the heavens. Some cultures view the heavens as the ultimate abode of their individual immortal souls. So space has been densely populated by the human imagination.

The heavens appear at night as an inverted star-spangled bowl. The bowl rotates westward with the hours, turning about half a revolution from sunset to sunrise, so that nearly the whole starry celestial sphere can be seen on a single cloudless night. The stars, together with the Moon and Sun and the five planets visible to the naked eye, were imagined in ancient times to control the destiny of nations and kings, as well as the personal fortune and fate of the individual citizen. Comets were given special emphasis and their human implications variously declared. The general idea around the world has been that the positions and motions of the heavenly bodies form a celestial semaphore system signaling future happenings here on Earth. This view is widely accepted today. We cannot help noting that the specific interpretation of the celestial semaphore varies greatly from one culture to the next. The application to individual cases has been greatly expedited by the electronic computer. One can now choose from a variety of historical astrological systems to obtain most any desired prediction for the future, resolving the ambiguities within each system in whatever way seems most congenial.

I remind you that astronomy began as the technical arm of astrology, endeavoring to measure the motions of the planets more accurately so as to predict their future positions and the associated consequences for the human community. Earth was considered as a nonspinning spherical body around which the heavens revolved once each day. Concentric crystal spheres were imagined to carry the Moon and Sun and the five planets, and one might have concluded that space was partitioned off with sheets of glass or quartz or whatever divine crystal that might be imagined, out to the outermost sphere on which the stars were fixed. So the ancient Mediterranean world, after millennia of observations, developed a cosmology based on moderately precise (better than a degree) determination of the positions of the celestial bodies. By the time of Claudius Ptolemy (100–200 A.D.), the observed nonuniform motions of the five planets against the background stars had been reduced to epicyclic motion around a small circle whose center moved in a circle around Earth. The power of established sophistry was such that no one questioned why a planet would circle an empty point in space. It is not without interest to note that through extended record-keeping the seasonal likelihood of the greatly feared eclipse of the Sun was established.

Whatever the motivation for astronomy, the concept of Earth as a sphere surrounded by a vast space was clearly perceived by at least a few individuals in ancient times, even if not widely appreciated. To illustrate the

precision of some of the thinking on ancient back porches, note that Eratosthenes (circa 230 B.C.) calculated the size of Earth by noting that when the Sun was directly overhead (at the summer solstice) at Syrene (modern Aswan), it was about one-fiftieth of a full circle south of the zenith at Alexandria. To be more explicit, Eratosthenes noted that the Sun shone directly down a vertical well in Syrene on 21 June, when the Sun was at its northernmost position at noon. That is to say, the Sun passed across the zenith at noon in Syrene. Then he observed that in Alexandria the northernmost excursion of the Sun, on the same day of the year, failed to reach the zenith by about one-fiftieth of a full circle. It followed that Alexandria was a fiftieth of the circumference of Earth from Syrene. Hence the circumference of Earth is fifty times the Alexandria-Syrene distance. The most uncertain part of his determination of the size of Earth was in the north-south Alexandria-Syrene distance measured at the surface of Earth. Eratosthenes used the round number of 5,000 stadia for the distance without stating which stadium unit he had in mind. A modern atlas gives a value of about 510 miles. This is, then, one-fiftieth of the circumference of Earth, which turns out to be $50 \times 510 = 25,500$ miles, giving a diameter of $25,500/\pi = 8,121$ miles. The actual equatorial diameter is 7,926 miles so Eratosthenes was off by only about 200 miles or 2.5 percent if we use an accurate Alexandria-Aswan distance. The essential point is that Eratosthenes clearly understood the spherical form of Earth in the midst of a vast surrounding space.

Aristarchus of Samos only a few decades earlier anticipated Copernicus to some degree. Beginning with the realization that the Sun is more massive than Earth, he recognized that Earth should orbit around the Sun, rather than vice versa, while spinning daily about its axis. He explained the seasonal variation of the height of the Sun in the sky and the associated summer and winter temperatures by the inclination of the spin axis of Earth to the orbital plane. It is curious and not a little tragic that this understanding of the cause of summer and winter is not grasped by most college graduates today over 2,000 years later. Finally, Aristarchus understood the enormous distance to the stars, recognizing that the Sun was one of them and space is essentially infinite without clear outer bound. It is evident that Aristarchus had at least an intuitive grasp of the principle of economy in scientific theorizing, stated explicitly some 1,600 years later by William of Ockham. It is hardly surprising that Aristarchus upset his colleagues. The massive tide of Hellenistic intellectualism was running in other directions, so Aristarchus was criticized and conveniently forgotten. You see why it is expeditious to work on the back porch.

Let us carry on, then, from where Eratosthenes, Aristarchus, and Ptolemy left off. William of Ockham stated (circa 1330 A.D.) the famous dictum, shared for other scholastics, that one should make no unnecessary hypotheses. The scientific approach, which we adopt for the meditations on our porch, can then be summarized: We experiment and observe as carefully and precisely as possible. A result is accepted as hard scientific fact if and only if it is reproducible. Then in inferring general principles from

the facts we make no unnecessary hypotheses. We choose the simplest principle that covers the known facts. Reality is to be the simplest sufficient concept, whether we find it congenial to our sensibilities or not.

It is this last point that has been the greatest deterrent to scientific progress right up to the present day. For even among practicing scientists, as elsewhere, personal congeniality is often the basis for judging a new concept. Truth and reality are all too commonly defined as the consensus of our peer group. It is a curious trait of the human mind that a new simplifying concept is usually upsetting rather than pleasurable and is therefore to be brushed aside by one or more of our conditioned reflexes. We will try to keep things more dispassionate on our back porch, regardless of what is going on in the street in front.

Note that the simplest adequate concept is the only objective *a priori unique* concept, for there are infinitely many less simple concepts, all covering the known facts and among which we have only subjective criteria for choosing. Once we abandon the simplest concept there is no limit to the concepts available, and we are free to build in any superfluous principles that our feelings desire. Experience shows the remarkable fact that the physical universe is constructed along the lines of the unique simplest concept. Thus it is that, so far as one can tell, the simplest concepts allow all phenomena to be precisely represented by the mathematical solutions of the simple mathematical equations of physics, i.e., simple mathematical laws. How and why the universe is constructed in this remarkable way is a question that lies beyond our ability to explore. In scientific circles it is sometimes expressed with the statement that "God is a mathematician." It is not a notion that is popular outside scientific circles, and it is not uncommon for people to claim "miracles" in direct contradiction to the normal properties of the world. In that connection we should be aware that a proper demonstration of any violation of the basic laws of physics would merit the Nobel Prize. That is to say, any claim of a violation must not be put forth carelessly, as is so often the case.

Consider, then, what is out there in space besides the Sun and Moon, the planets, and the occasional comet. Obviously there is sunlight and starlight, already mentioned. In keeping with the emphasis on force fields, it must be appreciated that light is a form of force field, consisting of a combination of electric and magnetic fields. Light transmits energy and momentum, exerting pressure on anything that reflects or absorbs it. The fact that you can see me because of the light reflected from me and impinging on the retina of your eye demonstrates that electric and magnetic fields are not merely mathematical abstractions. You may recall the concept of interplanetary travel by solar sailing, involving propulsion by the pressure of sunlight on an extended silvery sail. The technical difficulty with unfurling the sail after being launched into orbit may yet be overcome, and sometime in the not-too-distant future such sailing may be achieved.

There are gravitational fields, of course, which in themselves possess energy. Every speck of matter and every form of energy are sources of gravitational field, which can be

thought of as a stress system distorting the space from its classical flat Euclidean form. The magnetic field of Earth makes its own minuscule contribution to the gravitational field of Earth. To be precise, the effective mass of the magnetic field above the surface of Earth is equivalent to about twenty pounds of ordinary matter—only a very small contribution to the gravitational mass of Earth. But the fact emphasizes the reality, and indeed the ponderability, of the magnetic field.

This all began in 1600 A.D., one hundred years before Newton introduced gravitational fields, when the English physicist-scientist Gilbert pointed out that Earth is a magnet and the space around Earth is filled with magnetic field. He based his assertion on the magnetic mapping of Earth carried out by the enterprising sea captains of his day. Their ships carried magnetic needles—compasses—and as a purely practical aid to navigation they recorded the horizontal direction and vertical dip angle of their magnetic needles at known geographical locations. Gilbert noted that the magnetic properties of the space around a small spherical magnet (made from a lump of magnetic iron oxide, magnetite) in his "back porch" laboratory reproduced the known form of the magnetic field at the surface of Earth. From this he realized that Earth is a magnet and the magnetic field of Earth fills the surrounding space with a geometrical form that is the same as the extended field around his laboratory magnet. The figure is copied from Gilbert's book *De Magnete* published in 1600 A.D. The figure shows the orientation of freely suspended magnetic needles at various positions in space. Nowadays we would simply draw in some of the lines along which magnetic needles are oriented, calling them *field lines*. The essential point is that Gilbert drew the first picture of the terrestrial magnetosphere. So far as Gilbert was aware, the magnetosphere extended outward into space without bound, growing ever more tenuous with distance from its source within Earth. He made the obvious suggestion that Earth is a magnet because it contains large quantities of magnetite in its interior.

We must understand that, as already noted, the magnetic field is a stress system filling the space about us and penetrating through our bodies. The field is a real presence, even if we do not sense it directly. That is to say, we do not feel, taste, smell, hear, or see magnetic fields. There is evidence that some migratory birds and certain microorganisms sense the magnetic field through ingrown grains of magnetite, but we do not. We have to pick up our own lumps of magnetite or fabricate our own magnetic needles. But the result is the same. The magnetic field of Earth orients any freely suspended magnetic needle, such as the needle that I have suspended here on a thread so that it can revolve freely to point in any direction it chooses. The magnetic field is a real physical entity (about twenty pounds total, you will recall) and this is probably the appropriate place in this presentation to elaborate on the nature of magnetic fields. That means we must also talk a little about electric fields, which are an entirely different entity, but which are intimately associated with magnetic fields.

We begin with the iron magnet that I

hold here in my hand. The space around it is under stress. The field around the magnet is easily mapped with a small compass (magnetic) needle and has the simple form shown in the figure. That is to say, the field extends out one end of the magnet and curves around to enter at the other end. The field represents a stress system around the magnet. Note that the magnetic field is a continuum, whereas I draw only a few discrete lines for the purpose of sketching the geometry of the field. Please do not get the idea that the magnetic field is itself made up of separate lines. There are no gaps in the field.

Note that the field of this magnet declines rapidly with distance from the magnet, but the field falls to zero only in the limit of large distance from the magnet. That means that the magnetic field where each of you is sitting is very slightly altered by the field of this small magnet. So as I turn this small magnet about, I am altering the magnetic field through your bodies.

I have referred to the magnetic field as a stress field. The nature of the stress is quite simple. There is tension in the direction along the field and pressure across the field with the tension and pressure holding each other in balance. So think of the field lines as taut rubber bands stretched out around the magnet in the pattern shown in the figure. The rubber bands would like to collapse in against the magnet so as to take the shortest path from one end of the magnet to the other. They are prevented from doing so by the fact that the magnetic field exerts pressure. Each rubber band repels its neighbors so that the field is inflated outward from the magnet. The pressure and the tension balance when the pattern is as you see it. This stress field is no abstraction. It would rip the magnet apart if the field were strong enough or if the magnet were composed of some relatively weak material instead of steel. In fact the physical smashing of the magnet poses a serious engineering problem when working with strong fields. In summary then, Earth has a magnetic field of this same general form. We spend our lives walking around in it. The magnetic field of Earth is not very strong, being enough to orient a magnetic needle, but not exerting any great force on the iron screw driver or letter opener or the automobile that we handle in our daily lives. On the other hand, the magnetic field of Earth is strong compared to the tenuous forces in "empty" space, so it dominates space for some considerable distance out from Earth. The space controlled by the magnetic field of Earth is called the *magnetosphere*.

The static magnetic field is always associated with electric currents somewhere. The simplest way to create a magnetic field apart from an iron magnet is to pass an electric current through a wire. The figure shows a straight wire connected to a small dry cell that drives a current through the wire. The magnetic field created by this arrangement forms circles about the wire, with the tension in the field squeezing inward on the wire. Note that another current-carrying wire placed in the magnetic field would add its own field and would experience a force through interaction of its current with the field of the first wire. It is just that force on the current that drives the many electric motors operating the appliances around the house. You can see from

the way the outer field lines enclose both currents that the tension in the field tends to pull two parallel currents together.

When the wire is wrapped around to form a closed loop, the field wraps around with it and has the form shown in the next figure. You recognize the form of the field as resembling the field of Earth, from which one infers that there is a westward-flowing electric current deep within Earth. Recall that Gilbert suggested that Earth is a magnet because it contains large quantities of magnetic iron oxide. In that case, the electric currents would be the tiny currents within the spinning electrons, some of which are aligned in the mineral magnetite to give an overall magnetization. Gilbert's magnetite hypothesis covered all the known facts at the time. It was only much later, in the nineteenth century, that it was learned from laboratory studies of permanent magnets, e.g., magnetite or steel, that the interior of Earth is too hot to retain any significant magnetism. It is pretty clear today that Earth is a magnet because of the cyclonic motions in the liquid metal core, but that does not concern our present deliberations on conditions in space.

Now if magnetic fields are associated with electric currents, i.e., moving electric charges, the electric field, in contrast, is associated directly with the electric charges themselves, both positive and negative. The electric field extends out from positive charges and across the intervening space to the negative charges, in the usual convention. Thus, for instance, there are enormously intense electric fields within the individual atom as a consequence of the negatively charged electrons circling the positively charged nucleus. The electric fields are confined mainly to the space within the atom because the total electric charge in the atom is zero. So for all the very intense electric fields within each atom in our bodies, the electric fields extending across our bodies are relatively weak. Now suppose that an electron is knocked free from the atom, leaving a positively charged ion in place of the electrically neutral atom. There is then an external electric field extending radially outward from the ion, as indicated in the diagram. The field of the ion extends to the nearby negative electric charges. A simple way to produce an electric field is to rub a plastic rod with silk, wiping off enough electrons to give a discernible net electric charge and electric field. The rod is positively charged because it has lost some negative electrons which are now on the silk where they provide a net negative charge. You are aware that opposite charges attract each other. The effect arises from the tension in the field extending from one charge to the other. Similarly, like charges repel, and the mechanism for that repulsion is the head-on confrontation of the pressure in the electric fields of the two like charges. I demonstrate this with the repulsion of the plastic meter stick. The electric field pushes across the space between the meter stick and the plastic rod. There is stress and energy in that electric field, and I emphasize that simple fact by noting that the electric field is itself a source of gravitational field because of the equivalent mass of its energy, just as with the magnetic field. As with the magnetic field, there is tension along the field lines and pressure between them so that

electric and magnetic fields often take similar forms, even though they are entirely different entities. The electric field is detected as the force exerted on an electric charge, as distinct from the magnetic field, which exerts force on magnetic needles and on electric currents.

Having emphasized that electric and magnetic fields are two entirely distinct stress systems, with entirely different origins, I now point out that if I move relative to a magnetic field, I experience an electric field even if no electric charges are present. Conversely, if there are no electric currents present, and hence no magnetic fields, nonetheless I experience a magnetic field if I move relative to an electric field. That is to say, whenever I walk about on my back porch, moving through the ambient magnetic field, I experience an electric field even while someone sitting in a chair on the porch experiences no electric field. Similarly, if I hold still but the magnetic field moves, I experience an electric field because it is only the relative motion of field and observer that matters. You can see then that, so far as you are concerned, there is, or is not, an electric field depending upon whether you happen to be moving. Whenever I turn my head, an electric field appears momentarily in my head as a consequence of the motion relative to the fixed magnetic field of Earth. The electric field is too weak to have any physiological consequences because the magnetic field in which we live is relatively weak. But if I were to move my head in the strong field of a powerful electromagnet, ten thousand times stronger than the magnetic field of Earth, the motion of my head produces a mildly acid taste in my mouth and I experience little flashes of light in my eyes, both direct consequences of the electric field produced in my head. You can imagine the exotic life of a cosmic ray particle moving with nearly the speed of light through a contracted universe filled with irregular magnetic fields. The particle experiences a rapid variation of electric fields that are as strong as the magnetic fields as a consequence of its motion. If we apply these principles to our surroundings, it is evident that, whenever the magnetic field of Earth is buffeted by the activity far out in space, the slight motion of the magnetic field creates electric fields within my motionless body.

With the foregoing properties of magnetic and electric fields in mind, let us return to Gilbert's extended geomagnetic field. By the nineteenth century, careful scrutiny of free magnetic needles brought to light the fact that the magnetic field of Earth occasionally fluctuates slightly over periods of minutes and hours. That is to say, the elastic magnetic stress field of Earth is sometimes shaken, evidently by some external force. The phenomenon is called a *magnetic storm*, and it is accompanied by enhanced aurora. Something far out in space is pushing and shoving on our geomagnetic field.

Careful study of the fluctuations in the late nineteenth century discovered that the shaking occurred a day or two after an outburst of activity on the Sun, e.g., a flare. The next figure shows a modern photograph of ionized gas and magnetic field ejected from the Sun as part of an outburst. The Sun is mostly hydrogen, so we know that the ejection of matter from the Sun

consists mainly of electrons and protons, the pieces of which the hydrogen atom is composed. Such an ejection of particles from the Sun impacts the magnetic field of Earth a day or two later, from which one readily deduces that the particles travel across the solar system at about 1,000 km/sec, i.e., 600 miles/sec, from here to San Francisco in about three seconds, and the 92 million miles from the Sun to Earth in a little more than a day.

So what happens when the stuff arrives at Earth? Electrons and protons are electrically charged particles and the magnetic field exerts no force on an electric charge. Do the electrons and protons zip through the magnetic field without effect? The answer is that they do not, because they are moving relative to the magnetic field. Hence they experience an electric field, and, as a consequence of their motion across the magnetic field, they experience a rather strong electric field, pushing sidewise on them. The electrons and protons make a tight U-turn and are thrown back out into space. It is that impact against the magnetic field that jiggles and compresses the magnetic field from time to time. The motion of the shaking geomagnetic field relative to the surface of Earth means that anything fixed on the surface experiences a weak electric field. Unfortunately such weak electric fields extend thousands of miles across the continents, so that they may add up to a hundred thousand volts over continental dimensions, occasionally knocking out part of the modern continental power grid, at great economic cost to the natives of the region. So the weather in space can hit hard. The porch light may be off for several hours.

In summary, then, the telescopic study of the activity of the Sun and the careful scrutiny of a free magnetic needle, all possible from the confines of the back porch, led to the realization over a hundred years ago that space is sometimes traversed by electrons and protons from the Sun. It was also realized that these high-speed particles, collectively referred to as *solar corpuscular radiation*, were responsible for the enhanced aurora, occurring more or less in coincidence with the shaking of the geomagnetic field.

Cosmic rays were the next player to enter the stage. They were detected indirectly around the turn of the century through their damage to the air molecules on our back porch, knocking free an occasional electron, i.e., creating an ion and a free electron. The few free electrons created in this way allowed the air to conduct electric charge so that static charges slowly leaked away from an otherwise perfectly isolated body. The charged glass rod suspended on an insulating silk thread or the metal rod of an electroscope gradually lost their charge. Part of the effect is caused by the natural radioactivity to be found on every back porch. However in 1912 Victor Hess abandoned his porch and climbed into the basket of a balloon. He ascended many thousands of feet into the air while carefully measuring the rate of leakage of his electroscope. He found that the higher he went the faster the charge leaked off, establishing that there is ionizing radiation of some sort penetrating into the atmosphere from the surrounding space. Subsequent detailed studies with balloon-borne instruments, while the investigator

wisely remained secure on the back porch, have established that cosmic rays are made up mostly of protons, the nuclei of hydrogen atoms, traveling at nearly the speed of light. Professor Marcel Schein of our University was one of the leaders in establishing this fact. The Minnesota group showed that Schein's protons are accompanied by heavier nuclei in smaller numbers. Professors Peter Meyer and Rochus Vogt of our university showed that small numbers of electrons are mixed in with the protons, and Professors Meyer and Roger Hildebrand showed that about a third of the electrons are the positively charged variety, viz., positrons. The essential point is that space is filled with cosmic rays, forming a very tenuous but extremely hot gas whose energy density and pressure are comparable to those of starlight. The individual cosmic ray particles have so much energy that their collisions with the air nuclei in the upper atmosphere send a spray of mesons, gamma rays, electrons, protons, and neutrons down through the atmosphere and into the surface of Earth. Fortunately for us, the atmosphere is sufficiently thick that the spray is greatly attenuated by the time it reaches the ground. The cosmic rays evidently originate elsewhere in the galaxy and reach us only after passing long distances through space.

Cosmic rays are important for our study of space because the intensity of cosmic rays penetrating through our back porch is observed to vary over times of an hour or more, first discovered by Scott Forbush before World War II. He pointed out the close correlation with the activity on the Sun. The variations can be understood only as a consequence of varying electric and magnetic fields in space. John Simpson recognized this connection and invented the cosmic ray neutron monitor to study cosmic ray variations in detail. I recall that I shared an office—my “back porch”—with a neutron monitor my first year here in 1955. Simpson's work showed that the variations of the cosmic rays can be understood only as a consequence of variable magnetic fields in interplanetary space. These magnetic fields are evidently manipulated by the highly variable solar corpuscular radiation to produce the observed cosmic ray variations. So besides the solar corpuscular radiation and the cosmic rays interplanetary space is filled with magnetic field.

Then on 23 February 1956 an enormous flare on the Sun produced an intense burst of solar cosmic rays whose prompt arrival at Earth indicate little or no magnetic field lying across the Sun-Earth path. The subsequent slow decline indicated magnetic fields somehow closing off not far beyond Earth so that the solar cosmic rays did not escape entirely freely. The point is that cosmic ray particles pass freely along magnetic fields, but do not move freely across them as a consequence of the electric fields they experience when they try to do so. Again John Simpson's cosmic ray detectors played a central role in analyzing the behavior of the solar cosmic rays, together with supporting observations by many other investigators. The porch was a relatively “hot” place for a few hours. In fact the cosmic rays were so intense above the atmosphere of Earth as to provide a lethal dose of radiation had anyone been in space in those years. The electronics in present day communications sat-

ellites are sometimes seriously degraded by the bombardment of intense cosmic rays from flares on the Sun.

I recall the excitement of our analysis of the observations as the large picture took shape in our minds. But the question was how and why the interplanetary magnetic field should be in such a state.

About 1950, Ludwig Biermann called attention to the well known—and generally ignored—fact that the tenuous gaseous tails of comets invariably point straight away from the Sun regardless of whether the comet is moving toward or away from the Sun or whether the comet passes over the poles of the Sun or around the equator. This anti-solar tail-pointing phenomenon was first noted by Chinese astronomers in the ninth century. The essential point is that by 1950 physics had advanced to where one could make some statements as to why the tails point away from the Sun. The standard explanation for the anti-solar comet tail was the pressure of sunlight. Biermann showed from the known properties of atoms that the pressure of sunlight on the atoms in the comet tail is entirely inadequate. He pointed out, then, that the only alternative was that the pressure of solar corpuscular radiation accomplished what sunlight could not. Now it was generally accepted at the time that occasional violent outbursts on the Sun produce bursts of intense corpuscular radiation, but little more, so Biermann's universal solar corpuscular radiation was not taken seriously. However there was really no other possibility. With close scrutiny of the moving irregularities in comet tails, Biermann could see the more vigorous anti-solar acceleration of comet tails when the Sun was active, just as he could see the weaker acceleration when the Sun was relatively quiet. He could see the anti-solar acceleration in comets located over the poles of the Sun, far from any active region, and at sunspot minimum when there were no active regions anywhere on the Sun. The implication was that the Sun emitted solar corpuscular radiation in all directions at all times. The implication of continual corpuscular radiation in all directions at all times was supported by the fact that at high latitudes there are always to be found aurorae and small magnetic fluctuations, indicating that Earth is always buffeted, if only weakly, by solar corpuscular radiation. The comet tails are the wind sock that shows that space is always filled with solar corpuscular radiation, i.e., electrons and protons moving outward at something of the order of 500 miles/sec, sometimes faster and probably sometimes slower. Leverett Davis pointed out that the pressure of the solar corpuscular radiation is sufficient to sweep the interstellar gas out of the solar system. Just how and why the Sun emitted solar corpuscular radiation was not known. Most of us entertained dark ideas about acceleration of charged particles in varying magnetic fields on the Sun, so the idea of corpuscular radiation from the quiet Sun was puzzling, to say the least.

Fortunately the scene continued to develop. In 1956 Sydney Chapman showed from simple considerations on the balance of gas pressure versus gravitational attraction that the million-degree outer atmosphere of the Sun—the corona that is so spectacular during an eclipse of the Sun—

extends far out into space, beyond the orbit of Earth. The gas density is greatly diminished at Earth, of course, but it is another contribution to our otherwise empty space.

I was young back in those days, just getting started on my professional career as a physicist. I had a position as research associate with John Simpson, so I was familiar with his conclusion that there is large-scale magnetic and particle activity in space. I was fortunate to have conversations with both Biermann and Chapman, which left me impressed with the extended static corona of the Sun, computed by Chapman, and with the universal solar corpuscular radiation, inferred by Biermann. Both the static corona and the corpuscular radiation evidently filled interplanetary space. However, it soon occurred to me that Biermann and Chapman were mutually exclusive, because a stream of electrons and protons cannot pass freely through a static corona of electrons and protons. There is a strong electrostatic interaction between the charged particles of the moving and the stationary gas, exciting what are called plasma oscillations. This locks the two together. So the corpuscular radiation could not possibly penetrate through the extended static corona. Yet neither could be rejected. The reasonings that led to the corpuscular radiation and to the static corona were inescapable. Then it occurred to me that reconciliation was possible if Biermann and Chapman were talking about the same thing, viz., a nearly static million-degree corona near the Sun that somehow becomes an atmosphere expanding outward at 500 miles per second at large distance. I wrote down the simple equation for the balance of gravity and gas pressure, repeating Chapman's earlier work. I soon found that Chapman's static corona, with its million-degree temperature diminishing only slowly outward, exerted an outward gas pressure that did not decline to zero at large distance from the Sun. Hence, it could be truly static only if the solar system were enclosed in a rigid box. One of the crystal spheres imagined in antiquity would have done very nicely. Unfortunately enclosing crystal spheres had vanished with the ancient world. So if the corona could not be confined in a static form, I needed to include the possibility of an outward acceleration in the balance between gravity and gas pressure. The equation was still quite simple, although it had some novel features. The mathematics was quickly accomplished. The requirement was a mathematical solution that started at the Sun with the observed nearly static corona strongly bound by gravity. The pressure of the gas must then fall to zero at very large distance from the Sun where the solar gas meets the relatively empty interstellar space. I found that there was one and only one such mathematical solution for an atmosphere with an extended million-degree temperature. That solution exhibited the remarkable property that while the gas was essentially static near the Sun, tied down by the gravitational field, there was a very small outward motion, accelerating gently with increasing distance until it reached velocities of hundreds of miles per second by the time it was well on its way to Earth. This outflow was supersonic beyond distances of a few solar radii, and I called it the *solar wind* to emphasize its simple hydrodynamic

origin. The solar wind was the solar corpuscular radiation that blew away the comet tails, buffeted the magnetic field of Earth, and controlled the magnetic fields in space. The solar wind arises from the simple expansion of the solar corona whose extended temperature prevents it from being completely contained by the powerful gravitational field of the Sun. It followed at once that any weak magnetic fields near the Sun are stretched out radially from the Sun by the outward-flowing gas. The magnetic field is carried in the wind out through the solar system, wrapped into a spiral pattern beyond the orbit of Earth as a consequence of the rotation of the Sun. I had both Biermann and Chapman in one stroke, and I had the magnetic configuration in space indicated by Simpson's studies of the solar cosmic rays emitted on 23 February 1956. Fortunately Chandrasekhar was editor of the *Astrophysical Journal*, so I was able to publish these results over the stern rejection by the two referees, both authorities on the subject, Chandra informed me. Curiously, Sydney Chapman, who had contributed an essential part of the concept, never accepted the hydrodynamic solar wind even after its existence and supersonic properties were verified by direct measurements in space.

The solar wind blows out through the solar system, sweeping all before it until it becomes so spread out and tenuous as to be stopped by the tenuous gas and magnetic field in interstellar space. Simple calculation suggested that this would occur somewhere in the vicinity of one or two hundred times the Sun-Earth distance, i.e., at least two or three times farther than Neptune or Pluto, essentially duplicating Davis's earlier estimate for the intermittent solar corpuscular radiation. The ideal spiral magnetic field, complicated by many fluctuations in the turbulent wind, sweeps back the cosmic rays so as to reduce their intensity within the solar system in response to the level of solar activity. The more active the Sun, the less intense the cosmic rays reaching Earth. The occasional blast wave from a large outburst at the Sun provides the abrupt local reductions in the cosmic ray intensity discovered first by Forbush, and the general fluctuating state of the solar wind represents the interplanetary magnetic activity that Simpson inferred from the ongoing fluctuations in the cosmic ray intensity on his back porch. The same fluctuations in the solar wind shake the magnetic field of Earth, gently swinging the compass needle suspended on our porch and occasionally not-so-gently causing the lights to go out. The essential point was that at last we could draw a picture of what was happening out in space, and that picture extended far out beyond the planets of the solar system to meet the interstellar wind. The extended region is now called the *heliosphere*, and we understand that the whole thing is created by the continuing expansion of the corona of the Sun.

A few years after this work was carried out, the space age got into full swing. The general picture developed from the back porch was verified and quantified, for it must be understood that the precise strength of the gusty solar wind cannot be deduced from the approximate million-degree estimate of the coronal temperature. It is observed that the density of the solar wind at

the orbit of Earth varies between about two and twenty atoms per cubic centimeter, depending upon a variety of things at the Sun. Thus, the solar wind pushes in the sunward side of the magnetic field of Earth to distances that vary in the vicinity of about ten Earth's radii, while catching up bundles of the magnetic field and stretching them out behind Earth to form a long comet-like magnetic tail.

The mapping of the varied conditions in space through the solar system is not fully complete to this day. The Ulysses mission over the poles of the Sun has made its first pass, at a time of minimum solar activity, and NASA has a commitment to follow the spacecraft over the poles again in about four more years when the Sun is active. Then it is to be hoped that the Voyager spacecraft will survive enough more years to find the distant termination of the solar wind.

Now the cause of the million-degree temperature of the corona, that sets the whole operation in motion, has yet to be identified. Then there is the varying brightness of the Sun and its effects on terrestrial climate, about which I have said nothing. There is the question of precisely how the Sun goes about generating the magnetic fields responsible for its activity. And the question of why those magnetic fields appear at the surface of the Sun in an intensely fibril state, rather than as a continuum as we

find them everywhere else. Precisely how is it that these magnetic fields produce the immense eruptions of gas and field that buffet Earth in the outward passage? Then there is the question of the low neutrino emission from the Sun. So there is plenty left to do. I do not want to leave you with the idea that there are no mysteries remaining. Rather my goal is to give you an awareness of the force fields in which we live and work, as well as the intimate connection of those force fields to the activity out in space.

Eugene N. Parker is the S. Chandrasekhar Distinguished Service Professor Emeritus in the Departments of Physics and Astronomy & Astrophysics, the Enrico Fermi Institute, and the College.

The Nora and Edward Ryerson Lectures

The Nora and Edward Ryerson Lectures were established by the Trustees of the University in December 1972. They are intended to give a member of the faculty the opportunity each year to lecture to an audience from the entire University on a significant aspect of his or her research or study. The President of the University appoints the lecturer on the recommendation of a faculty committee, which solicits individual nominations from each member of the faculty

during the Winter Quarter preceding the academic year for which the appointment is made.

Previous Ryerson Lecturers

- 1973–74 John Hope Franklin, “The Historian and Public Policy”
- 1974–75 Subrahmanyan Chandrasekhar, “Shakespeare, Newton, and Beethoven: Patterns of Creativity”
- 1975–76 Philip B. Kurland, “The Private I: Some Reflections on Privacy and the Constitution”
- 1976–77 Robert E. Streeter, “WASPs and Other Endangered Species”
- 1977–78 Albert Dorfman, M.D., “Answers without Questions and Questions without Answers”
- 1978–79 Stephen Toulmin, “The Inwardness of Mental Life”
- 1979–80 Erica Reiner, “Thirty Pieces of Silver”
- 1980–81 James M. Gustafson, “Say Something Theological!”
- 1981–82 Saunders Mac Lane, “Proof, Truth, and Confusion”
- 1982–83 George J. Stigler, “*Laissez faire l'état*”
- 1983–84 Karl J. Weintraub, “. . . with a long sense of time . . .”
- 1984–85 James S. Coleman, “Schools, Families, and Children”

- 1985–86 John A. Simpson, “To Explore and Discover”
- 1986–87 Wayne C. Booth, “The Idea of a University as Seen by a Rhetorician”
- 1987–88 Janet D. Rowley, “Finding Order in Chaos”
- 1988–89 Gary S. Becker, “Human Capital Revisited”
- 1989–90 James W. Cronin, “What Does a High-Energy Physicist Really Do?”
- 1990–91 Stuart M. Tave, “Words, Universities, and Other Odd Mixtures”
- 1991–92 Marshall Sahlins, “Goodbye to Tristes Tropes: Ethnography in the Context of Modern World History”
- 1992–93 Philip Gossett, “Knowing the Score: Italian Opera as Work and Play”
- 1993–94 William Julius Wilson, “Crisis and Challenge: Race and the New Urban Poverty”
- 1994–95 Wendy Doniger, “Myths and Methods in the Dark”
- 1995–96 Cass R. Sunstein, “Constitutional Myth-Making: Lessons from the *Dred Scott* Case”

Report of the Panel on Sexual Harassment

December 10, 1996

The Policy and Procedures concerning Sexual Harassment (adopted by the Council of the University Senate, May 8, 1990) require that an annual report be made to the council (1) describing the University's program to prevent sexual harassment and (2) reviewing the incidents brought to the attention of the Sexual Harassment Complaint Advisors or the Panel on Sexual Harassment. This is the report for the year 1995-96.

Prevention and Education

The Sexual Harassment Complaint Advisors made eighteen presentations on the subject of sexual harassment. Of the eighteen presentations, one was to a group of faculty, two were to groups with a mixture of faculty and students, thirteen were to groups of students, and two were to groups of student services administrators. While interest in this topic continues and many orientation programs for entering graduate students, tutors, and teaching assistants have established a permanent place in their annual schedule for a presentation from the Complaint Advisors, it has proven difficult to reach faculty and academic staff effectively on this topic except through the pamphlet distribution. The Complaint Advisors invite suggestions about how better to reach this important segment of the University community.

After six years of successful operation, a sizable group of individuals who have completed a term as Complaint Advisors exists, translating into additional presentations, primarily to students, courtesy of these veterans. One goal of rotating individuals through a two-year appointment as a Complaint Advisor is to develop expertise and awareness among a growing number of individuals who will continue to benefit the University community long after the two-year term has expired.

Two years ago, the Complaint Advisors noticed an increase in the number of matters taking place through electronic means. In response, one of the new Complaint Advisors brings considerable technical expertise

to the group and has been extremely helpful in addressing computer-related problems.

As in past years, the pamphlet, *Sexual Harassment: What We Can Do*, revised in 1995, was distributed in the fall to all students and faculty with a memo from the Provost. (This process has already been repeated for 1996.)

A couple of student groups contacted the Complaint Advisors about confusion they fear a student may experience in (1) identifying a particular problem as harassment, sexual harassment, assault, or sexual assault and (2) determining which University resources are appropriate for dealing with particular problems. Students have been advised that area Deans of Students serve as general, all-purpose resources and can refer a student, if necessary, to a specialized resource person. The student groups have continued to work with the central Dean of Students Office to clarify policies and procedures and to help ensure smooth referrals.

Monthly meetings remain central to the Complaint Advisors' efforts. By sharing strategies that have helped resolve problematic situations, they benefit from each other's experiences. Again this year, invited speakers from the Office of Legal Counsel and the Student Counseling and Resource Service shared their perspectives and expertise with the Complaint Advisors. Complaint Advisors also viewed and discussed a United Educators training videotape of three case studies of campus sexual harassment incidents.

Quarterly round table discussion with representatives of the various campus offices that work on and around the subject of sexual harassment continues to provide a valuable forum in which to share ideas, promote collaborative projects, and eliminate duplication of efforts. These offices include the Sexual Violence Prevention Resource Center, the Student Counseling and Resource Service, the Peer Health Educators, the College Orientation Office, the Dean of Students Office—which coordinates the Sexual Assault Dean-on-Call Program for students—and the Housing Office.

Formal and Informal "Cases"

Formal

No internal formal complaints against faculty members were brought before the Sexual Harassment Panel nor were any internal formal complaints against staff members or students brought forward to their respective formal investigatory and disciplinary committees. Two complainants made official sexual harassment complaints to the U.S. Department of Education's Office for Civil Rights. The federal government promptly investigated both matters, found no merit in any of the claims, and dismissed the charges. One complaint involved allegations against a member of the academic staff; the other involved allegations against several faculty members.

Informal

Sexual Harassment Complaints about Faculty and Other Academic Employees. A female staff member complained that a male member of the academic staff made unwanted and inappropriate sexual advances towards her. The department chair and administrator promptly investigated the matter and determined that the allegations were accurate. The individual was promptly reprimanded in writing and given no salary increase for the following year.

Another female staff member sought advice because her faculty supervisor had made sexually directed remarks on several occasions. She decided to speak to the faculty member herself, reporting back that the faculty member had apologized for his misbehavior and that a cordial and productive working relationship had resumed.

A female graduate student reported that a member of the academic staff who had made sexual advances during the time she was his student had retaliated against her subsequently when he believed she had reported his misconduct to the department. An investigation solidly confirmed what the student reported. A letter of reprimand and warning was sent to the academic staff member and his appointment, shortly due to expire, was not renewed as a result.

Another student inquired on behalf of a female graduate student friend whose dissertation advisor was reluctant to disengage from their previously consensual relationship. Although she was asked, the inquiring student did not wish to disclose the names of the individuals involved. She was urged to encourage her friend to talk with one of the Complaint Advisors and to remind her friend that she should not let the faculty member pressure her into continuing a relationship that she did not wish to continue. The status of this situation remains unknown.

Questions about Related Matters. Students, faculty, and staff consulted with Complaint Advisors on another sixteen matters. Typically, advice rather than intervention was sought and provided, helping the individual to bring the problem into focus and to a successful conclusion. About one-third of these matters involved a student concerned about the conduct of a peer, primarily regarding ambiguous, possibly sexual, remarks. Another four individuals sought advice on how to deal with troubling situations with people not affiliated with the University, ranging from inappropriate electronic mail transmissions to odd telephone calls. No patterns characterized the remaining matters, which included such varied concerns as a female staff member's perception of being excluded from departmental business, a female student's report that a faculty member was allegedly viewing pornography in his office during his office hours, and a student's concern that her employer's conservative dress requirements were too restrictive.

Members of the Panel on Sexual Harassment

Jeanne Marsh, *Chair*

Charles Cohen

Kathleen Conzen

James Marquardt, Student Ombudsperson,
ex officio

Ingrid Gould, Assistant Provost, *ex officio*

Report of the Student Ombudsperson for the Spring Quarter 1996

By Marc Jonathan Blitz

The primary job of the Ombudsperson is to help students overcome barriers which stand between them and a fair solution to their problems. Sometimes these barriers consist only in a student's lack of knowledge about the University's procedures for resolving conflicts and complaints: The student simply may not know how to appeal a library fine, raise questions about a hospital bill, or deal with another concern about student life. In situations like these, the Ombudsperson's Office serves primarily as a referral center: We tell students where they can turn for help and advice.

However, at times, the hurdles which a student faces are more difficult to overcome. At times, students go to the appropriate office or authority but find their questions are answered not with helpful explanations, but with silence, evasiveness, or a request that the student drop his or her complaint. More commonly, students find that administrators or instructors *are* genuinely interested in helping them, but that their requests (while deserving of sympathy) conflict with the legitimate interests of other students—or with the interests of the University community. For example, a student might justifiably claim that he or she has been misinformed about the academic requirements of the College, yet be told by administrators that the College cannot waive the academic requirement in question without sacrificing its standards.

Whether the obstacle seems to be an unfair administrative action or an irreconcilable conflict between legitimate interests, the Ombudsperson's Office can help students overcome such obstacles by acting as a mediator, an impartial investigator, and a creative problem-solver. And apart from helping to solve difficult problems *after* they arise, this office is also charged with a preventive task: it is asked to publish regular reports describing some of the problems it has encountered—in part, so that University members can take precautions to avoid similar problems.

I and last year's Assistant Ombudsperson, Abby Markle, have already mentioned some typical problems in two official reports and a series of short newspaper columns. In this report, I would like to add a few thoughts about the 1995–96 year.¹ More specifically, I wish to briefly discuss two kinds of problems encountered by some of the students who came to us. First, some students complained that they were not given explanations for poor grades or for other academic decisions which had an impact on their careers. Second, some students found themselves confused by complex or obscure policies or procedures regarding academic matters and disciplinary issues. In illustrating these problems, I will alter some of the details in my accounts in order to protect the confidentiality of the students I write about.

Before I turn to each of these themes, I should first note that, for those who are interested, there are also other sources of information about the role of the Ombudsperson's Office and about the kinds of complaints that students have brought to it. This year's Ombudsperson, Jim Marquardt, and the Assistant Ombudsperson, Claudia Flores, are available to talk with students in the Reynolds Club, Room 8, or at (773) 702-8422 and can

answer e-mail messages addressed to ombudsperson@uchicago.edu. One can also learn more about the office from its World Wide Web page (<http://www.uchicago.edu/uoc/cc.student.html>) and from previous reports published by this office in the *University Record*, available in Regenstein Library.

Unexplained (or Poorly Explained) Academic Decisions: Grades and Termination from Ph.D. Programs

As has been true in past years, many students came to the Ombudsperson's Office to complain about grades or academic decisions. This office is not, of course, empowered to evaluate student papers or exams. In fact, neither this office nor any other administrative office has the power to overrule the academic decisions of an instructor or a department: In all but the most unusual cases, an instructor's judgment regarding a course or an exam grade is final.

However, even when an instructor has made a final decision about a grade or an academic matter, such a final decision will not necessarily resolve the matter at hand. Many students justifiably expect more than authoritative judgments about their academic performance. They expect these judgments to be accompanied by a statement of reasons, and they expect these reasons to give them an understanding of what it is about their work that makes it deserve a particular grade.

It is my impression that most students who want explanations for their grades are able to get them either in written comments or in their instructors' office hours. But in a few cases brought to our attention, instructors either refused to provide the reasons for a B-, a C, or a D or persisted in addressing a student's queries by begging the question (e.g., by explaining a D only by insisting that the student did "D-quality work"). One instructor apparently refused to return a student's exam or make available any comments about the grade. Another instructor had lost a student's paper and the comments written on the paper, but insisted that the reasoning behind the grade had been justified and that a regrade was therefore unnecessary.

In some of these cases, instructors who refused to justify their grade *did* attempt to justify their refusal to rethink the grade. In some cases, instructors apparently wanted a sense of closure: they did not want to open up the possibility that they would engage in a never-ending debate about the validity of a student's grade (and perhaps also of other students' grades). One instructor, for example, acknowledged to a student that a regrade might be merited, but argued that she did not have the time to conduct an elaborate appeals process. In another case, a student was told by her instructor that it was the instructor's policy not to discuss or clarify exam grades after they had been given. The student was left to try to interpret a few puzzling sentences scattered in the margins of the exam and to try to figure out what about her exam earned it a C.

Of course, faculty do not always have the time to answer *every* question a student might have about a grade, and if instructors felt obligated to do so, they might not have any time left for research or for other teaching duties. But while it is unreasonable to ask instructors to engage in an endless de-

bate about the fairness of a grade, it is also unreasonable to expect students to be satisfied with a vague and cryptic response to their work, one which does little to educate them about how their work is flawed and might be improved. So, while students sometimes have to settle for less than a rigorous proof of the fairness of their grade, they are justified in expecting at least a brief and thoughtful discussion of it—one which addresses their central questions about why they received the grade they did and which tells them how they might do better in the future.

Not all complaints about academic decisions were about grades. Some graduate students came to us to complain not about an instructor's reaction to a single course or exam, but about their department's reaction to their work as a whole. In fact, among the most worried students who came to our office were those who had just been asked to leave their Ph.D. programs. In most of these cases, students told us they had received some explanation for why their work fell short of departmental standards, but they said that this explanation often seemed evasive or manifestly at odds with the facts. One graduate student, for example, said he was told that there was a unanimous sentiment within his department that his work did not meet the department's standards. But one professor in this supposedly unanimous group had regularly praised his work and given him top grades. Another student was asked to leave her program because her dissertation project was fundamentally flawed. Yet the dissertation project had already been evaluated and approved by the student's committee.

I am not sure whether these students deserved the chance to continue in their programs, but I think it is clear that they deserved a good explanation for decisions about the quality of their work. In an institution known for its uncompromising commitment to intellectual life, it is only natural for students to expect that teachers and academic departments will respond to questions not only with authoritative pronouncements, but with reasoned arguments. As I noted earlier, it is my impression that this norm is accepted and practiced by most faculty members at this University, and it is my hope that it will also be urged upon the few who (for whatever reason) feel comfortable telling students little or nothing about the reasons for a particular grade or academic decision.

Complaints about Confusing Procedures

Some students complained that that they were penalized for failing to understand complex or obscure academic procedures and policies which were understood by few students. While these procedures may have seemed familiar and natural to some of the staff members who administered them, they were surprising and counterintuitive to the students who had to use them.

In one case I wrote about in the Autumn Quarter Report, for example, a student learned—to her dismay—that she would be forced to drop a required language class because of a poorly-publicized new policy regarding language exams. In a case we worked on in the Winter Quarter, a student was told she would have to postpone her

graduation because of an unwritten rule barring her from transferring certain credits from another college. In both of these cases, we found administrators who were able to rescue the students from their respective predicaments.

Another procedural issue, which was brought to our attention during the Spring Quarter, was the difficulty which some College students encountered in trying to reschedule their biology labs. We were told by a number of students that they attempted to sign up for a biology lab well in advance of the day on which it was to take place and that they were initially guaranteed that they would have no problem gaining a place in their chosen lab. They assumed that the remaining labs were assigned on a "first-come, first-served" basis and that they had signed up early enough to secure a space in their desired lab. As it turned out, the scheduling system was not actually a "first-come, first-served" system, and the students ended being displaced by other students who signed up after them, but signed up on a list which had greater authority than the one on which they had put their names: hence, the relevant consideration ended up being not merely *when* one signs up, but *how* (and where) one signs up.

The lab director showed flexibility in dealing with these cases and ultimately managed to find new lab spaces for the students who were left with no lab to take. Yet it would be helpful if instructors and administrators could find ways to avoid using procedures which (like the one above) invite a great deal of confusion and are likely to make students feel that they have been treated unfairly.

Another confusing situation described to us by students also deserves serious attention. Some students suspected of misconduct complained to us that certain administrators seemed to abruptly switch roles in the course of the disciplinary process. Such administrators, said the students, first presented themselves as information and advice-providers and then, without warning, adopted the role of an unyielding interrogator and dispenser of punishment. This problem is not an easy one to address: Many University officials play more than one role in the University and a change of roles can understandably confuse and worry students. Indeed, a similar confusion can even arise in the Ombudsperson's Office: The Ombudsperson often first acts as a guide to the complexities of University policy and procedures and (after being asked by the student to intervene) takes on the role of an impartial investigator who may or may not ultimately agree with the student's claim.

While such confusion is hard to eliminate, it needs to be squarely addressed, because when students remain confused about administrators' roles, their confusion can significantly undermine their confidence in the University's institutions. The University understandably insists upon "an obligation of candor on the part of any student who is involved in a disciplinary proceeding,"² and it is likewise important for administrators and faculty members to show candor in dealing with students and to do their best to avoid even unintentionally misleading a student about how the disciplinary process will unfold. In the Ombudsperson's Office, we try to avoid

similar confusion in part by distinguishing carefully between our role as advice-giver and our role as investigator, and by taking on the latter of these two roles only when a student explicitly requests that we do so (and we agree to do so).³ Many other University offices cannot adopt the same approach because they cannot give to a student accused of misconduct a veto over the University's decision to investigate and take disciplinary action. However, the University might try to establish a clearer division of labor between those who provide guidance to students involved in disciplinary procedures and those who engage in fact-finding or judgment. Where this is not feasible, administrators should take time to educate students before a disciplinary hearing about how the disciplinary process will work and to warn them that some officials may act both as advice-providers and judges. They might also let students know about confidential sources of information and advice which are independent of all or most

administrative structures (e.g., the Ombudsperson's Office or Niteline).

A Note about the Ombudsperson's Role at the University

Before ending this report, I want to say a few more words about the role of the Ombudsperson at the University. As I noted in an earlier report, many people (both students and administrators) assume that the Ombudsperson acts as a kind of unofficial appeals judge whose job it is to allocate blame for institutional failings. While it is necessarily a part of this office's mission to hold University authorities accountable for their decisions, the major function of this office is not to allocate blame, but to try to assure that students are treated fairly and in ways consistent with the University's fundamental norms. As was noted by John Moscow, the first Ombudsperson at the University, the Ombudsperson's role should not be that of an "institutional boogiemán," but rather that of a "trouble-shooter" and

"walking solution to everyone's problems."⁴ In most cases, he or she should offer criticisms or recommendations not as harsh reprimands, but as thoughts and proposals about how to improve student life at the University—and especially about how to address aspects of student life which give rise to confusion or concerns about unfair treatment.

It was heartening to see that many administrative offices this past year responded thoughtfully and positively to such proposals and that most of the administrators with whom we had contact provided thorough answers to our questions and concerns. I am grateful to such administrators for helping our office to serve its mission at the University, and I am especially grateful to the other members of the 1995–96 Ombudsperson's Office—the Assistant Ombudsperson, Abby Markle, and the Office Secretary, Yvette Courtade—for using their considerable talents and energies to make the office an effective troubleshooting center and advo-

cate for fairness.

Notes

1. I would also like to make available complaint statistics for the 1996 Spring Quarter and for the entire 1995–96 year. They can be found at the end of this report.

2. *The University of Chicago Student Information Manual 1996–97*, p. 82.

3. I should note that the Ombudsperson's Office plays virtually no role in formal disciplinary proceedings. Neither the Ombudsperson nor his/her Assistant ever serve on disciplinary committees called to hear cases on possible student misconduct (at least not during the year they work in the Ombudsperson's Office). The Ombudsperson's only official contact with disciplinary proceedings is (1) as a non-voting member of the panel that hears cases of faculty members accused of sexual harassment and (2) as the official charged with randomly drawing the names of Resident Heads who will serve on the House Disciplinary committees.

4. Final Report of the Student Ombudsperson for 1968–69, *The University of Chicago Record*, Vol. 3, No. 8, p. 1.

Marc Jonathan Blitz was the Student Ombudsperson for 1995–96.

Statistics

Spring Quarter 1996

	Action	Discussion	Total
Academic Affairs	13	21	34
Admissions	2	0	2
Grade Appeals	4	11	15
Policy Inquiries	5	5	10
Other	2	5	7
Student Affairs	6	5	11
Athletics	2	0	2
Hospitals	1	1	2
Housing and Commons	2	2	4
Student Activities	1	1	2
Student Employment	0	1	1
Other	0	0	0
Administrative Affairs	6	5	11
Bursar	1	1	2
Discipline	1	0	1
Facilities and Security	0	1	1
Financial Aid	1	2	3
Legal Problems	0	1	1
Library	2	0	2
Registrar	1	0	1
Other	0	0	0
Sexual Harassment	0	0	0
Discrimination	0	1	1
Miscellaneous	2	0	2
Total Cases	27	32	59

1995–1996 Academic Year

	Action	Discussion	Total
Academic Affairs	37	38	75
Admissions	2	0	2
Grade Appeals	11	18	29
Policy Inquiries	17	11	28
Other	7	9	16
Student Affairs	35	21	56
Athletics	6	2	8
Hospitals	7	3	10
Housing and Commons	12	9	21
Student Activities	5	3	8
Student Employment	3	4	7
Other	2	0	2
Administrative Affairs	37	16	53
Bursar	5	5	10
Discipline	4	0	4
Facilities and Security	3	4	7
Financial Aid	6	3	9
Legal Problems	1	1	2
Library	10	1	11
Registrar	7	1	8
Other	1	1	2
Sexual Harassment	1	4	5
Discrimination	0	2	2
Miscellaneous	5	2	7
Total Cases	115	83	198

The 445th Convocation

Address: "The Production of Human Capital at Universities"

By Gary S. Becker

I am glad to be here and to have the opportunity to address you on this important occasion.

Two Trends that Affect Universities and the University of Chicago in Particular

The University of Chicago and other universities in the United States and elsewhere are being greatly affected by two major trends that should continue into the next century.

Rising Demand for More Skilled Workers

One development is the increasing emphasis placed in modern economies on the command of skills, knowledge, and information, to wit, on investments in human capital, which involves the acquisition of knowledge and information by people. In the United States this has caused sharply higher earnings of college graduates compared to high school graduates and others with less knowledge and fewer skills. In other countries, such as in Western Europe, these earnings differences have not risen by so much, but the unemployment of young and less skilled workers has exploded upwards.

To take advantage of higher economic benefits from university education, the fraction of persons who attend universities has risen sharply. For example, in the United States, the fraction of young men with 12+ years of schooling increased from 37 percent in 1980 to 45 percent in 1993.

Incidentally, this shows why it has not been possible to predict college enrollments accurately. These do not depend only on demographic changes in the number of young persons—as many enrollment projections usually assume—but also on decisions about finishing high school and on continuing to college. These decisions are often affected by changes in the economic and social environment.

The propensity of young women to seek higher education grew even more rapidly because of the increase in the fraction of women in the labor force and the greater demand by employers for skilled women. In the United States, young women are now more likely than young men to attend college: 51 percent of young women had 12+ years of schooling in 1993 compared to only 37 percent in 1980.

Globalization of Higher Education

The second significant trend has been the move toward one world and *globalization* of economic and cultural activities. The international markets for capital and investments are well known, but globalization is also becoming a reality in higher education. Students from many countries now choose where to go on a world basis; they decide where they can get the most effective education. U.S. higher education and our economy have benefited enormously from this, as many students have chosen to come to this country, especially for graduate study, but increasingly also for undergraduate education. Many also stay to work after they finish their studies.

However, competition to United States' universities is becoming more intensive because many universities elsewhere are starting to copy the United States' approach. As a result, they are getting stronger and are

beginning to compete more effectively for the top students and faculty from their countries and even elsewhere: examples are found in France, Spain, Mexico, Israel, Sweden, Chile, and Hong Kong.

The Prospects of the University of Chicago

What are the prospects of this university in the face of these two trends: increasing numbers going on for higher education, yet greater world competition for students and faculty? United States' universities have so far benefited from these two trends because overall it is the best system of higher education in the world; the evidence for this is the bottom line: many foreign students come here, few American students go abroad. In effect, the United States is a major "exporter" of higher education.

I believe, and this shows my training as an economist, that the primary factor behind the United States' superiority is the enormous *competition* for students and faculty among hundreds and even thousands of colleges and universities. These include private and public institutions, large and small ones, and secular and denominational ones.

Competition usually is good because it forces individuals and organizations to perform better, and encourages the expansion, in influence and attractiveness, of the more innovative organizations. Of course, it is hard for administrators and faculty at Chicago (or elsewhere) to like strong competition when Harvard, Princeton, Stanford, or whoever is trying to pick off your top colleagues and compete for the best students. That is why universities often join together to *collude* in going after students, athletes, and sometimes faculty. What Adam Smith said about businessmen applies to university administrators: "People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices."

But we and other institutions in the United States are much better *because* of that competition. Indeed, the main defect of higher education in most countries is the weak competition among their universities. As a result, faculties and administrators sometimes view their institutions as "country clubs" that show preference for congenial, undisruptive, well-mannered faculty and students. In the competitive environment of the United States, however, a research university declines rapidly if it stresses these country-club types of traits and does not go after the best, even when they are ill-mannered, boorish, opinionated, and critical of colleagues.

Let me now apply this discussion of the increased demand for human capital and globalization of higher education to the prospects of the University of Chicago. This university faces two sizable obstacles as it tries to continue to improve its eminence in the face of these trends:

1. Chicago is a private university that is under-endowed relative to Stanford, Harvard, Princeton, Berkeley, and other competitors.

2. We are located in the Midwest, whereas many students and faculty, both American and foreign, believe most of the action in the United States is on either coast.

But Chicago has many other advantages, and has also turned these apparent disadvantages in its favor. Being under-endowed has forced Chicago to work harder and become more efficient; it is the *Avis* of top universities. I am not saying to this audience that we don't need more funds—Hugo would either kill me or cut my salary if I said that. Of course, Chicago does need more, since there is a saying in boxing: the good big man usually beats the good small man. In university performance, this implies that it gets harder and harder to offset growing funding gaps. This is why the success of the recently concluded fund-raising drive is so important.

But I do believe Chicago's under-endowment has forced it to be leaner—I hope not meaner—than Harvard, Yale, or the others. If we maintain that efficiency, greater funds can be put to excellent use, better than at other institutions. In economists' jargon, the rate of return on additional endowment funds to the University of Chicago is unusually high.

Being in the Midwest, away from Washington, New York, and Los Angeles, has many advantages too, as well as some disadvantages. The University of Chicago is less likely to follow intellectual fads such as trendy views like political correctness. Chicago has pursued independent, often highly innovative and controversial, ideas. As a result, Chicago has had many "schools of thought" that have fought the dominant paradigms in their fields.

Of course, you know all about the Chicago School of Economics and its collection of Nobel Prizes. But you may not know that most of these were ridiculed by professional economists when they first developed. There are also other highly distinguished "schools," including the Chicago School of Urban Sociology, the Chicago School of Literary Criticism, the Chicago School of Law and Economics, the Chicago School of Biology, and others as well.

At the University of Chicago ideas are taken seriously, and open discussion of ideas is often blunt and fierce. Statements are not accepted simply because they are made by a distinguished faculty member who has won many prizes. Authorities are to be heard and questioned, not slavishly followed. They have to justify what they claim with argument and proof, not assertion or reputation. As a result, the University of Chicago is not an attractive environment for faculty who want to retire intellectually—the younger faculty and the students are unmerciful, and that is the way it should be.

This is precisely what I love about this university and why I consider the University of Chicago the intellectually most satisfying university in the world. It is also why I feel Chicago's future is bright in the next century. The competition is hard, and world competition among universities is getting harder.

But with the support of friends of the University and the continuing commitment of the excellent faculty, students, and administration, I believe the University of Chicago is well poised to meet this stiffer competition. It will prosper along with the growing importance in the modern world of information, knowledge, and scholarship.

Gary S. Becker is University Professor in the Departments of Economics and Sociology.

Prologue

Introduction

By Jason Davis

Good evening. My name is Jason Davis, and I am a member of the University of Chicago Class of 2000. The University of Chicago was the only place I applied to because I wanted to be a part of a community that shared my interest and wonder in the world, as well as my desire to make it better. I've been here five weeks now, and I have already sensed the special atmosphere permeating the campus. *Everybody* is involved in something exciting, from first-year students discussing the *Iliad* in the halls to my physics professor's research in high energy cosmic rays. It is also clear to me that this vibrant community has been created by the people who came before me—scholars, visionaries, philanthropists, teachers, and students—who for more than a century have worked together to make Chicago the place it is today. Needless to say, I feel very privileged to have become a part of this community and to have the chance to be with you tonight as we celebrate Community and Discovery at the University of Chicago.

Before the ceremony begins, the University's 445th Convocation—and my first—we invite you to listen to some of the voices from the University's past. Their words tell the story of the foundation and development of our community, they define where and who we are today, and they guide us in our journey toward the future.

Individuals Quoted

Thomas Wakefield Goodspeed: First Secretary of the Board of Trustees (elected 1890)

William Rainey Harper: First President of the University (1891–1906)

John D. Rockefeller: Founder and first benefactor of the University

Saul Bellow: Student (1933–35), Professor in the Committee on Social Thought (1963–93), author, and Nobel laureate (1976)

George Steiner, A.B.'48: Author and educator

Ernest DeWitt Burton: President of the University (1923–25)

Marion Talbot: First Dean of Women in the University Colleges (appointed 1892)

Philip Roth: A.M.'55: Author

Robert Maynard Hutchins: President of the University (1929–51)

Lorraine Richardson Green, Ph.B.'18, A.M.'19: First African-American woman to receive a master's degree from the University

Lawrence A. Kimpton: President of the University (1951–60)

Arthur Holly Compton: Professor in the Department of Physics (1923–45) and Nobel laureate (1927)

Susan Sontag, A.B.'51: Author, critic, and film director

Hanna Holborn Gray: President of the University (1978–93)

Edward Hirsch Levi, Ph.B.'32, J.D.'35: President of the University 1968–75)

Voices of the University, Past and Present

By Abigail Sher

READER 1

April 7, 1886

Dear Mr. Rockefeller:

There is a profound interest felt by very many people in the re-establishment of the University. The time has come, we believe, when the hope of saving the old property has been generally given up, and when a feasible plan of re-establishing the work in a new location will be welcomed.

Thomas Wakefield Goodspeed

READER 2

January 11, 1887

Dear Mr. Rockefeller:

In my opinion there is no effort which would accomplish greater good than the establishment of such a University. It is a great mystery to me that people have not seen this and acted upon it.

William Rainey Harper

READER 1

January 7, 1887

Dear Mr. Rockefeller:

We have here a great necessity, a great opening, a great opportunity. I believe that a more important and promising project was never brought to anyone's attention.

Thomas Wakefield Goodspeed

READER 3

February 14, 1887

My Dear Sir:

With respect to the University, I think it is a very important question, but have not been able to see my way clear to give you any encouragement.

John D. Rockefeller

READER 4

The great advantage of the U of C was that it gave us a cover, a color of legitimacy. In the Wieboldt Lounge we gathered to talk about poetry, the novel, the theater. The quadrangles gave a certain cultural weight to our flimsy or sketchy aspirations. They made the impossible look possible.

Saul Bellow

READER 5

No one had to apologize for intellectual passions. The credo of my life is, you can't negotiate passions. If people don't accept them, or don't regard them as socially useful or economically valuable, they may well be right. And so you say, "I'm sorry, I am in the possession of an artistic or intellectual or scientific passion. *It possesses me.*"

George Steiner

READER 1

Mr. Rockefeller, we have here a great necessity, a great opening, a great opportunity. . . .

READER 4

It is primarily an attitude and secondarily an achievement. It is an interest in knowing things, a desire for truth, an insatiable curiosity, not about the trivial and the unimportant, but about the great things of the world and of human life.

President Ernest DeWitt Burton

READER 1

Mr. Rockefeller, I believe that a more important and promising project was never brought to anyone's attention.

READER 5

The credo of my life is, you can't negotiate passions. . . .

READER 3

There is hardly a chance that I could give the least encouragement for assistance in respect to the University, but I will carefully read the communication you suggest. . . .

John D. Rockefeller

READER 2

I have a plan for the organization of the University which will revolutionize College and University work in this country. It is 'bran splinter new', and yet as solid as the ancient hills.

William Rainey Harper

READER 4

The old nickname of "Harper's Bazaar," conceived in ridicule, has given place to world-wide esteem.

Dean Marion Talbot

READER 5

I was instinctively fanatical about seriousness. Chicago didn't make me like that, but it sure didn't stand in my way. . . . I couldn't understand ordinary life. I didn't know what satisfactions it could possibly yield. Hyde Park's the last place I lived where books seemed at the heart of *everything*.

Philip Roth

READER 2

It is 'bran splinter new', and yet as solid as the ancient hills.

READER 4

It is an interest in knowing things, a desire for truth, an insatiable curiosity.

READER 2

It is a great mystery to me that people have not seen this and acted upon it, Mr. Rockefeller.

READER 3

I am unable to give any affirmative answer. Although I have not abandoned the consideration of the question, I do not feel hopeful that I can give any encouragement.

John D. Rockefeller

READER 1

The University has always been devoted to inquiry . . . the tradition of inquiry will compel the constant investigation of education as it has compelled the investigation of everything else. The student is offered the realms of learning to explore at will. The student is not required to do anything. At entrance he stops being taught and begins to learn.

President Robert Maynard Hutchins

READER 4

We walked through Hull Gate. And it seemed that we had hit an electric current.

Lorraine Richardson Green

READER 5

The spirit of adventure has always been a part of this institution and has shown itself in countless experiments which have opened up new modes of thought and action.

President Lawrence Kimpton

READER 1

We did not see how a true nuclear explosion could possibly occur, but . . .

Arthur Holly Compton

READER 5

It was entirely fresh. It was a revelation! I was like a monk coming out onto Broadway.

George Steiner

READER 2

It is only a person who has made investigation who can teach others to investigate.

William Rainey Harper

READER 1

Let knowledge grow from more to more and so be human life enriched.

READER 4

Much of its work can be done successfully only as the university consistently maintains a breadth of horizon limited only by the possibilities of its outlook.

President Ernest DeWitt Burton

READER 2

I have a plan which will revolutionize.

READER 5

I am in the possession of an intellectual passion.

READER 1

I believe that a more important and promising project was never brought to anyone's attention, Mr. Rockefeller.

READER 3

May 15, 1889

My Dear Sir:

I will contribute six hundred thousand dollars toward an endowment fund for a college to be established in Chicago.

John D. Rockefeller

READER 5

It has been suggested that the motto of the University of Chicago should be "Praise John from whom oil blessings flow."

President Lawrence Kimpton

READER 1

Let knowledge grow from more to more . . .

READER 4

The nickname, "Harper's Bazaar" . . . has given place to world-wide esteem.

READER 1

And so be human life enriched.

READER 5

At Chicago I was handed an invaluable set of tools. The University of Chicago was the single most important part of my education. My entire life has been a development of and a debate with the education that I received there.

Susan Sontag

READER 4

It is primarily an attitude, and secondarily an achievement.

READER 5

Limited only by the possibilities of its outlook.

READER 1

Chicago has made for itself a culture that is cohesive, rigorous, and tough. No one leaves here, really. Away from it physically, memory of it remains.

President Hanna Holborn Gray

READER 5

And so you say, "I'm sorry, I am in the possession of an intellectual passion. *It possesses me.*"

READER 3

I assure you that nothing could give me greater pleasure than to look into your faces and contemplate what you have done. I believe in the work. It is the best investment I ever made in my life. I am profoundly, profoundly thankful that I had anything to do with this affair.

John D. Rockefeller

READER 1

From more to more . . .

READER 4

Not the best university going. The only university going.

President Edward Hirsch Levi

READER 1

And so be human life enriched.

READER 2

January 1, 1893

President William Rainey Harper

Our first Convocation has come, and now is gone. Will not the students of the University receive from it new inspiration for that which lies before them? Will not the Faculties of the University take up again their work no longer new, but already old; a work the magnitude of which no one can estimate; will not our friends carry home with them clearer conceptions of what the University is, what it is trying to do, and what it needs to make the effort successful; and will not those men and women to whose [generosity] the University owes its existence recognize still more clearly than before, the greatness of the work undertaken, the divine guidance in it all, the fact that what they have done has been done for all eternity.

Readers

James K. Chandler, *Professor in the Department of English Language & Literature and the College*

Susan Goldin-Meadow, *Professor in the Departments of Psychology and Education and in the College; Chair of the Committee on Human Development*

Ralph W. Nicholas, *William Rainey Harper Professor in the Department of Anthropology and the College*

James M. Redfield, *the Howard L. Willett Professor in the Committees on Social Thought and on the Ancient Mediterranean World and in the Department of Classical Languages & Literatures; Chair of the Committee on the Ancient Mediterranean World*

Martha T. Roth, *Associate Professor in the Oriental Institute, the Department of Near Eastern Languages & Civilizations, and the Committee on the Ancient Mediterranean World*

Abigail Sher, A.B. '95, is an actress.

The University of Chicago Medals

The University of Chicago Medal was established in 1976 by President John T. Wilson to recognize distinguished service of the highest order to the University by an individual or individuals over an extended period of time. The award is made by the Trustees of the University and is among the highest honors the University can bestow. In the twenty years since its creation, it has been awarded to only nine individuals, including those who received the medal at this convocation.

**Lindy Bergman, Laboratory Schools '35,
A.B.'39**

*Presentation by Andrew M. Rosenfield,
J.D.'78, Trustee of the University*

Mrs. Edwin A. Bergman—better known to her many friends and family as Lindy—has woven her life in and around the University of Chicago. She and her husband, the late Edwin Bergman, have enriched the University and its Hospitals through their dedication, generosity, and hard work. The legacy she and Ed created, and that she continues to create, will last for many generations.

Lindy's commitment to the University began when she entered the Lab School as a grade school student, continued through her college years here, and included an uninterrupted sixty years of volunteer service to the University. Her volunteerism began when she was sixteen and worked in the Hospitals gift shop, and has grown over the years to leadership within the Hospitals as a Life Trustee and as a member of advisory boards and visiting committees across the University. She has integrated her love of the visual arts with her love of the University—with wonderful results. It was Lindy who launched the program to decorate the Hospitals with artwork, making it a more interesting and more humane place at one stroke.

Lindy and Ed together founded the Bergman Gallery in Cobb Hall where the Renaissance Society regularly holds some of the nation's most avant garde—and highly regarded—exhibitions by modern artists. She continues to share her expertise in art as a member of the Boards of the Renaissance Society and the University's Smart Museum. And to help others continue to see the world and the beauty around them, Lindy has recently endowed the Bergman Eye Clinic, which will be housed in the new Duchossois Center for Advanced Medicine. The Distinguished Service Professorship and the College Scholarship Fund she and Ed endowed clearly speak to their belief in the excellence of the University's faculty and the importance of helping bright young people come here to learn. Finally, I conclude by saying that I can tell you *first hand* of Lindy's great generosity and deep and enduring love of the University because, as some of you know, my wife, Betsy, is Lindy's daughter.

For all these reasons and many more, Mr. President, I am honored and proud to present Lindy Bergman for the University of Chicago Medal.

Max Palevsky, Ph.B.'48, S.B.'48

*Presentation by William B. Graham, S.B.'32,
J.D.'36, Life Trustee of the University*

Max Palevsky has said that his whole life has been shaped by the time he spent as a College student at the University of Chicago. His love of learning and his commitment to the student experience at Chicago have in turn shaped his service to Chicago, profoundly affecting the University he loves so deeply.

Max Palevsky came to the University as a young Army officer during World War II to study meteorology. He was transferred to Yale to study electronics but wanted to come back to Chicago. And return he did,

earning baccalaureate degrees in the College and the Physical Sciences Division in 1948, then going on to a spectacularly successful career in the computer and film industries. In the years since, he has provided his advice as an alumnus and Trustee to a series of University of Chicago Presidents. His support for the University has made a lasting difference, particularly for our undergraduate College students. The Max Palevsky Professorship in History and Civilization in the College has been held by several of our most distinguished faculty. In 1984, the gift that created the Max Palevsky Cinema in Ida Noyes Hall established a new campus landmark. The "Max," as students call it, is one of their most popular gathering places. In the just-completed Campaign for the Next Century, Max and his wife, Ellen, have endowed a fund that will be used to enhance faculty excellence across the University.

Max Palevsky is a remarkable product of our University in so many ways. His lifelong love of learning—and Chicago—may best be illustrated by the following anecdote: When he returned to campus some years ago for the dedication of the cinema, he asked for only one item to remember the occasion—the nine-volume set of the newly published *University of Chicago Readings in Western Civilization*.

Mr. President, it is with great pleasure that I present Max Palevsky for the University of Chicago Medal.

Learning as Discovery—The Chicago Experience

*Remarks by Michael J. Klingensmith,
A.B.'75, M.B.A.'76, President of the University of Chicago Alumni Association Board of Governors, and President of Entertainment Weekly magazine*

As you will be reminded over the next few minutes, discoveries made at the University of Chicago have not only helped to shape the larger course of history, but they have also influenced the individual histories—the personal stories—of thousands of individual lives.

My own U of C story began twenty-five years ago, when I came to the University of Chicago from a suburb of Minneapolis, where I had proudly finished third in my class of three hundred. I came to the University of Chicago not knowing how much I didn't know. But five years, and two degrees later, I left the University with a very clear understanding of how much I didn't know.

As much as this is a difficult admission for me to make, I was not the most distinguished scholar in the history of the University of Chicago. For me the most defining moments of my experience at the University were extracurricular. My pinnacle experience, in fact, was being drafted by my good friend Mike Krauss to be the sports editor of the *Chicago Maroon*. A job which Jim Warren of the *Chicago Tribune* would later write, "must have been akin to being the toll keeper in the exact change lane."

Little did I know, that that experience, coupled with much of what I learned in the classroom, would start me down the road to a lifetime spent working the fascinating world of New York's magazine publishing industry. The fact that it did so is illustrative

of the reality that while the University is so well known for affording wonderful opportunities for academic pursuits, it is truly under-appreciated for the opportunities it affords outside the classroom. In pursuits as varied as film or music, theater or journalism—and yes, by the way, even sports—a rich and rewarding experience is readily available at the University of Chicago.

And it's because of what the University of Chicago has meant to me that I'm so grateful to have been given the opportunity to contribute to the leadership of its Alumni Association and to have been afforded the opportunity to be one of those chosen today to tell their U of C stories.

*Remarks by Jacqueline Stewart, A.M.'93,
graduate student in the Department of English Language & Literature, Benjamin Mays Fellow, and CIC Pre-Doctoral Fellow*

When I arrived at the University of Chicago four years ago to begin my graduate studies, I felt I had a very difficult decision to make. I was attracted to Chicago because the English Department here had recently hired faculty members who specialized in two fields I had always wanted to explore—African-American literature and cinema studies. I wondered which of these areas would become my primary focus.

As an undergraduate at Stanford, I had attempted to combine my interests in film and literature many times, but found myself being shuttled back and forth between the Communications and English departments, as if no one understood the connections I wanted to make. The fact that two film scholars, Miriam Hansen and Jim Lastra, were appointed to the English Department here suggested to me that at Chicago I might have less difficulty bridging my interests. Still, I figured that at some point I would have to decide once and for all which field I would call my own.

Fortunately, during my very first quarter here, I experienced a moment of discovery that helped me to resolve my academic identity crisis. In the fall of 1992, I took a superb course on turn-of-the-century African-American literature with Professors Ken Warren and Elizabeth Alexander, who assigned the class to read *Crusade for Justice: The Autobiography of Ida B. Wells*. Wells had long been a hero of mine; her legacy of writing and speaking against racial and gender discrimination had inspired me ever since my mother had told me stories about her courageousness when I was a child. Reading Ida B. Wells's memoir proved to be even more rewarding than I had first imagined, though, because in it she describes her participation in protests against Chicago screenings of D. W. Griffith's landmark and controversial film, *The Birth of a Nation*, in 1915. Wells angrily relates her disappointment with Griffith's "unjust and unworthy portrayal of the Negro race."

Upon reading Wells's account of this film, I recognized a remarkable moment in which African-American literature and film history intersected in an interesting, and quite unexpected, way. It occurred to me that I could structure my course of study around such moments, and four years later I am writing a dissertation on Black film spectatorship and criticism at the turn of the twentieth century. I am deeply indebted to

those faculty members who have demonstrated Chicago's unique appreciation for interdisciplinarity. They have encouraged me to develop my first-year moment of discovery into a sustained exploration into two irresistible fields of inquiry.

Remarks by Jennifer Costello, third-year student in the College and Lillian Gertrude Selz Scholar

Did you ever have a moment where, even for just a second, everything comes together and makes perfect sense? You see where you are, where you need to go, and finally you make the realization of what you need to do to get there. This happened to me about two years ago.

I remember it like it was yesterday. It was beautiful, fall Saturday afternoon—October 16, 1994, to be exact—and I had just finished my first month of classes, survived my first midterm, had my very first collegiate basketball practice, and could make it from Shoreland to Cobb Hall, to Pierce, to the Reg, to the gym, and back again all without getting lost. I was at home, alone, in my first-year double at Shoreland, looking out the window of the twelfth floor at the Point and beautiful Lake Michigan. The discovery I made that day is one which I will carry with me for a lifetime. Perhaps the best way to explain it is to read you a passage from my diary.

Dear Diary,

Well, I made it to college! It is now the very beginning of my fourth week here, at the U of C, and I love it! As I sit here and look at this spectacular view I have from my room, I feel as if I can accomplish anything. . . . I just have this great feeling of inner peace and calm, but also an inner voice and feeling of inspiration telling me to go and reach for my dreams because I will catch them. I know that things will not always be as "beautiful" here as they are today, and I also know that I have some BIG challenges ahead of me this year and in the years to come—but I also know as I look out there today that I will meet those challenges face-to-face, I will not step back, but instead pass through them with flying colors. . . . I love college at the U of C, and I know I will make my dreams come true here!

That day I made the discovery of something that I had known within my heart all along, but that finally became clear to me. I realized that I could be anything that I wanted, and that I, Jenny Costello, could make a difference. That day I, also, made the discovery that the University of Chicago was just the place I needed to harvest and grow the seed of a young first-year student into a mature, successful, and well-rounded graduate who had the opportunity to make a difference in this world, while pursuing her dreams in both academics and athletics, and while growing spiritually, emotionally, and socially into the young woman she always imagined she could be. Today two years later, I do not think these words could ring more true, for my experiences here thus far have taught me this again and again. My first year, when our basketball team made history, becoming the first women's basketball team ever at the U of C to make it to the NCAA National Tournament, I learned that with teamwork, drive, and dedication dreams really do come true. The past two

years, every time I work in the Psychology Lab with Professor Duncan, I learn how exciting and rewarding it is. I am also reminded of the difference that I am able to make in others' lives, as I see the smiling faces of the disabled children and adults that we sponsor in the Special Olympics every year in the spring.

There is something about the University of Chicago that I cannot explain, but that I noticed the very first day that I stepped foot here, on campus. It is something that makes one expand one's horizons, press one's limits, and reach out for sights beyond one's wildest dreams. At no other time in my life have I ever felt so ready to meet the challenges that the world cares to deal me as right now. And that is exactly why I cherish the many discoveries I have made here at the University of Chicago in my first two years and look forward to the many more to come.

I am and will always be grateful for what this University has taught me and helped me discover about myself and will never forget all that it has done and continues to do for me.

Remarks by Harvey B. Plotnick, A.B.'63, Trustee of the University, Chairman of the Campaign for the Next Century, and Chief Executive Officer, Paradigm Holdings, Inc.

As I listened to Jenny, I couldn't help recalling my own first few weeks in the College here thirty some years ago. These were heady days for me: days of excitement—I was ecstatically happy—days of discovery. It was wonderful. Unlike Jenny, I didn't keep a diary, but I do recall very vividly writing the very first letter from school to my parents. And in it I said, and I recall this perfectly well, "This must be the most exciting university anywhere." And I still think it is.

You have heard very personal stories from Mike Klingensmith, Jackie Stewart, and Jenny Costello, who have preceded me. Each learned something during their experience at Chicago which changed the courses of their lives. What most of us know is that such discoveries happen every day at the University of Chicago. There are discoveries of many kinds: they win Nobel prizes; they cure diseases; and there are of course private discoveries that change one individual life, thus affecting the lives of everyone that person touches. Each discovery is momentous in its own way.

The community of students, scholars, alumni, and friends and parents—represented here by each and every one of you—is integral to sustaining this place in a way that will enable discovery to continue. One reason we are gathered on campus today is to mark the achievements of the University's Campaign for the Next Century. Our campaign was a success because so many people believe so deeply in the value of this university, in their own experiences here, and in the work that goes on here every day. Because of their support and yours, that work is now better able to go forward.

On behalf of the alumni, the Board of Trustees, the faculty, and the students of the University of Chicago, I want to thank every one of you who took part and helped and worked and gave. Chicago fosters and nurtures learning and discovery that have the capacity to change the world for the better.

Your commitment makes you a part of the University's very bright future.

Honorary Degree

Hanna Holborn Gray, President Emeritus of the University and the Harry Pratt Judson Distinguished Service Professor in the Department of History and the College

Presentation by Richard P. Saller, the Edward L. Ryerson Distinguished Service Professor in the Departments of History, Classical Languages & Literatures, and New Testament and Early Christian Literature, and the Committee on the Ancient Mediterranean World; Dean of the Division of the Social Sciences

Hanna Holborn Gray's career is most remarkable. She is an extraordinary leader, a distinguished public servant, a legendary teacher, and a devoted scholar.

In 1950, she received her B.A. from Bryn Mawr College, and in 1957 she was awarded a Ph.D. in history from Harvard University. For the next three years, she taught at Harvard, first as an instructor and then as an assistant professor. In 1960, she and her husband, Charles, moved to Chicago where he had an appointment in the History Department.

In 1961, Mrs. Gray was appointed Assistant Professor of History in the College. As a teacher of western civilization and Renaissance history, she quickly demonstrated the superb classroom skills that would lead to her being awarded the Llewellyn John and Harriet Manchester Quantrell Award for Excellence in Undergraduate Teaching this past June.

Mrs. Gray soon became identified as a person who was prepared to take on administrative responsibilities and as a most effective administrator. She balanced judgement and patience, enabling her to enjoy the confidence of her colleagues and peers. With responsibility came visibility, and in 1972 she left the classroom and the University of Chicago to become Dean of the College of Arts and Sciences at Northwestern. In 1974, she accepted the responsibilities of Provost at Yale, and in 1977, Acting President. In 1978, Mrs. Gray was named tenth president of the University of Chicago.

At each institution she has served, Hanna Gray has strengthened and revitalized the faculty by making stellar academic appointments and insisting on the most rigorous standards of scholarship. At Chicago, under her leadership, graduate programs were reorganized and revitalized, the College curriculum was revised, and enrollment increased. She launched a graduate school of public policy and a department of computer science. She created a new science quadrangle which includes one of the world's foremost science libraries and new teaching laboratories for physics and chemistry.

During her forty-year career, there have been many and dramatic changes in American society, particularly of the place of women within it. Hanna Gray's steadfast resolve and commitment to the highest standards have played an important part in opening doors for others. When she was first appointed to the faculty of Harvard in

1959, she was not allowed to enter the faculty club through its front door. She is now one of seven members of the Harvard University Corporation.

Here are just some of her accomplishments:

—She is the first woman to be named president of a major research university.

—She is Director of the Boards of Ameritech, Atlantic Richfield, Cummins Engine, and J. P. Morgan.

—She is a Trustee of Bryn Mawr College, the Howard Hughes Medical Institute, and the Mellon Foundation.

—She has served on the National Council on the Humanities, Pulitzer Prize Board, and the Yale University Corporation.

—She was presented the Medal of Liberty by President Reagan in 1986.

—She accepted the Medal of Freedom from President Bush in 1991.

—She has received sixty-four honorary degrees—this will be her sixty-fifth.

Since accepting her first full-time administrative appointment through her fifteen-year tenure as President of the University of Chicago, Hanna Gray has viewed her administrative role as a fundamentally educative one. Her passion for teaching in the classroom translated itself into a commitment to communicate with others, at other educational institutions, in government and private corporations about the mission of a great research university—and why it is so essential. Her success in this has played an invaluable role in preserving and sustaining what is most important to us all.

It is my privilege to present Hanna Holborn Gray for the honorary degree of Doctor of Humane Letters.

Remarks

By Hugo F. Sonnenschein

It is a special pleasure to stand before you today as we celebrate the successful completion of the Campaign for the Next Century and recognize the profound impact Lindy Bergman, Hanna Holborn Gray, and Max Palevsky have had upon our University. Each of these remarkable individuals represents an ideal of extraordinary devotion to the University. But while they exemplify deep and abiding attachment to this institution, they are not alone in that commitment. Indeed, the purpose of this convocation is to thank each of you—faculty, students, Trustees, alumni, and friends—for your commitment to the University, for your belief in its distinctive mission, for your scholarship and your teaching that lie at its core, and for your financial support that makes our scholarship and learning possible. The success of this campaign was a cooperative achievement, fueled by conviction, and accomplished by generosity and hard work. Without each and every one of you, we would not be celebrating here today.

Why do individuals like Mrs. Bergman and Mr. Palevsky believe so deeply in the University? Why does this University mean so much to us? Indeed, why is it so important to the greater society? Put bluntly, the University of Chicago is so important because it has the mission that a great university should have, and, in my view, it comes closer to realizing that mission than any

other university in this country. This is the university that, for its entire history, has put the search for truth first—the search, which is an active process. We demand an unshakable commitment to the primacy of this search, and the faculty demand this level of commitment not only of themselves, but of their students. Our students then carry this commitment to truth, this rigor of thought and intellectual engagement, with them for a lifetime, as have Mrs. Bergman and Mr. Palevsky and others you have heard speak today. Thus, we are a place that transforms lives, and we should be most proud of this achievement.

This is the university that, for its entire history, has insisted upon excellence at every turn. When William Rainey Harper recruited the original members of the faculty, he moved heaven and earth to attract the most distinguished men and women to his new, unproven university. Goodspeed's history of the University relates how Harper "wanted the very best and ablest. . . . The more eminent they were, the more he wanted them."

These founding values are as characteristic today as they were one hundred years ago. Listen to the words of the distinguished sociologist David Riesman—speaking at Harvard—defending the best of higher education: "The University of Chicago is pre-eminent—unbowed, uncowed, uncompliant, non-politically correct. Chicago remains unrelievedly scholarly, and I'm grateful for it."

Listen to the words of matriculants to the Class of 2000—some of whom are with us today:

[I chose the University of Chicago] "[b]ecause the discussions I listened to were not shouting matches, but were riddled with pauses: pauses where people seemed to stop and think about what was being said."

[I chose the University of Chicago because it is] "a bold place to be. . . . My intellect will be doing acrobatics, turning itself inside out to squeeze every bit of learning from my studies and daily life."

From Harper's time onward, we have understood what it takes to make a truly great university. For over one hundred years, this university has remained focused on what is most important: scholarship, teaching, and learning. Scholarship. Teaching. Learning. Of course, there have been many changes at the University over the years. In 1893, the University Register featured not only courses on the history of political economy, the works of Chaucer, and solar physics but, in addition, a course in advanced elocution and a seminar in sanitary science. In 1902, Harper explained that a gift of \$120 would pay the tuition of a poor student for a year. Then he noted that a gift of \$3,000 would endow a full scholarship. As some of you, parents and donors, can appreciate, these numbers have changed.

So, changes have taken place. But in terms of values and aspirations, the University of Chicago has been steadfast. And in this instance, and perhaps only in this instance, even single-minded.

Hanna Gray has devoted an academic

lifetime to the service of these values: scholarship, teaching, learning. She has talked the talk, powerfully conveying the importance of our mission to presidents, cabinet members, senators, and CEOs, while amply illustrating the scope of her erudition by invoking great Florentine and Milanese thinkers such as Machiavelli and Yogi Berra. Most characteristically and importantly though, she has also walked the walk. Witness her receipt this past spring of the Quantrell Award for Excellence in Undergraduate Teaching. Hanna Gray immeasurably strengthened the quality of the University's faculty and student body. And, because she recognized that bold steps were necessary to preserve and nourish that which made the University unique and vital during its first one hundred years, she launched the Campaign for the Next Century.

John D. Rockefeller once said: "It is far better that the University be supported and enlarged by the gifts of many, than of a single donor. This I have recognized from the beginning and, accordingly have sought, to assist . . . in enlisting the interest, and securing the contributions, of many others."

In this campaign we have realized Rockefeller's dream of broad-based support for the university he founded. Last year, 54 percent of College alumni contributed to the campaign. This was a higher participation rate than Harvard, and substantially higher than Dartmouth, Yale, and Stanford. Rockefeller would also have been pleased by the fact that 43% of individual gifts were from non-alumni friends of the University.

Equally noteworthy for understanding the magnitude of our success:

—The \$676 million raised during the campaign was approximately twice as much as had ever been raised in any previous five-year period.

—Through the campaign, we have created forty-five new endowed faculty chairs and nearly two hundred new scholarships and fellowships.

—1996 was the first year fund-raising cash receipts exceeded \$100 million, and they exceeded it by \$26 million.

But the argument I most wish to put forward this afternoon concerns why I believe that the impact of this campaign will extend well beyond the resources garnered during the last five years and the exquisitely good use that we will make of the resources. For it is my belief that with such fundraising success, with what represents a genuinely new level of support, it is now possible for us to imagine a dramatically different rate of investment in the University during the next several years.

This university was founded with the highest aspirations—to hire the best faculty and to compensate them at a level that would retain them, to build the finest physical facilities for faculty and students. Harper recognized the level of support that great scholarship required. His resourcefulness in persuading eminent scholars to move to Chicago was legendary. He was inexorable in his pursuit of talent and adroit in using Rockefeller's money. Through the generosity of its founders and friends, the University, almost at birth, was endowed at a level that made excellence possible. And now, because of your commitment, generosity, and hard work we too can envision making

the necessary investments in our university. We can imagine the future in the same bold way that Harper did. I urge us all to think this way. We will benefit enormously from such a transformation. Because of the cornerstone we have laid through this campaign, we can contemplate:

—new library collections that will attract the world's most eminent scholars;

—dormitories that will foster learning communities;

—much-needed athletic and recreational facilities;

—classrooms for undergraduate, graduate and professional students that set a standard for their various disciplines; and

—facilities for research, including science research, that are today's equivalent of what Harper was able to provide.

The successful completion of such projects will transform the campus, dwarfing in magnitude any decade of building since World War II. Again, such investments are necessary. This University has the capacity to make the years ahead even stronger than those that have come before. This is what the success of the campaign enables us to see. These investments must be made in a manner that is true to our mission. They must support what we wish to be in the long run. It is right that our extraordinary faculty and students—all of whom have demonstrated by coming here that they place scholarship, teaching, and learning first—are provided with the resources they need to achieve their goals.

My colleague Gary Becker is of course correct in his remarks. Our character, our mission, our values give us a leg up on the competition. We can lick them all with one arm behind our back, but the other arm must be strong. It must be nourished.

Competition for faculty, and for the students we most want to bring here, who want to be here, is extremely keen. What we have shown, together, through the enormous success of this campaign, is that, from the point of view of external resource support, we have nothing to fear. We can dream Harper-size dreams—as we must.

Let me conclude by again thanking each one of you. We have raised not just \$676 million, but because of the *meaning* of this success, we have now before us the prospect of a future more glorious than even our remarkable past.

Thank you.

Summary

The 445th convocation was held on Saturday, October 26, 1996, in Rockefeller Memorial Chapel, during Celebrate Chicago! The Next Century, a celebration of the successful conclusion of the Campaign for the Next Century. Hugo F. Sonnenschein, President of the University, presided.

Two University of Chicago Medals were conferred, on Lindy Bergman, Laboratory Schools '35, A.B.'39, and Max Palevsky, Ph.B.'48, S.B.'48.

The honorary degree of Doctor of Humane Letters was conferred on Hanna Holborn Gray, President Emeritus of the University and the Harry Pratt Judson Distinguished Service Professor in the Department of History and the College.

Gary S. Becker, A.M.'53, Ph.D.'55, University Professor in the Departments of Eco-

nomics and Sociology, delivered the convocation address, "The Production of Human Capital at Universities."

Additional remarks were delivered by Michael J. Klingensmith, A.B.'75, M.B.A.'76, President of the University of Chicago Alumni Association Board of Governors, and President of *Entertainment Weekly* magazine; Jacqueline Stewart, A.M.'93, graduate student in the Department of English Language & Literature, Benjamin Mays Fellow, and CIC Pre-Doctoral Fellow; Jennifer Costello, third-year student in the College and Lillian Gertrude Selz Scholar; Harvey B. Plotnick, A.B.'63, Trustee of the University, Chairman of the Campaign for the Next Century, and Chief Executive Officer of Paradigm Holdings, Inc.; and Hugo F. Sonnenschein, President of the University.

The convocation was preceded by a prologue, "Voices of the University, Past and Present," a compilation of quotations by notable figures associated with the University throughout its history. Abigail Sher, A.B.'95, wrote the script.

The 446th Convocation

Address: "Our Dangerous World"

By Jean Bethke Elshtain

I am deeply honored to address you on this worthy occasion, especially so because I am a relative newcomer to the faculty of the University of Chicago. You graduates have spent more time at this rare institution than I! You no doubt anticipate that I will say something about rites of passage; about how much is expected from you given your fine education; about the sacrifice many of your families made in order that this moment might come to pass; about the fact that the world, in all its complexity, awaits you, eager to see what mark you will make as you leave here and launch yourselves into various ventures and adventures. All of this is true and such comments are always propitious at commencement time. But I intend to focus our attention instead on our dangerous world.

We know that the world is dangerous, do we not? Each time we pick up a newspaper or turn on the television set we learn of yet another disaster, or cover-up, or peril, or inexplicable tragedy. Indeed, the rough rule of thumb around television news rooms is crude but to the point: "If it bleeds, it leads." Lament the focus on violence, mayhem, and madness we may, but we also watch and read and murmur transfixed as scenes of distress and horror move across our screens. We read the headlines and turn first, by all accounts, to the terrible stories, not the reports on how a town managed to save its historic district from demolition, or how tenants organized to kick out drug dealers and make their hallways and playgrounds safe, or how a politician did something honest and worthy, or perhaps that a lawyer actually refused the blandishments of a very rich but very corrupt client. This isn't as newsworthy in our eyes, apparently, as are those stories that touch on the extremes of human behavior, deeds that chill our bones or set our blood to boiling. To be sure, we revel in tales of goodness if these come to us in the form of life-threatening heroism—the person who leaps into an iced-over river to yank a child to safety; the fireman who runs into a burning building because he has learned that not all the occupants have been evacuated; the mother who forfeits her life to save that of her child; the soldier who falls on the grenade and, in so doing, spares his comrades.

In such scenarios, fear is the common denominator, rare heroism the extraordinary moment that only serves to emphasize the lowly mean that governs our everyday existences. And it is this mean—lay low, don't expose yourself to the world overmuch as you will likely be wiped out if you do, honor the rare acts of courage but don't let them put pressure on you to do anything rash or foolish—it is this that holds us in its grip. Was Thomas Hobbes, that mordant master of English prose who decried the imaginative and metaphorical use of language because it led to all manner of abuses and absurdities by stirring the dangerous passions, then right that we are both frightened and frightening creatures who, unless we are checked by counter-pressures, will not hesitate to take advantage of our neighbor, not so much because we desire gain as because we fear loss. Indeed, for Hobbes, our natural condition is a war of everyone against everyone. The life of the human race, until the coming into being of an awesome Leviathan to hold us in check, is

"solitary, poore, nasty, brutish, and short." And, he would say to us, do you think you are somehow immune? Do you think you are not fearful? Well, then, let such a one consider that "when taking a journey, he armes himself, and seeks to go well accompanied; when going to sleep, he locks his chests; when even in his house he locks his chests; and this when he knows there bee Lawes, and publike Officers armed, to revenge all injuries shall bee done him; what opinion he has of his fellow subjects, when he rides armed; of his fellow Citizens, when he locks his dores; and of his children, and servants, when he locks his chests. Does he not there as much accuse mankind by his actions, as I do by my words?" It is fear that motivates us and the overwhelming fear of death is the greatest motivator of all, for it inclines us to peace, by which Hobbes meant order and relative safety.

We don't like to think of ourselves in this light. But was Hobbes right? Do we not take all sorts of precautions because the world is dangerous? Do we not revel in disaster because we have, this time, been spared? Do we perhaps court danger, or consume stories of those who do, because we think that actions in extreme circumstances speak to some deep truth, namely, that human beings who dare to risk their lives have temporarily overcome the inhibiting, even paralyzing, fear of death that drives us all? As with any extreme philosophy—and that is what Hobbes has offered us—there is some truth to the matter. We do perceive the world as dangerous. We do care deeply about our own safety. We do cherish our own lives. But he is wrong to suggest that those who sacrifice themselves for others are overtaken by a kind of temporary madness. For we are creatures who love as well as fear; who are called to hope and to a recognition that the ties that bind us one to another are more, far more, than just prudential assessments of self-interest or 'knowing I can't fight them, I'd better join them' calculations.

But our concern for one another can all too easily be swamped by fear. Our responsibility to our neighbors and to our towns and to the wider democracy of which we are a part may wither on the vine if we grow cynical about the difference we might make and if we become convinced that the world is a bitter place and we do well, therefore, to till our own gardens and let it go at that. And when we withdraw we retreat into a cocoon that reproduces a world Hobbes would recognize all too well, one in which predators prey on helpless victims; disasters destroy whole towns and peoples; political leaders lie, cheat, and smile all the while they are doing it; women, especially, tiptoe furtively when they leave their dead-bolt locked apartments because men everywhere are looking to do them in. Our dangerous world confirms our belief that we'd best mind our own business and let the few heroes and heroines take extraordinary action. We hope we would do the same under the circumstances but we also hope, deep down, that we are never tested.

So: danger as the norm. Heroism as the exception. This is a world of extremes. But we don't recognize it as such. For we have domesticated danger: it is our daily fare. But perhaps, in fact, the real danger lies in seeing the world as a roiling vortex of perils. That,

in turn, invites extreme behavior that threatens to become the way we do things. Our precautions transmute into obsessions with danger. Our prudential assessments tip over into wildly overinflated perceptions of peril and looming disaster. Our sociality suffers as our insularity grows. We lose our balance, quite literally. I think much of America today is unbalanced. We know that fear has a debilitating effect on behavior, as people embrace a distorted perception of themselves as likely victims. Those who research such matters tell us, for example, that habitual television viewers have a wildly inflated sense of the dangers they face, especially women. For victimization of women is routine fare on television dramas. We know that fear has a corrosive effect on the workings of intelligence itself. Because it is so hard for us to accept that terrible things sometimes happen without an evil intelligence lying behind them, we revel in conspiracy theories that fuel the paranoid conviction that shadowy, powerful forces are out to do us, or our particular communities, in, to destroy us utterly. It makes little difference, then, what we do: 'they' will get us if they want to.

What we lose by frightening ourselves, or permitting ourselves to be frightened and horrified in this way, is any appropriate sense of balance and proportion and perspective. What gets occluded is everyday life in all its honor and complexity and dignity. We think that in extremity lies truth unadorned. But perhaps this is a seductive lie. Perhaps in extremity there is only extremity rather than the deep, dark secret of the human condition. Knowing as we do that brutal and dangerous things grip the imagination of our culture, we should resist. For politically upping the ante of what is required in order to change the way things are leads to utopian fantasies and totalistic solutions. If we are convinced that the world is so rotten and dangerous and terrible only a major upheaval will do to put things right, we embrace extreme answers because we have presupposed a nigh-terminal condition as the norm. What Albert Camus called "logical deliriums"—like the totalitarian ideologies that have tormented our century or current conspiracy theories that insult our intelligence and poison our public life—overtake us. The quotidian voice is lost. The possibility of a community of justice and reconciliation, one in which differences are recognized and honored but do not swamp a search for fellowship, is forfeit. Borne along by our fears, we undermine that which alone might help us to be less fearful—a recognition that the world is made and remade each and everyday by simple acts of kindness; by tending to the bodies and souls of those we love; by paying some attention to the stranger who makes claims on us; by saying 'Have a good evening,' to the tired person who, with us, is standing in the elevator after a hard day's work, yearning for some hot food and human companionship.

Democracy, after all, is about fellowship. It is about a kind of civic affection that ties us to one another. It is a civic brotherhood and sisterhood. Our high purposes are enacted on the ground concretely by tending to the life and lives around us. We are called to enact an ethic that helps us to place our dangers in perspective, an ethic that, in Michael Andre Bernstein's words, stresses "not the attractiveness of extreme risk or

the darkest teachings of violence and domination" but, instead, evokes a "celebration of the everyday prosaic world with its undramatic practices and values . . . a principled defense of the quotidian." The genius of democratic life historically has been to dramatize the quotidian in order to make it visible to us. Our dangerous world casts everyday decency into the shadows and shines a bright spotlight on indecency. We are no longer open to a vision of mutual respect and the uncommon, quiet heroism of so many ordinary people. The Christian gospel central in my own formation tells us: "Be not afraid." I borrowed these words—this injunction—as a motto for the ongoing drama of democracy in one of my recent books. Be not afraid! The world is far less dangerous than we have been led to believe. The world is far kinder and more decent than we presently presuppose. Even the great St. Augustine, no shirker when it came to sketching the world's perils and our own inclinations to evil-doing, nevertheless called the world a "compressed pile of blessings," filled with marvels, and wonders, and oddities of all sorts but also renewed each day by the making of peace on a small scale through acts of neighborliness and reciprocity and given that affection that binds us one to another.

Congratulations to you all. Be not afraid!

Jean Bethke Elshtain is the Laura Spelman Rockefeller Professor in the Divinity School and the Committee on International Relations.

Summary

The 446th convocation was held on Friday, December 13, 1996, in Rockefeller Memorial Chapel. Hugo F. Sonnenschein, President of the University, presided.

A total of 392 degrees were awarded: 47 Bachelor of Arts in the College, 1 Bachelor of Science in the College and the Division of the Physical Sciences, 7 Master of Science in the Division of the Biological Sciences and the Pritzker School of Medicine, 30 Master of Arts in the Division of the Humanities, 10 Master of Science in the Division of the Physical Sciences, 67 Master of Arts in the Division of the Social Sciences, 113 Master of Business Administration in the Graduate School of Business, 2 Master of Liberal Arts in the Center for Continuing Studies, 4 Master of Arts in the Divinity School, 2 Master of Divinity in the Divinity School, 1 Master of Laws in the Law School, 1 Master of Arts in the Irving B. Harris Graduate School of Public Policy Studies, 2 Master of Arts in the School of Social Service Administration, 4 Doctor of Law in the Law School, 15 Doctor of Philosophy in the Division of the Biological Sciences and the Pritzker School of Medicine, 12 Doctor of Philosophy in the Division of the Humanities, 25 Doctor of Philosophy in the Division of the Physical Sciences, 40 Doctor of Philosophy in the Division of the Social Sciences, 2 Doctor of Philosophy in the Graduate School of Business, 6 Doctor of Philosophy in the Divinity School, and 1 Doctor of Philosophy in the School of Social Service Administration.

Jean Bethke Elshtain, the Laura Spelman Rockefeller Professor in the Divinity School and the Committee on International Relations, delivered the convocation address, "Our Dangerous World."

Memorial Tributes

Maurice F. X. Donohue, 1911–1995

By George Anastaplo

HOSTESS Prithee, honey-sweet husband,
let me bring thee to Staines.

PISTOL No; for my manly heart doth
earn. Bardolph, be blithe; Nym, rouse
thy vaunting veins; Boy, bristle thy
courage up; for Falstaff he is dead,
and we must earn therefore.

BARDOLPH Would I were with him,
wheresoe'er he is, either in heaven or
in hell!

HOSTESS Nay, sure he's not in hell. He's
in Arthur's bosom, if ever man went
to Arthur's bosom. 'A made a finer
end, and went away an it had been
any christom child. 'A parted ev'n just
between twelve and one, ev'n at the
turning o' the tide. . . .

—Shakespeare, *Henry V*, 2.3

I should like to dedicate this Works of the Mind Lecture on Greek Tragedy to the memory of Maurice F. X. Donohue, former Dean of Adult Education here at the University of Chicago as well as my fellow student in the Committee on Social Thought and (before I was privileged to meet him) a fellow officer in the Army Air Corps during the Second World War. He served with distinction as an intelligence officer with the Eighth Air Force in England. It was he who originally hired me (in 1956) for the Basic Program staff, even though he regarded me as “cantankerous,” evidently because I was one of the few graduate students who ventured again and again to challenge the formidable classicist David Grene, his highly esteemed mentor (and later mine), in the Wednesday night Social Thought seminars. Dean Donohue died this winter in his eighty-fifth year, after refusing to continue debili-

tating treatments which had to be administered more and more frequently with less and less benefit.

Maurice Donohue has left the Basic Program as perhaps his most spectacular monument. It was he, more than any other administrator associated with the program for five decades now, who was responsible for its present form and its distinctive vitality. Here is how he has described his career with the Basic Program (*Law and Philosophy*, John A. Murley, Robert L. Stone, and William T. Braithwaite, eds., I, 597 [1992]):

. . . I was Dean of the University College [at the University of Chicago], which embraced Home Study, Radio & Television, Trade Union, Degree, Non-Credit, and—for a while—Business programs, as well as the Downtown Center, then in the old marble-walled building at 19 South LaSalle Street, in the heart of Chicago's financial district.

The principal jewel in our crown was The Basic Program of Liberal Education for Adults, founded by Cy Houle. He hired me as Assistant Dean in 1952, and I succeeded him about seven months later, when poor health forced his resignation. . . .

A remarkable struggle ensued [during the following decade], to preserve, expand, and copy the Basic Program, with a kaleidoscopic set of personalities as directors and intellectual stars. We tried to copy it with a focus on the arts, on the special needs of trade union leaders, and on world politics. These imitations were essentially in

method and mood, but they also included some of the same texts.

These imitations of the Basic Program have been abandoned in recent decades. But Dean Donohue's pioneering efforts bore unexpected fruit for which we can all be thankful. Two of our Basic Program students were Edwin and Lindy Bergman, whose celebrated modern art collection was originally inspired by their studies in University of Chicago adult education classes. One consequence of all this—which the ancient tragedians would have appreciated and made even more of than I am making—was that the Basic Program acquired an invincible champion when Mr. Bergman became the Chairman of the Board of Trustees of the University of Chicago. This happened to be at a time when the Basic Program had been slated for abolition by a budget-conscious academic administration somewhat confused as to educational priorities. Mr. Bergman soon straightened out the University authorities about the Basic Program. His timely elevation to the Board chairmanship could even have been considered providential by a Greek playwright. In any event, we are still here, poised for our next half-century of dedication to examining the enduring questions, questions to which Dean Donohue, with the insatiable curiosity he retained from his youth as a journalist, was always open. (This curiosity was also reflected perhaps in the series of marriages in which he, a man of considerable charm, enlisted both himself and one fine woman after another, with whom he managed to remain on good terms after they had had to go their separate ways.)

It is sometimes tempting, especially for the jaundiced if not the jaded among former staff members, to recall the Basic Program classes as the refuge of “bored and unhappy housewives . . . [and other] embodiments of ordinary human unhappiness.” (See, for example, *Political Philosophy and the Human Soul*, Michael Palmer and Thomas L. Pangle, eds., p. 4 ([1995]). Maurice Donohue knew better: he, as a generous soul, could recognize human aspiration as he saluted “the hundreds of thoughtful men and women who have been saved, in some meaningful sense, by the Basic Program” (*Law and Philosophy*, I, 600). Certainly, our better students are anything but “bored and unhappy” when they happen to come to us. Certainly, also, “housewives” as such do not figure much in our student body. Dean Donohue's contribution to the Basic Program cause—the cause of serious reading as essential to a truly human existence—distinguishes him as one of the most important leaders in American adult education in this century, following as he did in the footsteps of two of his heroes, William Rainey Harper and Robert M. Hutchins, illustrious Presidents of the University of Chicago who were also champions of lifelong learning in the United States.

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Charles Brenton Huggins, 1901–1997

By Paul Talalay

“In silence, in steadiness, in severe abstraction, let him hold by himself; add observation to observation, patient of neglect, patient of reproach, and bide his own time—happy enough if he can satisfy himself alone that this day he has seen something truly.”

Charles Huggins viewed these words of Ralph Waldo Emerson as a mirror of the ideals and aspirations of his own life.

Born in Halifax, Nova Scotia, in the first year of the twentieth century, Charles Huggins grew up in the beautiful Evangeline country of the Maritime Provinces. He graduated from Acadia University at the age of nineteen, received his medical degree from Harvard, trained in surgery at the University of Michigan, and joined the founding medical faculty of the University of Chicago in 1927. At the young age of only twenty-six, he thus became part of that idealistic and unique experiment—a truly full-time academic medical faculty. He remained passionately committed to this concept. He was the last survivor of the original

group of eight illustrious medical pioneers. Among these giants, he clearly achieved the greatest distinction.

But he never lost sight of his humble origins and occasionally reminded us that “at home bread was cut on the wooden kitchen table.” He always dressed simply—a well-worn brown tweed jacket (sometimes with leather elbow patches) and gray trousers. I am not sure that he owned a suit, and the formal clothes that he wore at the Nobel ceremonies in Stockholm were obviously resurrected Victorian antiques.

For nearly seventy years, Charles Huggins lived—and for much of that time with his beloved Margaret—in what he himself described as “the shadow of the University of Chicago,” where his modest stature, yet towering personality, and his incisive and sometimes outrageous comments became a legend in the community. He led an unpretentious and unencumbered life. His habits were simple, and his punctuality was legendary. Neighbors set their clocks when he walked by on his way to and from work or on his evening walks with Mrs. Huggins

through Hyde Park. Mysteriously, he never wore a watch.

“Discovery was his business,” first and foremost. Indeed, it was his only business, and he never allowed his thoughts to stray far from this central driving force of his life.

When I was a student, he ate his lunch at his desk in a laboratory that had been converted to an office. He brought an inconspicuous small sandwich in one jacket pocket, and an apple or orange in the other, thus saving use of a brown bag. He closed his office door promptly at noon, ate his lunch, and then slept for precisely forty-five minutes in an old and terribly worn easy chair which Mrs. Huggins had bought for \$5 at a thrift sale. I expected that some four-, six-, or eight-legged beasts would emerge from the stuffing, but they never did. When he awoke, his door opened and he emerged at precisely one o'clock refreshed for another five hours of intensive work.

He always left work punctually at six, after he had seen his patients. He passed my lab bench, put on his coat, and said: “I'll see you later, Paul.” On the off chance that he

might return, I worked late into the night—but he never did. Although he did not own a briefcase and never took work home, his mind must have searched relentlessly for that crack in the seemingly impenetrable facade of the cancer problem, for he always had a new suggestion when he appeared the next day.

Scientific Discoveries

I feel sure that Charles Huggins would want us to recall here today at least some of his many discoveries. He was the first to bring science and quantitative chemistry to his medical field, urology; some have called him the “first chemical urologist.” He founded the field of the endocrinology of human cancer. It is his monument. In a series of classical papers published in the 1940s, Huggins reported how the intolerable lives of some men suffering from hopelessly far-advanced prostatic cancer could be restored to health. These discoveries of the endocrine control of advanced prostate cancer led in 1966 to the award of the Nobel Prize in Medicine or Physiology.

These were his crowning achievements. But perhaps the many letters he received from grateful patients around the world touched him most deeply. Given to discarding unnecessary correspondence, he saved these letters in an uncharacteristic act of sentiment. "We travel light," he used to say. Yet, I remember one letter in particular, from a professor at the University of Michigan who, on recovering from being bedridden and in constant pain from metastatic cancer of the prostate, wrote: "I feel like Lazarus, arisen from the dead."

Few indeed are privileged to experience such awe-inspiring gratitude.

But his many (not-so-minor) minor discoveries have also left their deep mark on medical science. He introduced colored products to follow enzymatic reactions and coined the now commonplace term "chromogenic substrates." He developed the most widely used animal model for the study of mammary cancer. He devised methods for the quantitation of prostatic function. He contributed to the understanding of how chemicals cause cancer and devised methods for preventing cancer. His work on the transformation of soft tissues to bone paved the way to the production of artificial bone, potentially an enormous benefit to medicine.

Philosophy of Science and Training of Young Scientists

What was it then that drove this remarkable man to devote his life to the business of scientific discovery? He often characterized science as an artistic pursuit, likening its most glorious moments to the inspired creative acts of a Mozart or a Michelangelo. He was fond of the phrase "Science is the Art of the Twentieth Century." He maintained that the origins of scientific creativity defied rational explanation. Indeed, he saw a divine quality in scientific creativity.

Although he did not believe that there were rules for success in science, he thought that there were guidelines. He adhered to these himself and taught them by example to his students.

Indeed, his highly successful students are scattered around the world. I cannot count how many of them became professors and departmental chairmen. But most remarkably, they are prominent in many different disciplines: he has his family of urologists, of biochemists, of pathologists, of pharmacologists, and of cancer researchers.

How was it then that Charles Huggins trained so many successful scientists? How did he transmit his own restless spirit of inquiry? What was the secret of his Midas touch?

He believed in the essential simplicity of Nature. Indeed, simplicity and clarity of thought, expressed through a wonderful economy of written words, were the secrets of his genius. He wrote: "In science one always strives for simplicity, which is the elegance of proof: *Simplex sigillum veri*. Simplicity is the hallmark of truth."

He insisted that encouragement of younger colleagues was essential to their success. "Always use the carrot, never the stick," he insisted. I must confess that there were times when the carrot had a strong resemblance to the stick. Nevertheless, his constant encouragement and steadfast example raised our sights and uncovered unrecognized potential, thereby permitting us to achieve more than we thought we could.

He claimed: "I never hire anyone who is not smarter than myself." But even elementary considerations throw doubt on this claim.

He did all his own experiments demonstrating extraordinary discipline and personal involvement, constantly reminding us that "the laboratory bench is the scientist's best friend." "With blood on my hands, I have the chance to discover; at my desk, I do not."

He always advised: "Work on a single scientific problem with a small group of students. Do not permit distractions. Nothing can be accomplished when too many pigeons are flying about the room."

He had uncanny powers of observation, and often saw in the laboratory or at the bedside clues to the secrets of nature that escaped others.

He taught us to appreciate the basics of the scientific process: "The goal of science is not the acquisition of data, necessary though these are, but the analysis of facts. And if the methods are simple, with an ingenious twist, and the analysis is penetrating, then science becomes elegant."

He advised against spending too much time in the library. "You can be a reader or a writer, not both."

Sometimes his comments bordered on the outrageous. He would say: "Avoid administration, it attracts only inferior minds." This did not exactly endear him to his Deans and Presidents. When he heard that I was going to assume the chairmanship of a department, he simply said: "I am sorry that you insist on ruining your life."

He dissected problems into their essentials. He thought clearly. He quickly identified the heart of the problem.

He considered wasting time the greatest of sins that robbed us of our most precious asset. In this vein I well remember how he dealt with a visitor, a medical corps colonel in full dress uniform who marched into the lab while Huggins was attempting to revive an experimental rat that had received an overdose of anesthesia. "Have you seen Dr. Huggins?" the colonel asked. Huggins paused briefly from mouth-to-mouth resuscitation of the rat. "Not recently," he said!

Lectures, Teaching, and Administration

His gift for economy of thought was also epitomized in his lecture. Among the few formal lectures to the medical students, his lectures on urology became classics. Some would justifiably claim that they were the only sessions that they remembered from

medical school. His most widely remembered aphorism was: "There are five causes of hematuria,"—that is, blood in the urine, if you will forgive my mentioning such matters here. I still remember them with the utmost clarity. Of course there were dozens of causes of hematuria, but he preferred that students learn a few important ones well, rather than forgetting them all.

Yet, except for the odd lab emergency, he always had time for his friends and colleagues and students. Appointments were not needed—but the discussions were brief and definitive, rarely more than fifteen minutes. His typical response to a request might well be: "Let's think about it"—and that meant a resounding no. He never, to my knowledge, sat on any committees, commenting that he could sleep better in his office than in committee meetings.

Although he received honors and prizes too numerous to recall here, his crowning achievement was the award in 1966 of the Nobel Prize for devising the hormonal treatment of cancer of the prostate.

In accepting this singular honor, Professor Huggins's remarks eloquently epitomize his own life:

First in my thoughts on this happy occasion is gratitude to my wife who has endured much as a Science-Widow. She did not interfere with the self-discipline which is necessary to create and which is lit by the passion for discovery. It is possible that the wife of a lab worker is never quite sure whether she or Science comes first in her husband's affections.

Secondly, is gratitude to the wonderful colleagues "with satchel and shining morning face." They keep the pot stirred. There is plenty of emotion in our business of discovery which is bred in the heart and in the head. Inevitably one develops affection for all of the colleagues united in the common purpose.

Thirdly, there is gratitude for the wonderful advantage I have enjoyed of a medical education. The doctor is blessed above all men in possessing the right and privilege to care for sick folks. The University provided me with a clinic where one could minister unto the cancer patients for whom little could be done.

It is awesome. It is inspiring. It is terrible. It is wonderful. The agony of cancer was expressed by Sir Thomas Browne: "The long habit of living makes meer men the more hardly to part with life and all to be nothing but what is to come."

A cancer worker utters the mariner's prayer: "Oh, Lord, Thy sea is so vast and my bark is so small."

Charles and Margaret were devoted to each other and led a happy home life with their daughter, Emily, and their son, Charlie, who followed in his footsteps and became a

clinician scientist, and was credited with developing a radically new method for preserving blood for transfusion. They made the most of simple pleasures such as their walks around Hyde Park, reading and re-reading the classics (Shakespeare, Chaucer, and Dickens were favorites), listening to music (especially Mozart), and playing cribbage. When they were not traveling, they enjoyed the Michigan dunes and spend part of each summer there.

The Hugginses had multitudes of scientific friends worldwide and were extremely generous in sharing these acquaintances with their young colleagues. An invitation to a scientific dinner at their home was much prized. Even daughter Emily was touched by these occasions. Soon after arriving at boarding school, she wrote home: "I am terribly homesick already. I miss those wonderful dinners at home when daddy and his visitors talk about cancer all evening."

The last few years were not easy ones for Charles Huggins. In 1983, we were gathered at a memorial service in this very chapel for his dear Margaret—whom we characterized as a "woman of valor." She took care of everything for her husband—except science and surgery. In 1990, his son, Charlie, succumbed to cancer. By a cruel and ironic twist of fate, Charles Huggins was unable to save his only son from the very disease that had been the central focus of his life-long scientific passion. But I am sure that he derived some measure of pleasure and serenity from the time spent with his daughter, Emily, with his daughter-in-law, Nancy, and with his seven wonderful grandchildren and eight great-grandchildren. Sadly, in the last few years he was house-bound but cared for with extraordinary devotion by Tommy and Lucy Altamero.

At the age of seventy-eight, when he was still working full time in his laboratory, Charles Huggins described his philosophy of science in the preface of his book *Experimental Leukemia and Mammary Cancer* as follows:

One works along at the lab bench without haste and without rest. Time has no meaning; every day something will be done, something will be found out. It is total commitment to the task at hand. It requires Spartan self-discipline. These are happy days, one following another, hopefully without end, so great is the delight of discovery.

Let us say farewell here to Charles Huggins: grateful for his towering discoveries; grateful for teaching us all so much about the delights of the business of discovery; and grateful for the shining example of a life that touched so many of us so deeply.

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Julian H. Levi, 1909–1996

By Jonathan Kleinbard

Julian Levi elicited a strong reaction from everyone who knew of him, those who understood what he was doing and those who didn't. In those days, and perhaps even today, you either hated him or, like those of us here this morning, loved him. I can tell you something about this. On a Saturday twenty-five years ago, I had returned to the University to work and was walking home for lunch. I had crossed 57th Street when a red station wagon pulled in front of me on the sidewalk and a member of the faculty jumped out. I knew him from my first stint at Chicago. He was a distinguished scholar in his field and a social activist. He didn't say hello. Instead he said, "Now that you're back you can help get rid of Julian Levi. Talk to Edward."

I was startled and taken aback. "You've got to be kidding," I said. "You wouldn't be living on 55th Place in that nice house if it wasn't for Julian." He didn't say good-bye, but instead jumped back into his car and drove off in a fury.

Julian brought about those reactions because he did things. There are visible results. You can see his greatest accomplishment everywhere about you (step out of the Chapel and look around)—the presence of the University of Chicago in Hyde Park, Hyde Park in the city of Chicago, a stable, integrated neighborhood where whites sell their homes to blacks and blacks sell their homes to whites without panic. Julian's legacy is a treasure—not only the presence of this great university in the city of Chicago, but the demonstration to an unaccepting world that such a society can exist.

But what would you expect? Probably not much if you went to see him in his South East Chicago Commission office in the old YMCA building on 53rd Street (now of not-so-blessed memory with its population of ex-cons and pre-release felons). You would walk through the dingy entrance past the entrance desk, up the dirty staircase, into his office. On the walls were pictures of Hyde Park before urban renewal and after, pictures of Mayor Richard J. Daley breaking ground for new housing, and maps showing criminality in the area, prepared by Don Blackiston, the tough wiry criminologist whom Julian recruited with Jack Meltzer, the planner, to help him. From Julian's window, you could look down on 53rd Street. When you looked over his desk, you couldn't miss the sign behind his chair. It said: "When you are up to your ass in alligators, it is difficult to remind yourself that your initial objective was to drain the swamp."

Julian was surrounded by alligators, but he drained the swamp.

I can see Julian today, with his bulldog jaws and hamcock fists, and sense the creative energy and brilliance that enabled him to save this neighborhood and university from oblivion. It is true that his ideas often were the most difficult to implement. But in most cases they were the only ones that were effective, even if you had to walk through a mine field to get them done. He never claimed he did it alone. He credited the University's leadership—Chancellor Lawrence Kimpton

and Trustees led by Glen Lloyd, Laird Bell, Gaylord Donnelley—residents who banded together in the SECC, and other neighborhood groups that at first supported him and later often attacked him, and most of all a committed, courageous Mayor Daley.

Julian would tell us over and over again that to be successful the stability of the neighborhood has to be linked to the academic mission of the institution. There is a real university here, unlike other universities that are a lot of parts and pieces without cohesion. Our neighborhood is the glue that makes this cohesion possible because, again unlike other places, the faculty live here in large numbers. They share more than work; they share living.

When Edward Levi asked me to return to the University in 1971, he said one of my tasks was to act as the liaison with Julian so that people would not think that the two brothers were engaged in fraternal pillow talk to run things together behind the scenes. Of course everyone did. How could you think otherwise about these clever descendants of rabbis—both their father and grandfather—these two intellectually acute, intellectually honest leaders? Edward, the younger, was more subtle in his ways than Julian, who usually bristled for a fight. Edward saw things in shades of gray. Julian, sharply defined. Both in different ways had saved the University they loved. Julian planned and implemented the neighborhood strategy that enabled the institution to survive in its physical environment. Edward recreated its standing as one of the nation's great research universities and steered it steadily and calmly through the years of the student troubles while his colleague presidents were calling in the civil police and rending their campuses by these and other impulsive acts.

Julian was the older brother in many ways to Edward and Harry. He was the older brother who arranged for the young professor Edward and his bride, Kate, to honeymoon at the Mexican home of his father-in-law, Milton Reynolds. Many years later he asked the mayor to line up the Illinois delegation for his brother's confirmation hearings as attorney general. Through his life he was the concerned uncle to his nieces and nephews, much as he was devoted to his own children and grandchildren. I mention it here, because most of us had little opportunity to observe or experience this side of Julian. We knew only the angry Prophet Isaiah and not the private Julian who felt deeply about his loved ones and friends, like A. N. Pritzker (with whom he and Marje traveled the world), Janet and Rick Dietrich, Buddy Mayer, Allison Davis, Rube Hedlund, the Daley family, and many, many others. He was always willing to help, to think through our problems and find solutions.

For those who accused Julian of racism and still speak about those years as though Julian rode through them in a white sheet, there is only one answer: perceptions of race and class were and remain the major issues affecting the great American research universities like Yale, Columbia, Penn, Chi-

cago, and others located in urban settings.

But you won't find any really integrated communities in this country, other than Hyde Park around the University of Chicago. None of them had a Julian Levi.

The ideal of a society in which race and class are not the issues that overpower our relationships concerned Julian throughout his life. He was the co-author of the White House Task Force Report on the Cities submitted to Lyndon Johnson in 1967, a report which formed the basis of the Kerner Commission Report that followed the 1968 riots. The task force report had one major theme—the "overriding problem of our cities is segregation by race and income," and it called for solutions based on the tenets of economic and racial integration. Its proposals to President Johnson have been repeated again and again by Julian's successors. Those on jobs showed up recently again in a book entitled *The Disappearance of Work*. Not new stuff, Julian said on the telephone only two weeks before he died. He gave us an agenda to accomplish what we call "fairness," an agenda yet to be used.

Remember that the Hyde Park of Julian's birth and education was different than the Hyde Park he found in 1952. He had married Marjorie Reynolds, helped his father-in-law obtain and keep the patent for ballpoint pens, and engaged, as only Julian could, in dozens of other hard-fought legal successes. The courts must have been littered with the carcasses of those engagements. But he was bored and craved a larger challenge. He got one. He wasn't educated in sociology and neighborhood change, but he wasn't blind. He had an overpowering intellect. As some of you know, when he grasped a problem, he ate it whole, and then spat out solutions that ranged from new federal and state legislation that enabled cities to take properties by eminent domain to suing landlords who violated building and zoning codes. In 1959, he drafted Section 112 of the Federal Housing Act, a key to the success of urban renewal here and in communities around the country and also to some of the crowning public works achievements of Mayor Daley. The section enabled the city to receive federal credits for dollars that institutions like the University expended on the neighborhood and related capital projects. Thus, the \$36 million the University spent from its endowment on the neighborhood resulted in millions of dollars in federal credits to Chicago. (And, by the way, the \$36 million was 10 percent of the University's endowment in those days.)

The sociologist Edward Shils used to say that you knew Julian had been there by the doors. He meant the old doors from demolished tenement buildings that were used to surround Hyde Park construction sites during urban renewal. With a staff of planners led by Jack Meltzer and through Don Blackiston's assistance, Julian brought forward Hyde Park A and B, the two urban renewal plans that revitalized this neighborhood. He had disappointments: Monoxide Towers, as we call it, the double apartment building in the middle of 55th Street; the failure to do something creative with the

Midway Plaisance as the architect Eero Saarinen had proposed; the lack of follow through by the universities to create a National Periodical Lending Library on our campus. But overall, Hyde Park A and B were successful. They were not accomplished without controversy, but Julian was unflinching and so were Chancellor Kimpton and the Trustees who stood with him.

Among those who fought him, in addition to those within the neighborhood, were Monsignor John Egan, then working in the Back of the Yards community, and Nicholas Von Hoffman, a community organizer working with Egan. They met privately with Julian to demand an assurance that poor blacks relocated from Hyde Park would not move into the white parishes. Julian sent them off in disgust, saying relocation if and when it occurred—black, white, or Asian—would have to be handled by the city and not by him or the University. It was too late in any event. Change already was occurring in South Shore. St. Philip Neri quickly turned into an all-black parish even before the Hyde Park program began. In Hyde Park, middle-class blacks were as concerned as the white population about the high crime rate and the conversions of apartments into small illegal units. Parents, regardless of their color, wanted as they do today good schools for their kids, a gang-free environment, good shopping, and parks. You name it. Your race does not change your needs or the standards you demand for your family. For all of his rough demeanor, Julian understood this, and he worked to make it happen. Julian took a lot of heat when he led the planning and implementation of urban renewal in the 1950s and 1960s. I have never heard Marje complain. I know Bill and Kay, his children, were taunted and occasionally threatened when they walked to school.

He had courage. He was a risk taker. For him, not taking risks was accepting failure. At the height of the controversy before the urban renewal program was approved by the Trustees, Julian brought in the demographer Phil Hauser, former head of the U.S. Census Bureau, to meet with the Trustee Executive Committee. Hauser said if you did nothing the trends would be irreversible. What guarantees if you intervened? he was asked. No guarantees, Julian interrupted. Hauser agreed. The Trustees voted to proceed. (And months later, after weeks of demonstrations and debate, Mayor Daley led the City Council in a 43 to 0 vote in favor of the program. It was a risk he also was convinced you had to take.)

Of course Julian had influence beyond Hyde Park. He was a teacher, and many of his students from Chicago and Hastings are his disciples in the way they approach public policy issues. In his seminars, his students became his colleagues in drafting some of the most important municipal and state legislation and regulations, including, with Bernard Meltzer, a new landlord-tenant law. He developed changes in the tax code that helped non-profit institutions. He crafted an amendment to the National Defense Act that removed the requirement that universities administer a loyalty oath to

students who apply for government loans. He became a special consultant to the American Association of Universities and the American Council on Education on federal policy as it affected higher education. Julian served as Chairman of the Chicago Plan Commission, and then the Mayor also asked him to head a special commission to protect low-income citizens suckered by the U.S. Department of Housing and Urban Development to purchase foreclosed homes throughout the city. Speculators purchased the better units. But homes selling for anywhere from \$2,000 to \$10,000 were being advertised by the government and sold to lower-middle-class families who then were unable to afford to fix them up or keep them up. The families would be ruined financially, wiped out. Julian not only ran the City's Home Rehabilitation Office, but also insisted on paying rent for the space it

occupied in City Hall.

He was not a free market man in the Chicago tradition. He forged a unique partnership between public and private sectors, a hallmark of our city's success in dealing with its problems. In his last years, Julian thought again that as a nation "we are afflicted with the problem of race, which is a national failure in our history that we've never really faced. People's willingness or unwillingness to accept others of different race and culture are a reflection of their social values." He went on, "It's a matter of trying to reach for whatever the prevailing economic and social forces are that will bring you to where you want to be, and that is something that you constantly, constantly have to work at. If you don't, then market forces take your destiny away from you. That's the challenge that anybody who is looking at the long term future of an institu-

tion has to worry about. It's both a challenge, threat, and an opportunity." He was talking about public schools. He was excited about what he had heard about the changes Mayor Richard M. Daley is making. He was also talking about colleges and universities and the role they must play in their communities. He was talking about neighborhoods and cities.

Princeton University presented the Rockefeller Public Service Award to Julian and Arthur Brazier in 1977. These two outstanding leaders became colleagues, partners in trying to improve the public schools in Woodlawn and revitalize the Woodlawn community. Dr. Brazier, with Mayor Richard M. Daley's help, is carrying on these projects successfully in our time. Princeton cited Julian for his "energy, sensitivity, and know-how" leading to "one of the finest examples of an integrated residential and

commercial district in a major U.S. metropolitan city."

Well, I guess I would challenge them to find another such district and all of us to find another Julian Levi.

Julian Levi lived a full and purposeful life. We benefited from it. Generations will. We should and I personally thank Marje, Bill, and Kay for all the time with him they sacrificed for us, for our university, its neighborhood, and its magnificent city.

Jonathan Kleinbard worked closely with Julian Levi for nearly thirty years, during twenty-one of those years as vice-president of the University of Chicago.

