

## Beckman anniversary

## Analysing profitable research

Fullerton, California

At the age of 86, Arnold O. Beckman still has his sights set on the future.

Beckman launched his corporate career with the innovation of the pH meter in 1935. Many years and many millions of dollars later, the founder and chairman of Beckman Instruments still considers himself more a scientist than a businessman. Today, with his \$1,000 million company safely tucked under the Smith Kline Beckman wing, the former chemistry professor from the California Institute of Technology spends most of his time and money supporting programmes that he hopes will shape scientific enterprise in the years to come. He has contributed more than \$100 million in the past decade, nearly \$70 million in the past year alone.

Last month, at the festivities to mark the company's 50th anniversary, Beckman spelled out his formula for keeping science in the United States alive and well. The key ingredient, he says, is education.

Of the US education system, Beckman says "we've got a big repair job to do". He sees education as a dynamic, rejuvenating escort that directs an individual throughout his or her lifetime, and he feels that the present structure of higher education misrepresents that vision. "This strange idea of dividing education into four-year packages", he says, blurs the mission of college education, which is "to teach people how to learn".

Beckman maintains that degrees awarded at the conclusion of an arbitrary period of time give the impression that education is a static commodity. The one big advantage to be gained from having a PhD, he claims, "is to realize it doesn't mean anything. I've seen PhDs who are nitwits."

How would he restructure higher education? "Like a department store" that people would patronize whenever the need for a particular item arose, not like a remote citadel whose doors shut firmly behind those who graduate.

Certainly Beckman's own career has been spurred on by insatiable curiosity. A blacksmith's son from Cullom, Illinois, he had built his own chemistry laboratory before he reached his teens. He graduated first in high school class and, within four years, earned both bachelor's and master's degrees in chemistry from the University of Illinois. A brief spell at Bell Laboratories gave Beckman the electronics background he would later exploit in instrumentation design. In 1928, when Beckman received his PhD in photochemistry from California Institute of Technology, the institute invited him to join the faculty.

Beckman and his wife Mabel were settled

at Caltech when, late in 1934, one of Beckman's fruit-growing friends asked him to build a device to measure the acidity of lemon juice. Within a few months, Beckman had developed the "acidimeter"; the term pH had not yet been established.

By 1939, Beckman's instrument had spawned a business that demanded a full-time manager. Beckman left Caltech, not without considerable deliberation, to pour his energy into National Technical Laboratories, Inc., which eventually became Beckman Instruments. A year later, his company began marketing the model DU quartz photoelectric spectrophotometer, the Helipot potentiometer, and a portable oxygen analyser. These three products guaranteed the company's success, and by 1966, Beckman had received a business statesman award from Harvard Business School of Southern California.

Beckman's philosophy on research echoes his personal experience. "The end result of research is to find out something useful", he says. "The days when applied science was a step lower than basic science



Arnold Beckman at his company's anniversary celebration.

are gone." For Beckman, academic research should not be spiked with financial incentives from outside an institution. Unless patent proceeds go to the individual's employer, a researcher will find himself "working for two masters".

Patent royalties aside, Beckman expresses concern over the lack of reliable sources of research support. "We've been too affluent", he laments. "The money (for research) comes from the public, but look at what the public is interested in; look at the salaries they pay someone for throwing a few baseballs over a plate. I'd like to see a small percentage of the GNP automatically devoted to basic research." Beckman also advocates industry support in the form of cooperative arrangements. These are in industry's best interests, he contends, because industry needs academic links.

Since the 1982 merger with Smith Kline Corporation relieved Beckman of many of

his executive responsibilities, he has been kept busy practising what he preaches. Last month Caltech students, faculty and trustees gathered for the dedication of a \$6.5 million chemistry building established through a Beckman donation. Beckman had previously remembered his alma mater with \$7 million for an auditorium and behavioural biology laboratory. A \$3.5 million gift created the Beckman Laser Institute and Medical Clinic at the University of California, Irvine and another \$3.5 million set up a vision centre at the University of California, San Francisco.

Beckman also donated \$10 million to form the City of Hope Beckman Research Institute; Stanford University received \$12 million to erect the Arnold and Mabel Beckman Laboratories of Biochemistry. Finally, Beckman outdid himself last October with a \$40 million gift to the University of Illinois, the largest amount ever given by any individual to a public university (see *Nature* 317, 568; 1985).

Although Beckman suggests that he is "not a generous man", this lack of generosity has saddled him, to his dismay, with the label of philanthropist. Today Beckman distributes his beneficence through the Beckman Foundation, which has just two employees, Beckman and his

secretary, and which receives 1,300 proposals every year.

Despite Beckman's apparent nonchalance about his benefactions, he shrewdly manipulates his wealth to promulgate his philosophy. He supports only proposals that fit his criteria for the successful research community. Beckman encourages interdisciplinary interaction, which he thinks will become imperative as science becomes more com-

plex. He also looks for a steady "infusion of young brains, people who don't know what you can't do".

Tempering his confidence in the saving powers of science, Beckman is also keenly aware of the thorny problems it thrusts upon society. Last November, Beckman gave the National Academy of Sciences and the National Academy of Engineering \$20 million for a west coast headquarters to study and adjudicate the ethical and social challenges posed by scientific advance (see *Nature* 318, 97; 1985).

Vital to Beckman's action-oriented formula, however, is one component that cannot easily be institutionalized: enthusiasm, which he considers the best motive for any endeavour. "If you're not enthusiastic about what you're doing, you're probably doing the wrong thing", says the spirited octogenarian. By that measure, Arnold Beckman must be doing all the right things.

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