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PROF. D. MAUGHAN BROWN

GRADUATION ADDRESS: 15th April 1993

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Everyone in this hall this evening will be aware that the groundswell of change which is currently affecting every area of life in South Africa is not passing our Universities by. For some while now Universities have been drafting mission statements intended to define their proper roles in South Africa in the 1990s and on into the next century, and have been embarking on strategic planning processes in an attempt to identify the best ways of implementing those Mission Statements in a context of massively increasing demand for Higher Education and sharply decreasing funding.

The mission-defining, and strategic planning processes have succeeded in clarifying the key questions and have added greater urgency to the quest for answers which are appropriate to our local context. How does one set about giving access to the University to those who have the potential to succeed when it is clear that matric results are often not a reliable indicator of that potential? What mechanisms can be developed for ensuring that all students with the potential to succeed at University have the means to afford to go to University? How, crucially, does one maintain academic standards in the face of increasing student:staff ratios? What does it mean to be an affirmative action institution where staff appointments are concerned? How does one develop lecturers' excellence in teaching and how does one measure and reward that excellence? To what extent should one be encouraging applied research as distinct from pure research? How does one set about developing curricula which will imbue graduates with the skills being looked for by employers?

You'll be pleased to hear that I'm not going to attempt to address all these questions in the 15 minutes allowed me. Indeed I'm not going to attempt to address any of them. Those few of you who are lucky enough to get to attend two graduation ceremonies on successive nights will be able to hear the Acting Vice-Chancellor, Professor Gourley, talking tomorrow evening



about the University's current strategic planning process, which she has been largely responsible for driving.

One of the fundamental assumptions underlying our tertiary educational system which has been thrown into the melting pot in the course of the past two years of national brainstorming has been that of the "natural" separation of Universities from Technikons and Colleges of Education. A good deal of current thinking sees the need for a breakdown of traditional boundaries, and far greater flexibility in terms of entry and exit points to tertiary education.

This might produce a model where, for example, someone could gain access to tertiary education via a teacher's training college, could transfer credits obtained there to a technikon and, having transferred further accumulated credits, could ultimately emerge as a University graduate with professional qualifications. If traditional training vs. education roles are going to become much more fluid, and if Universities aren't going to define themselves solely in terms of a research function - what is it, in particular, that might be seen as the distinguishing characteristic of a University? One answer might be found in the level of self-reflexiveness with which Universities approach their function. In that "reflexive", where mental operations are concerned, means turned or directed back upon the mind itself, the "self" part used in current terminology is somewhat tautologous. Before elaborating on what I mean by self-reflexiveness in this context I need to sketch in very briefly some of the potential future developments of the Pietermaritzburg campus by way of indicating why a focus on self-reflexiveness seems appropriate, to me at any rate, at an Arts and Social Science Graduation.

One of the major strengths of the Pietermaritzburg campus, in terms of "footprint", regional location and academic infrastructure, lies with Agriculture and Environmental Science. If we can capitalize on our existing strengths in animal and plant sciences, in cell biology, and in the earth sciences, making the most of our geographical location and contiguity with organizations such as the Natal Parks Board and the Institute for Natural



Resources, we should be able to produce undergraduate and post graduate courses, as well as internationally recognized research which will compete with any in the Southern Hemisphere. The areas our courses could excell in would include commercial and subsistence agriculture (and possibly forestry); resource management and land utilization (with a particular emphasis on hydrology and the management of water resources); terrestrial ecosystems; and environmental conservation. Sustainable resource management will pose one of the key challenges of the coming decades, and this campus is ideally situated to make a major contribution towards providing the teaching and research necessary to address the development needs implicit in that challenge.

The major strategic focus for the Social Sciences on the Pietermaritzburg campus is likely to be Rural Community Development, which is essentially the human and social science side of the same coin. Pietermaritzburg's situation in an urban environment with easy access to the rural communities of the Natal Midlands situates it ideally as a centre for rural and peri-urban studies. We would be likely to look to the School of Rural Community Development as the catalyst for generating undergraduate courses, leading to certificates and diplomas as well as degrees, drawing on a wide range of expertise which already exists within this University, if not necessarily on this campus, including rural sociology, human geography, town and regional planning, appropriate building technology, Dietetics and Home Economics, and primary health care and community medicine. Where research is concerned the region can offer a Social Science laboratory second to none.

If these are two of the major strategic directions this campus chooses to follow - and until detailed discussions with all interested parties have been held that must remain in the realms of conjecture - what role is there for the Humanities and those areas of the Social Sciences not directed towards Rural Development? Their role in general terms lies, I would suggest, in the cultivation of self-reflexiveness as a central pillar of institutional culture. By institutional self-reflexiveness I mean the institution's critical consciousness of its own functioning as an



institution - a constant process of evaluation and re-evaluation of its aims and goals, and its success or otherwise in meeting those aims or goals. This goes beyond self-consciousness, or even self-awareness, and embodies an on-going intellectual critique of what is being done, why it is being done, and why it is being done in the particular way it is being done. Where a University is concerned this must involve, above all, a constant awareness of, and sensitivity towards, context.

To take the most obvious and rudimentary of examples: I must be aware as I talk of the incongruities of the context in which I speak. I stand here on a warm late 20th century autumn evening in Pietermaritzburg wearing mediaeval robes of office of Western European derivation and headgear whose popular name, adopted in the mid 19th Century, associates mental processes incongruously, one hopes, with cement-mixing. "Here" is a sports hall best known for the basketball rivalry between two well-known local schools but dignified very successfully for this occasion by the University Estates division - who have brought outdoor plants indoors for the purpose. I am talking to a captive audience who have come here to graduate, or to watch relatives, friends or students graduate, not to hear me talk. I am speaking from a platform situated in a town which has for seven years been the symbolic, if not the topographical, centre of internecine violence which has cost thousands of lives including those of hundreds of children, and I am speaking as part of an academic ceremony which will end with the singing, in Latin, of "Gaudeamus igitur..." - let us therefore rejoice while we are young. I am speaking in the context of a nation shocked by the brutal assassination of a political leader loved and looked to for liberation by a substantial portion of the people of this country, who now bitterly, angrily, and in some instances violently, mourn his death.

It is, it seems to me, right and proper that we should, in this context, come together to celebrate the achievements, culminating in the graduation, of those who will be being awarded their degrees tonight; that we should don ceremonial garb for the occasion; and that we should deck the hall with boughs, if not with



holly. It is right that we should rejoice while we are young - or at least those who can still decently regard themselves as being young. It is also right that there should be acknowledgement of the deaths and the mourning and the anger. It seems to me, trying to be self-reflexive, that I need to keep all these incongruities, if that is what they are, in the air, juggler-like, if I am to say anything worthwhile on an occasion such as this.

If the Humanities and Social Sciences have as one of their key functions the development of critical-mindedness in their graduates - defined as the need to keep questioning and the ability to analyse the answers given - they also have a crucial role to play in the cultivation of an institutional culture of self-reflexiveness.

At the level of individual departments and faculties there is a good deal of critical self-examination going on - particularly with respect to the development of curricula appropriate to the particular needs of the society in which we live. At the institutional level we are only just beginning to re-evaluate our institutional identity, which is perhaps most in need of re-evaluation in respect of our relationship as a University with the communities we serve - and this applies as much to the formal commercial and industrial sectors as it does to our relationship with the rural and peri-urban communities from which an increasing proportion of our students come.

The University of Natal incorporated a commitment to "development" into its 1989 Mission Statement. Having done so we are in the process of working through what it means to be committed to "development" as part of our mission. In the process many of the traditional assumptions about the role of the University in society are being questioned.

Universities tend to perceive themselves as having three principal functions: they generate new knowledge through research, they impart the new knowledge to their students, and they then extend that knowledge to the communities the University serves. This



"diffusion of knowledge" model is very different, it should be noted, from the "ivory tower" of a popular mythology which sees Universities as institutions cut off from the surrounding world, turned inward on themselves, generating ever more arcane knowledge and imparting it to an ever more rigorously selected circle of the elect. Universities which see themselves as having a role to play in disseminating knowledge to the surrounding populace do recognize themselves as having a social context and responsibility. It is seen as being a good thing for knowledge, and technology in particular, to be "transferred" to those outside the walls of the academy. Terminology is often instructive.

Transfers were what one had as a child - patterns on pieces of specially prepared paper which, once they had been soaked in water, could be transferred to glasses, plates or anything else appropriately blank. To 'transfer' is to convey a design from one surface to another - the design must obviously be assumed to be complete and self-sufficient before the transfer takes place. "Dissemination" conjures up mental images of the sower going forth to sow, sprinkling seed on soil freshly prepared to receive it, and "diffusion", where knowledge is concerned, is interchangeable with dissemination. "Extension" denotes a stretching out, usually of a limb. Even "outreach", sometimes used as elegant variation on "extension", has slightly pious overtones suggestive of its being so much better to give than to receive that it becomes difficult to conceive of anybody having anything one might want to receive. The impulse is always unidirectional, those who are having the knowledge transferred to them, or extended to them, are the passive recipients. "Benefits" are seen as accruing to the external community as a result of extension or outreach; little thought is given to the reciprocal benefits accruing to the University, in terms of the generation of knowledge as well as goodwill, from its interaction with that community.

But this way of conceptualizing "extension", like the many other features of the University mentioned earlier, is also currently under review - a review given added impetus by a recent four-week visit to this University by Professor Richard Bawden, an



agriculturalist from the University of West Sydney who came, in part, to help us arrive at greater clarity with respect to a university vision of what we mean by agricultural "extension". The alternative way of perceiving a university's interactive relationship with the external community, which is taking shape as a result of his visit, is equally applicable across the whole spectrum of extension or developmental activities - from community theatre to appropriate building technology.

The essence of the argument is that as universities struggle to remain relevant to future needs they are having to develop new approaches, new theories and new practices based on the active participation of all actors involved in the processes of development as learners. This involves a model of action-research which sees those whose practical needs are the subject of research as being co-researchers rather than the passive recipients of hand-outs of knowledge. No longer does the researcher remain outside the system being studied, undertaking research from a stance of objectivity. Instead the researcher's own role and perceptions become part of the interaction being studied. Instead of remaining scientifically detached and holding objectivity as the supreme good, the determining ethic becomes one of responsibility. In brief, the interaction is based on the assumption that the University can learn a great deal from those whose problems, identified by themselves, it is trying to assist in solving; the benefits of interaction flow in both directions.

It is essential for any productive interaction that the university remain acutely sensitive and responsive to external social, political and economic developments - while trying to avoid being helplessly subject to such developments. It is clearly vital to such a relationship that those outside the University should be able to trust totally in the integrity of the institution. All parties must be able to have absolute confidence in the University's good faith as it strives to maintain what is best in its past while adapting where appropriate to meet the needs of the future.



Those of you who are graduating tonight have been involved in one way or another in the processes of change taking place at this University. You have a crucial role to play in continuing to interact critically with the University. We will look to, and need, your support as we try to maintain that precisely appropriate balance between the old and the new. Our congratulations and good wishes go with you.



GRA3/2/21

PROF BM GOURLEY, ACTING VICE-CHANCELLOR  
AND PRINCIPAL, UNIVERSITY OF NATAL.

GRADUATION ADDRESS : 16 APRIL 1993 in Pietermaritzburg.

Mr Chancellor, Deputy Vice Chancellors, Dr van der Pol, Honoured Guests, graduands, ladies and gentlemen

We are privileged to live during an extraordinary time, not only in South Africa but indeed in the world of today. Fritz Capra has termed this decade "a turning point". He believes it is "a transition of planetary dimensions"; "as individuals, as a society, as a civilization and as a planetary ecosystem" he says "we are reaching the turning point". John Sculley, one time chairman of Apple Computers, has called it "the turning of an era", the start of the 21 st Century Renaissance" and Sculley is a lot more modest in his perceptions of the future than Capra. He is envisioning a renaissance galvanized in much the same way as the first renaissance was galvanized, that is by technology - except this time it is not the technology of printing but rather the technology which has come to be known collectively as information technology. Computers and their capacity for simulation, artificial intelligence and use of hypermedia, mobile cellular telephone technology, fax machines, global broadcasting, satellite directed television and video cassettes all combine to put information in the hands of many. The question now is what you do with the information rather than whether you have it. Intellect and creativity are the key economic resources rather than the old style capital, labour and raw materials. Fortune magazine as long ago as 1991 declared "intellectual capital is becoming the company's sharpest competitive weapon" and "brainpower is replacing land as the elemental form of wealth" (Fortune, June 1991, pg 43).

Clearly this has enormous implications for you and I as individuals, and indeed Naisbitt and Aburdene in their book cataloguing megatrends for the next 10 years proclaim one of those trends to be "the triumph of the individual". It is now up to us to equip ourselves in



such a way that we can harness the technologies and exercise our intellects and capacities for creativity in such a way that we add value in a manner and on a scale undreamt of in any previous time. George Gilder in his book called the American Vision writes that "rather than pushing control to Big Brother at the top as the pundits predicted (Orwell for example) the technology by its very nature pulled power back to the people..." Individuals", he says today possess "powers of creativity and communication far beyond those of the kings of old".

Now clearly these major shifts have enormous implications for universities. The University of Natal is acutely conscious of this and has over the last 12 months engaged in an ambitious strategic planning exercise - an exercise which has entailed pondering the consequences of these developments on its modus operandi and indeed on its role in society. The strategic plan being developed has many facets to it and I cannot describe them all in the next 15 minutes. I will instead concentrate on one of the most important aspects only - that which has immediate consequence and implications for each and every person here this evening - and of course graduands and scholars in particular.

I intend drawing on Ernest Boyers' report sponsored by the Carnegie Foundation called Scholarship Reconsidered where the question was posed " what does it mean to be a scholar?" For us at the University of Natal the question was very much the same : **are we doing the right things?** What are the right things to be doing? I will describe just five.

The first right thing to do is to make quite sure the University is equipped with the technologies that will fuel the developments we have envisioned. Without these technologies and the tools they support we cannot create a new environment. Each of the technologies alone can enrich the educational process but each gains additional strength



when learners at whatever level can share resources over networks - networks that literally access the most remote of databases and put you in touch with scholars all over the world. I will not dwell too much on the remarkable features and potential of networks. What I will say is that the University of Natal has one of the most sophisticated networking systems in South Africa and is contributing directly to the development of a global computer communications system known as "The Internet". By the end of this year we will be well advanced on a path which connects computer, telephone and fax and will be even more sophisticated. We can tap into networks literally all over the world and communicate via E-Mail with scholars of our discipline all over the world. So the basic infrastructure either is or about to be in place.

The second right thing to do, we believe, is to continue to pursue "the scholarship of discovery". The University of Natal, like other good universities of the world, understands that research is at the very heart of academic life and sustaining this creative process is absolutely crucial if scholarship is to be vigorously advanced. Universities and indeed businesses must be designed to foster innovation, innovation which they must understand has never come from bureaucracies and hierarchies - it has always come from individuals.

Research in the university has never been confined to staff members only. The University of Natal's student population is 30% post graduate and most of these students are involved in the research process. But this is insufficient in the new world. The brutal fact is that it is no longer possible to teach students at university everything they need to know in any one career. There is no ration of knowledge that they can draw on throughout their careers. Even more significant, some of what they know will become totally obsolete. And this means that we must prepare all students, not just professional scholars, to embark



on a lifetime of learning and discovery. Learning is no longer a prelude to a career but a lifelong endeavour. The challenge recognised by the University will be to find ways of bringing to the process of instruction the passion for discovery that drives research. Students today (and indeed graduands here this evening, if they haven't already, should master the skills and tools of research as part of their basic education. They must learn to understand that to work in research is to recognize that knowledge does not reside privately in individual minds, or text books, or journals, or libraries or laboratories or data bases. Knowledge resides in a complex web or network that encompasses all of these. And creating a learning environment (one of the University of Natal's specific strategic objectives) is empowering not only individuals and the institution but indeed the world of knowledge.

The third right thing to do is pursue the scholarship of what Boyer calls "integration". Over the last 300 years the curriculum has been organized largely in terms of disciplines. This division promotes the tendency to view the world of nature, life and work as segmented, differentiated into parts ... an approach that is in fact proving detrimental to our society. Solutions to problems posed in our discipline often produce problems for another. The cliched issue of the ozone layer comes immediately to mind. Another and perhaps better example is the ethical problems encountered in dealing with scientific issues in the biotechnology field. Naisbitt and Aburdene contend that "philosophers and theologians, chronically underemployed for centuries, will be pursued by headhunters as though they were computer scientists"(pg 244). The fact is we need creative people who go beyond the isolated facts, who make connections across disciplines, who help shape a more coherent view of knowledge and a more integrated, more authentic view of life. In our fragmented academic world, this task of integration becomes more urgent every day. Several years ago, when a world renowned physicist Victor Weiskopf was asked what



gave him hope in troubled time, he replied "Mozart and quantum mechanics" - a sophisticated and perceptive answer.

The academic world is responding of course and we see some of what is happening in the new hyphenated disciplines like psycho-linguistics, bio-engineering etc. The University of Natal hopes to encourage the process by embarking on two specific strategic initiatives. The first is creating schools of overlapping disciplines. One such example is already underway - the School of Rural Community Development which involves Agriculture, Science and Social Science faculties. There are several other examples.

The second strategic initiative is one of curriculum reform. Some of this reform at least is responding to the views put to us by employers, and these views were reinforced by our study of trends and what was happening elsewhere in the world. Science and technology students needed more of what the humanities have to offer and the humanities students needed some of what the sciences have to offer. Two quotations are interesting here : one from a study called Educating Americans for the 21st Century which says "The basics of the 21st Century are not only reading, writing and arithmetic. They include communication and higher problem-solving skills, and scientific and technological literacy - the thinking tools that allow us to understand the technological world around us. These new basics are needed by ALL students - not only tomorrow's scientists - not only the talented and fortunate - not only the few for whom excellence is a social and economic tradition".

The other quotation comes from Peter Drucker, the management guru : "No matter whether the manager's job is engineering, accounting or selling, his effectiveness depends on his ability to listen and to read, on his ability to speak and to write".



The fourth right thing to do is pursue the scholarship of application. We need to relate the theory and the research to the realities of life. This is particularly true in South Africa and in our region, and the University of Natal is (as far as I know) the only University in South Africa that has put the word "development" very specifically in its Mission Statement - teaching, research and development. We understand we are in the communities' service. We do not believe we can be a university that is surrounded by pressing human needs and ignore them. That would be not only an intellectual failure but an ethical failure as well. With our shorelines polluted, the ozone layer threatened, our people unhoused, sick and hungry, our schools dangerously deficient and our cities imperiled there is clearly no shortage of issues to be studied - policy issues as well as practical alternatives. The University of Natal has in fact already responded in a quite extraordinary way to these issues and houses a host of units and projects, mostly funded by overseas agencies, which tackle what have come to be known as development problems. The strategic challenge is to integrate these activities into curricula so that lessons learnt can be replicated and research opportunities spread and communicated to others struggling with similar problems. We are lucky to have scholars who are demonstrating that knowledge can be applied and theory can emerge from practice. Not only that, but that good scholarship in these areas deserves status and place in the University.

And this brings me to my fifth and last right thing to do. As it is so well articulated in the Carnegie report "scholarship means not only the ability to rediscover and integrate and apply knowledge; it also means to inspire future scholars in the classroom - a process we call the scholarship of teaching".



Most of us have had the experience of at least one inspired teacher and you will know what an impact such a person can have in your life. Some of our graduands here tonight aspire to that noble calling and we are indebted, as a society, to those of you who fulfill your best aspirations. Certainly to keep scholarship alive, we need classrooms and laboratories where there is active, not passive, learning; where students are creative, not conforming, where curiosity is aroused rather than simply satisfied, where students learn to work together in collaborative efforts, where the journey of discovery is so exciting it is never abandoned. Certainly the technology to assist the teacher and the learner has never been more prolific. The possibilities presented by hypermedia, simulation and artificial intelligence combine to offer a dazzling array of classroom aids. Text, graphics, sound and motion can all be combined to suit individual preferences. Learning experiences need not be confined to the classrooms as computer programmes and video presentations offer students self-paced learning opportunities as well as alternative learning styles.

Again, the strategic challenge to the University is to improve teaching where it is necessary to do so and move away from a system of incentives where a professor is better rewarded for delivering a paper at a convention in Honolulu than he is by meeting with undergraduates back home. We must find a way to properly reward good teachers because to short-change teaching is to short-change scholarship itself.

What I have tried to describe here this evening is a glimpse at the future, a future which has been described as a second Renaissance - a rebirth and revival of learning and culture unleashed by new technologies - a future in which every one of us here tonight has an opportunity to harvest - if we understand the significance of our role and our ability to profit by the opportunities and possibilities it represents.



I also ask for your support as you join the convocation and alumni of the University of Natal. You are assured of belonging to a University which has confronted the issues of our time and is equipping and reformulating itself to remain worth of its tradition of service by scholarship in the various forms I have described not only to the immediate community it serves but to the wider community of scholars and people everywhere who have, through the possibilities offered by the new technologies, access to the unbounded world of knowledge. We are all on a journey into the 21st Century and I believe there is no place that journey will be more exciting than in higher education.

My very best wishes to you all in what will clearly be an eventful journey.



Graduation Address, University of Natal

GRA 3/2/19

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for ceremony in Pietermaritzburg, 17<sup>th</sup> April 1993UNIVERSITY ARCHIVES  
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## A PLEA FOR PLEASURE IN SCIENCE

C. K. Brain  
Transvaal Museum  
Pretoria

I expect that people entering the world of science these days as new graduates will find an exciting field but one that has some tiresome aspects. It is easy to be squeezed into a situation where pleasure fades from one's work. The economy here, as in many parts of the world, is somewhat depressed, and many large research organisations, like the CSIR, have become more strongly market-orientated than they were in former years. The emphasis now is on technology transfer to industry, and the slogan there could well be: "pay your way, or pack your bags". I have heard the new breed of science managers saying that there is little place now for intellectual curiosity: that is for dreamers who are not in touch with the real world.

Research may still be pursued in less aggressive environments, like universities and natural history museums; here I have often had cause to thank God for the Foundation for Research Development, whose policy is to support *good science*, whether it has immediate application or not. But even here, money doesn't exactly fall into one's lap. One has to pass through a rigorous peer-review evaluation system every few years and, depending on one's evaluation rating, research support becomes available. One is under a different kind of pressure here - the slogan could well be: "publish or we pull the plug", but in either system it is easy to become project-driven to the point that one's work becomes a stressful drudge.

How can one avoid this? I have one suggestion and it has to do with finding the right direction for oneself and then pursuing it for the sake of pleasure. The key is to home in on the direction uniquely right for oneself, whether it be in a quiet back-room laboratory, in the field, or in the fast-moving world of technology transfer. In this regard, I will tell you a story from my own past.

A great many years ago, when I first went to the University of Capetown, I wanted to study zoology and geology. While at school, I had derived the greatest pleasure from animals and rocks and knew intuitively that this was the right combination of subjects for me. However, on my first day at U.C.T. I was interviewed by a student advisor who told me that my chosen combination of subjects was a senseless one and that I would never get a job. I thanked the professor for his advice and then did zoology and geology all the same, because I *knew* it was right for me and had decided long before to let the job problem take care of itself. Well, I've been lucky: I have never been without a job although I must admit that early on in our marriage, Laura and I spent many a weekend taking photographs of other peoples weddings to help pay the bills at the end of the month!



In later years I have often been grateful for that intuitive sense that has told me what is uniquely right for myself, and for a steadfast streak that has prevented me from being pushed into wrong directions. It just so happens that I am at heart a naturalist - someone whose first response to the natural world is an emotional one, and whose subsequent work is motivated by intellectual curiosity. All my science has been done for fun, and I make no apology for it. I console myself by asking where, for instance, would biology be today had it not been for the pure intellectual curiosity of Charles Darwin, that took him around the world on the voyage of the *Beagle* and laid an evolutionary basis for biology. One should remember also that intellectual curiosity is one of the important sources of new technology, and without it, we would have little to transfer to industry in the years ahead.

I must admit that, at one time, I wondered if my theory of pleasure as a basis of productivity only applied to "soft" science like biology. Would it work, for instance, in the more precise realms of physics? Well, it so happens that Laura is an admirer of the physicist Richard Feynman, and she pointed out a passage to me on this topic in one of his books. Feynman worked during the last war on the development of the atomic bomb at Los Alamos and was later given a Nobel Prize for theoretical physics. He wrote a light-hearted autobiography called *Surely you're joking, Mr. Feynman*, in which he describes how, after the war, he was lecturing at Cornell University and, as a result of the stress involved in the atomic bomb project, he realised that he was "burnt out". This is what he wrote :

"Physics disgusts me a little bit now, but I used to *enjoy* doing physics. Why did I enjoy it? I used to *play* with it. I used to do whatever I felt like doing - it didn't have to do with whether it was important for the development of nuclear physics, but whether it was interesting and amusing for me to play with...

So I got this new attitude. Now that I *am* burned out and I'll never accomplish anything, I've got this nice position at the university teaching classes which I rather enjoy ... I'm going to *play* with physics, whenever I want to, without worrying about any importance whatsoever.

Within a week I was in the cafeteria and some guy, fooling around, throws a plate in the air. As the plate went up in the air I saw it wobble, and I noticed the red medallion of Cornell on the plate going around. It was pretty obvious to me that the medallion went around faster than the wobbling.

I had nothing to do, so I start to figure out the motion of the rotating plate. I discover that when the angle is very slight, the medallion rotates twice as fast as the wobble rate - two to one. It came out of a complicated equation! Then I thought, "Is there some way I can see in a more fundamental way, by looking at the forces or the dynamics, why it is two to one?"



I don't remember how I did it, but I ultimately worked out what the motion of the mass particles is, and how all the accelerations balance to make it come out two to one.

I still remember going to Hans Bethe and saying, "Hey Hans! I noticed something interesting. Here the plate goes round so, and the reason it's two to one is ..." and I showed him the accelerations.

He says "Feynman, that's pretty interesting, but what's the importance of it? Why are you doing it?"

"Hah!" I say. "There's no importance whatsoever. I'm just doing it for the fun of it". His reaction didn't discourage me. I had made up my mind I was going to enjoy physics and do whatever I liked.

I went on to work out equations of wobbles. Then I thought about how electron orbits start to move in reality. Then there's the Dirac equation in electrodynamics. And then quantum electrodynamics. And before I knew it (it was a very short time) I was "playing - working, really - with the same old problems that I loved so much, that I had stopped working on when I went to Los Alamos: the thesis-type problems; all those old-fashioned wonderful things."

It was effortless; it was easy to play with things. It was like uncorking a bottle : everything flowed out effortlessly. I almost tried to resist it! There was no importance to what I was doing, but ultimately there was. The diagrams and the whole business I got the Nobel Prize for came from the piddling around with a wobbling plate".

Well now, it remains only for me to congratulate the new graduates on their achievements and to wish them well in their future careers. My plea is that they should find real pleasure in science, as I am convinced that while they are having fun, they will be doing the best work of which they are capable.

#### Reference

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17/4/93



# NU INFO

April 1993

ALUMNUS EDITION

## Graduation address extracts

Professor Brenda Gourley – 16 April 1993

For us at the University of Natal the question is: **are we doing the right things?**

### Technology

Technological developments are stimulating what can be described as a second Renaissance – a spectacular impetus to knowledge and discovery. We must make quite sure the University is equipped with the technologies that will fuel the developments we envision.

The University of Natal either has or is about to put in place a communications system which makes it possible for us to tap into networks literally all over the world and communicate with scholars of our discipline all over the world. So the basic infrastructure either is, or is about to be in place.

### Scholarship

We must continue to pursue “the scholarship of discovery”. The University of Natal, understands that research is at the very heart of academic life and sustaining this creative process is absolutely crucial if scholarship is to be vigorously advanced.

Research in the university has never been confined to staff members only. The University of Natal’s student population is 30 percent post graduate and most of these students are involved in the research process. But this is insufficient in the new world. The brutal fact is that it is no longer possible to teach students at university everything they need to know in any one career. This means that we must prepare all students, not just profes-

sional scholars, to embark on a lifetime of learning and discovery. And creating a learning environment (one of the University of Natal’s specific strategic objectives) is empowering not only individuals and the institution but indeed the world of knowledge.

### Integration

The third right thing to do is pursue the scholarship of “integration”. Over the last 300 years the curriculum has been organized largely in terms of disciplines. This division promotes the tendency to view the world of nature, life and work as segmented, differentiated into parts ... an approach that is detrimental to our society. We need creative people who go beyond the isolated facts, who make connections across disciplines, who help shape a more coherent view of knowledge and a more integrated, more authentic view of life.

The academic world is responding of course and we see some of what is happening in the new hyphenated disciplines like psycho-linguistics, bio-engineering etc. The University of Natal hopes to encourage the process by embarking on two specific strategic initiatives. The first is creating schools of overlapping disciplines. One such example is the School of Rural Community Development which involves Agriculture, Science and Social Science faculties. There are others.

The second strategic initiative is one of curriculum reform. Some of this reform at least is responding to the views put to us by employers, reinforced by our study of trends and what was happening else-

where. Science and technology students needed more of what the humanities have to offer and the humanities students needed some of what the sciences have to offer.

### Application

We must pursue the scholarship of application. We need to relate the theory and the research to the realities of life. This is particularly true in South Africa and in our region. We do not believe we can be a university that is surrounded by pressing human needs and ignore them. That would be not only an intellectual failure but an ethical failure as well. The University of Natal has in fact already responded in a quite extraordinary way to these issues and houses a host of units and projects, which tackle what have come to be known as development problems. The strategic challenge is to integrate these activities into curricula so that lessons learnt can be replicated and research opportunities spread and communicated to others struggling with similar problems.

### Teaching

Again, the strategic challenge to the University is to improve teaching where it is necessary to do so and move away from a system of incentives where a professor is better rewarded for delivering a paper at a convention in Honolulu than he is by meeting with undergraduates back home. We must find a way to properly reward good teachers because to short-change teaching is to short-change scholarship itself.



# Graduation address extracts

Professor David Maughan Brown – 15th April 1993

THE mission-defining, and strategic planning processes have succeeded in clarifying the key questions and have added greater urgency to the quest for answers which are appropriate to our local context.

One of the major strengths of the Pietermaritzburg campus, in terms of "footprint", regional locations and academic infrastructure, lies with Agriculture and Environmental Science. If we can capitalise on our existing strengths in animal and plant sciences, in cell biology, and in the earth sciences, making the most of our geographical location and contiguity with organisations such as the Natal Parks Board and the Institute for Natural Resources, we should be able to produce undergraduate and postgraduate courses, as well as internationally recognised research which will compete with any in the Southern Hemisphere. The areas our courses could excel in would include commercial and subsistence agriculture (and possibly forestry); resource management and land utilisation (with a particular emphasis on hydrology and the management of water resources); terrestrial ecosystems; and environmental conservation. Sustainable resource management will pose one of the key challenges of the coming decades, and this campus is ideally situated to make a major contribution towards providing the teaching and research necessary to address the development needs implicit in that challenge.

The major strategic focus for the Social Sciences on the Pietermaritzburg campus is likely to be Rural Community Development, which is essentially the human and social science side of the same coin. Pietermaritzburg's situation in an urban environment with easy access to the rural communities of the Natal Midlands situates it ideally as a centre for rural and peri-urban studies. We would be likely to look to the School of Rural Community Development as the catalyst

for generating undergraduate courses, leading to certificates and diplomas as well as degrees, drawing on a wide range of expertise which already exists within this University, if not necessarily on this campus, including rural sociology, human geography, town and regional planning, appropriate building technology, Dietetics and Home Economics, and primary health care and community medicine. Where research is concerned the region can offer a Social Science laboratory second to none.

## Self examination

At the level of individual departments and faculties there is a good deal of critical self-examination going on – particularly with respect to the development of curricula appropriate to the particular needs of the society in which we live. At the institutional level we are only just beginning to re-evaluate our institutional identity, which is perhaps most in need of re-evaluation in respect of our relationship as a University with the communities we serve – and this applies as much to the formal commercial and industrial sectors as it does to our relationship with the rural and peri-urban communities from which an increasing proportion of our students come.

The University of Natal incorporated a commitment to "development" into its 1989 Mission Statement. Having done so we are in the process of working through what it means to be committed to "development" as part of our mission. In the process many of the traditional assumptions about the role of the University in society are being questioned.

Universities tend to perceive themselves as having three principal functions: they generate new knowledge through research, they impart the new knowledge to their students, and they then extend that knowledge to the communities the University serves. This "diffusion of knowledge" model is very dif-

ferent, it should be noted, from the "ivory tower" of a popular mythology which sees Universities as institutions cut off from the surrounding world, turned inward on themselves, generating ever more arcane knowledge and imparting it to an ever more rigorously selected circle of the elect. Universities which see themselves as having a role to play in disseminating knowledge to the surrounding populace, do recognise themselves as having a social context and responsibility. It is seen as being a good thing for knowledge, and technology in particular, to be "transferred" to those outside the walls of the academy.

But this way of conceptualising "extension", like the many other features of the University mentioned earlier, is also currently under review.

The essence of the argument is that as universities struggle to remain relevant to future needs they are having to develop new approaches, new theories and new practices based on the active participation of all actors involved in the processes of development as learners. This involves a model of action-research which sees those whose practical needs are the subject of research as being co-researchers rather than the passive recipients of hand-outs of knowledge.

## Sensitive:

It is essential for any productive interaction that the university remain acutely sensitive and responsive to external social, political and economic developments – while trying to avoid being helplessly subject to such developments. It is clearly vital to such a relationship that those outside the University should be able to trust totally in the integrity of the institution. All parties must be able to have absolute confidence in the University's good faith as it strives to maintain what is best in its past while adapting where appropriate to meet the needs of the future.



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