In the 19th century,

the essential resource

 $w \ a \ s \ l \ a \ n \ d$.



In the 20th century, capital.

In the 21st century, the

essential resource is...

e s s e n t i a resource

the vital pursuit

this book is about the University of Michigan and Learning Learnin

Kurtz, a boy of three, a violent gas

Kurtz, a boy of three, a violent gas explosion, on fire, rushed into the Trauma Burn Unit of the University of Michigan Medical Center... burns hideous, agonizing, cruel, cover the young body, the staff sees only two strips of skin, one under his diaper, the other across his head. He is three. Three years old, III burned. Two strips of skin left. 5%. "In the '60s, if you suffered a 50% burn, you had—perhaps—a 50% chance to survive. Now the death rate is about 8%."

here's a history here. The people who lived or died gave the bits of knowledge. If people have a history of doing the miraculous, it becomes the expected. And then you can teach that."

Zak's case: Leora Bowden: "Zak becomes a part of the greater picture that gets reported nationwide, for the things that we have learned....

About cultured skin. "How many times did we try cultured skin for Zak? Zak needed 95% of his skin replaced. We prayed for that skin to grow. But those are the questions...do you take a litttle piece and put it on him or do you put it in a petri dishand try to make it grow so you'll have a bigger sheet to put on him.

"It's inch by inch you learn." And that makes all the difference, for Zak and for the next burn victim. "Zak had to start to learn how to eat again, he had to learn how to walk again, which we worried about because of the degree of burns on his legs."

Leora: "Part of the trauma center concept is having the eople trained so the first responder there knows wh needs to be done, hands it off to the next person, to the next person, to the next person...there's a cast of several hundred people who were involved."

People at this hospital consistently do what others haven't yet been able to do.

Leora: "We did the first major rehabilitation study in the country about the outcome from severe burns. People say, 'Oh it must be awful, people must just collapse after such a devastating injury,' and the fact is—they don't. The norm is,—to go on and do very well. People do survive. They return to work. For kids here, the expectation is you will go to school. Not that you will sit home and hide.

What gets conveyed here is what is possible, so that other people will believe it's true."

The trade deficit

LOOMS LARGE,

One in seven American jobs is tied to the automobile industry and two thirds of it is driven by autos.

ichigan Manufacturing Mecca brings together two massive ____strengths: the unsurpassed calibre of the research and teaching at the U-M, and the innovative roots and productive muscle of America's automotive industry.

Traditionally, University research has focused its horizon line ten to twenty years out. Industry's cycle is far shorter: three to perhaps five years. A classic case of two ships, passing in the night...

The late Professor Sam Wu thought it was time to navigate differently.

He knew that 2 mm was the key. 2 mm—the width of a nickel—is the standard. Manufacture auto bodies with no variation in size or shape greater than 2 mm, and niques has been found to be less than a you'll lead the consumer satisfaction surveys. You are in the front ranks of global manufacturers. Make auto bodies with wider variations and you're giving consumers squeals, squeaks, leaks and warranty complaints. You may be headed for the scrap heap of industrial history.

Well into this decade the 2mm goal seemed unattainable in American automotive manufacturing, even as certain Japanese and German models met the standard.

Professor Sam Wu died during surgery in

1993. But what Sam taught us lives, grows, and guides us to the next breakthroughs, as the 2mm project continues at what is now named the S.M. Wu Manufacturing Research Center, on the U-M campus.

University of Michigan students started learning on the line. Shift after shift, side by side with veteran autoworkers on the assembly line at Chrysler's Jefferson North plant, they studied the method for aligning rear panel assemblies. Weeks of observations, thousands of measurements and endless nights of analysis led them to suggest that plant engineers re-align a sensor deep inside a piece of assembly equipment.

The fix itself took 20 minutes. 51 other problems studied by the students of Sam Wu yielded 48 solutions. Consumer complaints about auto bodies manufactured at the plant were cut in half from 1993 to 1994.

The payback from installing these techyear. A cost benefit study defined the payback as 1000%.

Dwight Carlson, CEO and President of Perceptron and Chairman of Auto Body Consortium: "More than any other thing, do you know what we learned?

"When we started, it seemed laughable the thought of making this program a reality, by pulling together government agencies, academic institutions, and intensely competitive companies across the auto industry. The most important lesson Sam taught us is,

This is real. We can do this."

"What seemed complex, Sam made clear."

Robert Lutz, President and Chief Operating Officer, Chrysler Corporation, April 17, 1993.



Networks and highways. Digital information, global transmission. The technology is fabulous.

What do we do with it? What does it mean in human terms? That's what we are learning here at ITIC.

The Integrated Technology Instructional Center. It is—in one dimension—a physical place. An emerging facility gracing the University's North Campus. But it crosses dimensions, and integrates disciplines. The arts, sciences and humanities are all players here. They weave across the common landscape, and don't care much about boundaries.

Tow to label ITIC? Not an easy call.

Functionally, it's a teaching, learning and research facility. Programmatically, it's where new technologies are bent to the creation of knowledge, and pursuit of learning. And in terms of output, the impact lies in how it fosters collabo-

teams based in Denmark and California, to study the earth's upper atmosphere as it's manifested in a site over Greenland. No one leaves home, everyone is linked to the site and one another...

"The web is an interesting structure...

From here, geology students are working with still the Vita creature."

0700 Greenwich Mean Time, Copenhagen:

one group takes readings and establishes findings...

1300 GMT, Ann Arbor:

a team evaluates those findings and conjures how they might impact the current hypothesis...

2100 GMT, Palo Alto:

a third team tests those ideas and queries Copenhagen about support data...

0300 GMT....

These teams aren't just communicating, they're collaborating. The work of one triggers a new insight—or a new assignment, homework is still very much with us—for another.

Learning is moving faster; it must also move wider. ITIC stands for: Crossing boundaries under blue skies.

http://www.mi

TEACHER ROOM HOUR

There are many ways to learn. But the initial, critical mass comes in the ONE-ON-ONE connection.

Then did it happen for you? Was it a sudden moment of clarification, your mind organizing a range of forces, elements, sources and influences into a pattern that made sense?

Or was it the sheer tumult, the cascading of ideas each emerging to pounce on the other in an astonishing eruption of intellectual exuberance—at twenty past the hour, on the third floor of a building with squeaky floorboards?

The catalyst was a teacher. Through the beauty of his logic or the audacity of her insight, eyes were opened. Minds churned. Left side cells pushed things into place and right side cells knocked down walls. What's the best metaphor—professor as lion tamer, fending with a stool and snapping the whip? Professor as tour guide, opening doors of perception and pointing the way? Professor as travel agent may be as apt as the description gets: one who understands journeys and advises on itinerary.

THISIS EXPERIENCE IN LIFE.

out, you can't step into the same hallway twice.

minds together is the most fundamental form the research team lead by Dr. Francis Collins to disof teamwork.

In the phrase of former University President of cystic fibrosis... Miller, the education of a student leads to "Death of and teaches accordingly.

Fifty minutes of ferment, and a path—not too a Salesman"...a theater professor encourages an much to say a life—has been changed. As it turns undergraduate student named James Earl Jones, who becomes the Great White Hope, and an In Ann Arbor, putting bright and energetic Othello for the ages...curiosity and empathy drive cover the gene responsible for the terrible affliction

James B. Angell, the process creates "an uncommon The teacher doesn't know when she education for the common man." His summation stands in front of the class that the will be as valid a century from now as it was a cen- emerging young mind will light up the tury ago, on this campus where...with Arthur world's stage. She simply assumes it will,



It almost broke me

Learning at Michigan happens in a spectrum of environments.

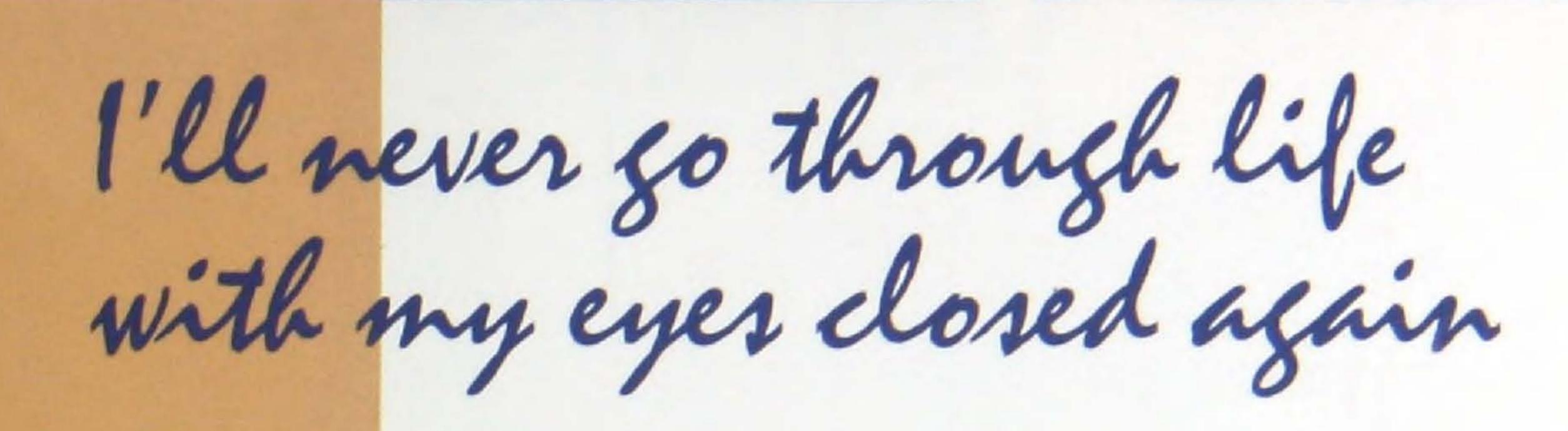
For a growing number of students it happens on the front lines of this society. Learning in the head is not enough for these students. They are learning in the heart.

Their futures will be as physicians, teachers, entrepreneurs, novelists, chemists, senators, marketing gurus. Their futures won't be quite the same.

"I volunteer at a shelter for battered women and their children. I have a regular shift, evenings; and sleep there at night. One night as I came through the kitchen a woman who'd never had much to say was there with her four-year-old son. She was restless, almost furtive. It was late and I was thinking about what I had to get done the next day. She asked me something simple - did I know where a bowl was, something like that. It felt almost awkward, her tone, and then she mentioned something else insignificant, in a halting way...

"I ended up sitting at the table with her, talking listening really - most of the night. Her son fell asleep in my lap. Her life and her experiences, what she'd been through they were nothing like what my path has been. Somehow the hour, the kitchen, the darkness outside - we didn't reach any shattering breakthroughs or come to any cosmic understanding of the universe. But the next week she told me it had helped. I'll remember that, and her story and the way the headlights from the occasional car pushed shadows across the kitchen wall, at 4 AM..."





Yes, they do good for those they serve. Ask the family in Iowa whose home they helped rebuild after floods ravaged the heartland. Or the high school students in Massachusetts with whom they created workshops to help adolescents reduce the level of violence in their environment. A group of Michigan students on a road trip in February—but instead of the beach they head to a town in West Virginia, a neighborhood in Cleveland, and a structured service learning experience. Because this is not just doing good. It's good learning.

"Maybe it's because I'm male and an athlete at Michigan-but some of the harder-to-reach guys gravitated to me a little. It didn't take much really, just to take a little interest in what they were up to ...

"One kid was having trouble getting his homework done. It turned out when he tried to stay in and do it at home his mother would really get on him, call him stupid, tell him to 'do that in school, school is for that.' There was no support. When I met him, he thought alone was how you did it."

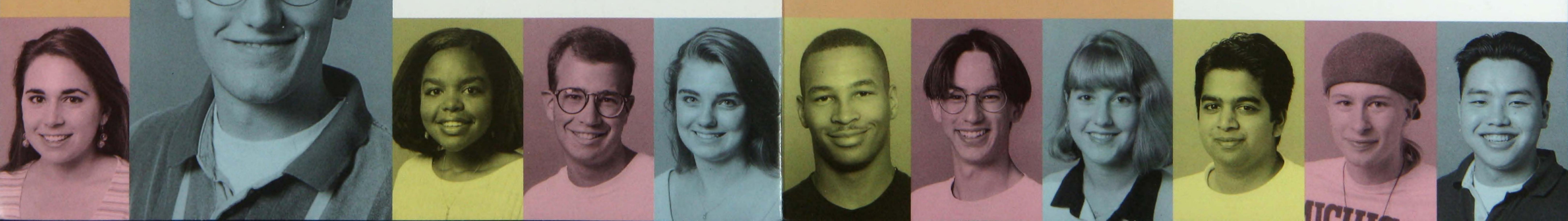
If there is a single word that characterizes the University of Michigan—historically, intellectually, artistically, athletically, politically, culturally—it is: intensity. There is nothing soft about how these students are learning. A current member of the faculty says:

"Michigan legitimized this way of learning."

And Dr. Shirley Sutton challenges her students, "being here means you have the intellectual capability and the financial means—through yourself, your family, those who support financial aid—to be a Michigan student. It means you have been given a gift. You don't just put that in your pocket.

"Give back.

Knowledge is for the collective good."



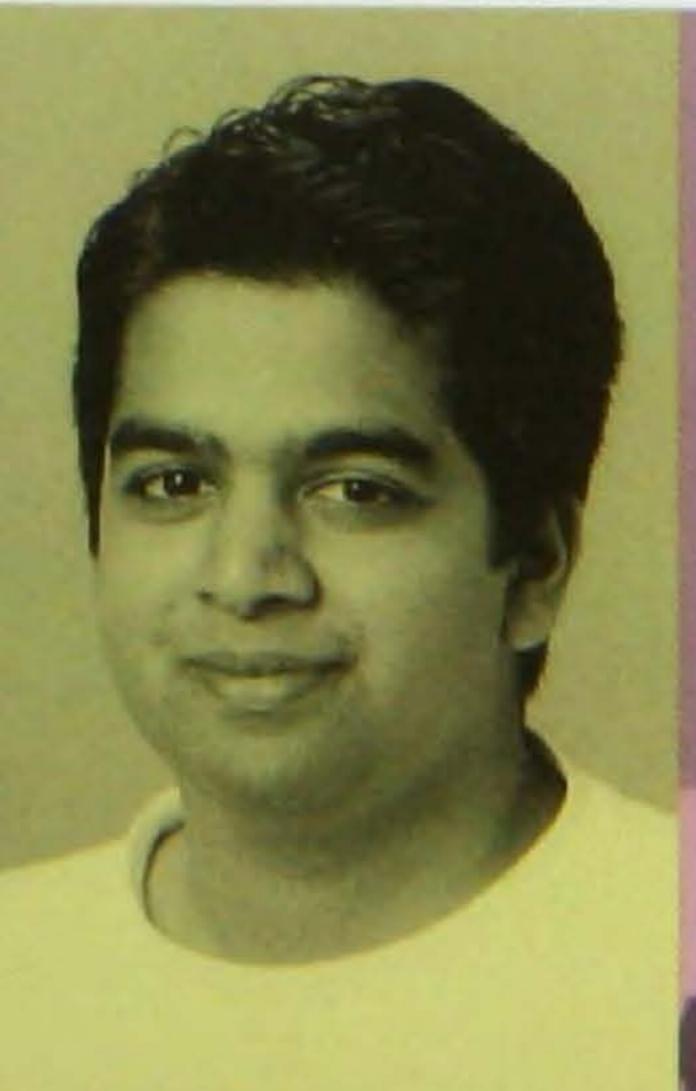


















To create results... cross disciplines Kunners

Championships are terrific. Learning is paramount.

The University of Michigan Solar Car Team conceptualizes their vehicle. Then they design it—or one of the "Team's teams" does; another will build it from scratch while another executes the business plan that manages the venture...another creates selves. Conditions can range from sudden thunderstorms in the deep American South, to raging sandstorms in the Australian outback. These are crucial factors, but to win you must harness the sun.

But then—what makes a winner?

What the world needs now more than love, or a good five cent cigar—is solutions.

How to educate. How to medicate. How to mediate. How to communicate. How to sustain. How to manage. How to preserve. How to nurture. No century has generated so much information—or so many challenges. We've filled our heads, and now we scratch them. Innovation is the application of intelligence and imagination.

Take minds. Discipline, train, challenge them. Put them in teams and push them across disciplines.

Learn from each other.

Answers come from collaboration, and cross pollination.

Channel the energy, to solutions.

Everything is new under the sun. One the campaign to gain sponsorships...and a hopes this technology will be fruitful. One team plots the strategy for the races them- hopes that solar cells and storage batteries will generate energy, create jobs, limit pollution. But that remains to be seen. There may be useful answers from this pursuit. Or solar power could be superseded by something different, better.

> In 2032, solar power

may not be a factor. minas will be.

Webs

connections

history

i m a g i n a t i o n

technology

t e a m s

trust

s w e a t



The Regents of the University

Deane Baker, Ann Arbor
Laurence B. Deitch, Bloomfield Hills
Daniel D. Horning, Grand Haven
Shirley M. McFee, Battle Creek
Rebecca McGowan, Ann Arbor
Andrea Fischer Newman, Ann Arbor
Philip H. Power, Ann Arbor
Nellie M. Varner, Detroit
James J. Duderstadt, ex officio

The University of Michigan, as an equal opportunity/affirmative action employer, complies with all applicable federal and state laws regarding nondiscrimination and affirmative action, including Title IX of the Education Amendments of 1972 and Section 504 of the Rehabilitation Act of 1973. The University of Michigan is committed to a policy of nondiscrimination and equal opportunity for all persons regardless of race, sex, color, religion, creed, national origin or ancestry, age, marital Vietnam-era veteran status in employment. educational programs and activities, and admissions. Inquiries or complaints may be addressed to the University's Director of Affirmative Action and Title IX/Section 504 Coordinator, Room 4005, Wolverine Tower. Ann Arbor, MI 48109-1281, (313) 763-0235; TDD (313) 747-1388; Fax (313) 763-2891. For other University of Michigan information call. (313) 764-1817.