



Smithsonian
National Museum of American History
Kenneth E. Behring Center

Guide to the Records of Wedge Innovations

NMAH.AC.0534

Lisa Robinson

2012

Archives Center, National Museum of American History
P.O. Box 37012
Suite 1100, MRC 601
Washington, D.C. 20013-7012
archivescenter@si.edu
<http://americanhistory.si.edu/archives>

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Collection Overview

Repository:	Archives Center, National Museum of American History
Title:	Records of Wedge Innovations
Identifier:	NMAH.AC.0534
Date:	1985-1996
Extent:	13 Cubic feet (28 boxes, 5 oversized folders)
Creator:	Shayt, David H. Wedge Innovations
Language:	English .
Summary:	The records of Wedge Innovations document the invention and development of a new hand tool, the SmartLevel, an electronic builder's level; also included are company management and policies.

Administrative Information

Acquisition Information

The collection was donated by Andrew Butler, SmartLevel inventor and company founder, Brian Bayley, Vice-President for engineering at Wedge Innovations from 1989-1992, and Kevin Reeder, an independent industrial designer, 1995-1997.

Provenance

The collection was donated by Andrew Butler, SmartLevel inventor and company founder, Brian Bayley, Vice-President for engineering at Wedge Innovations from 1989-1992, and Kevin Reeder, an independent industrial designer.

The oral history interviews were conducted in 1995 and 1996 by David Shayt, curator, Division of Work and Industry and funded by the Lemelson Center, National Museum of American History.

Some material from David Shayt's working files for the oral history project, which came originally from Ronald Wisnia and Ken Gunderson, engineers at Wedge Innovations, was interfiled with the Butler donation. Records donated by Andrew Butler, Brian Bayley, Kevin Reeder, Rick Fetter, Ronald Wisnig, Ken Gunderson. Oral histories conducted by David Shayt, curator, National Museum of American History.

Related Materials

Materials at the National Museum of American History

The Division of Work and Industry, National Museum of American History contains artifacts related to the SmartLevel Collection. These include five SmartLevels (Accession #1991.0823; 1996.0284; 1996.0285; 1996.0288; and 1996.0289). They are an original teak WedgeLevel,

a Pro SmartLevel, a Series 200 SmartLevel, a Bosch version of the SmartLevel, and a Macklanburg-Duncan SmartTool level. There are also four sensor modules (torpedo levels), two sensors, two carrying cases, one cap, one tee shirt, and one wooden puzzle with the inscription "The World Isn't Just Level and Plumb."

Processing Information

Processed by Lisa Robinson, 1997; revised Alison L. Oswald, 2002; revised by Julie Pepera, 2006.

Preferred Citation

The Records of Wedge Innovations, 1985-1996, Archives Center, National Museum of American History, Smithsonian Institution.

Restrictions

The collection is open for research use.

Conditions Governing Use

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Biographical / Historical

Andrew G. Butler (b. 1955), the founder of Wedge Innovations exhibited an interest in building construction and an entrepreneurial spirit early in life. From age 12 to 17 he built a boat that he then sailed alone from California to Tahiti, where he spent several years as an independent carpenter and building contractor. After returning to the United States, he earned a B.S. degree in electromechanical engineering from Stanford University (1983) and became a software specialist for Bechtel Construction. In 1985, he conceived of an idea for an electronic carpenter's level that could read a range of angles. Butler formed Wedge Innovations in 1986. He worked in the basement of his home in order to develop and market this level, selling his boat to finance the venture. He hired Marilyn Crowell as his secretary and Robert Nagle and Dan Kellogg as engineers. This company developed the sensor technology and software necessary to build the company's first product, the WedgeLevel. The heart of this tool was an electronic sensor circuit connected to a microprocessor capable of measuring the tool's orientation. This sensor module fit into an ergonomically-designed teak rail with anodized aluminum edges jointly developed by Butler, engineering design consultant Kevin Reeder, and engineer Ronald Wisnia.

In 1987, Wedge moved to Santa Clara to begin manufacturing the WedgeLevel. The transition from a research and development concern to a manufacturing company proved difficult, due to manufacturing and financial difficulties. It was difficult to obtain a reliable yet inexpensive source of teak for the rails, designs for a plastic composite and aluminum rail were developed, while offshore manufacturing of the sensor components was established. Overarching all concerns was the persistent difficulty of obtaining sufficient investment capital. While managing his growing company, Butler also began planning for a line of hand tools that combined microelectronics and user-oriented, ergonomic design. In 1988, the company changed the name of its product to SmartLevel in order to emphasize the company's proposed line of Smart Tools. That same year, the company adopted a new corporate logo, a stylized W with a red wedge, signaling its growing maturity. Promotion of the product also began through demonstrations of the prototype done by consultant building contractor, Rick Feffer.

In January 1989, the SmartLevel prototype was launched at the National Association of Home Builders Show in Atlanta, Georgia. The favorable publicity generated by this launch and by the company's media campaign generated many orders. To supply these orders, Wedge moved to larger quarters in Sunnyvale on April 1, 1989. In June 1989, Wedge gained further publicity by donating several SmartLevels to a Habitat for Humanity project in Milwaukee, where former president Jimmy Carter used one. Although Wedge expected to ship the first SmartLevels in July 1989, there were considerable delays in manufacturing. In particular, there were stability and performance problems with the sensor, which engineer Ken Gunderson was brought in to remedy. The sensor module was re-engineered to be more rugged and the level was redesigned with a plastic composite and aluminum rail. The new level, known as the Pro SmartLevel, was intended for the professional construction market. The first SmartLevels were shipped on September 5, 1989.

In 1990, patents were granted to Andrew Butler, Donald G. Green, and Robert E. Nagle for an inclinometer sensor circuit and to Butler and Ronald Wisnia for a carpenter's level design. That same year, Brian Bayley joined Wedge as Vice-president for Engineering, and Edwin "Win" Seipp joined as Project Manager - DIY SmartLevel. Seipp's responsibility was to develop a low-cost, "do-it-yourself" version of the SmartLevel, which was eventually called the Series 200 SmartLevel. This level had an all-aluminum rail and a non-removable sensor.

In September 1990, the company moved to San Jose and by 1991 had over 60 employees. Although sales continued to grow and name recognition of the product was quite strong, Wedge had difficulty meeting the expectations of its investors. Butler entered into financial negotiations with the Macklanburg-Duncan Corporation, a large-scale manufacturer of hand tools, to seek investment in his company. These negotiations led in November 1992 to the acquisition of Wedge by Macklanburg-Duncan, which dissolved all but Wedge's engineering section. Macklanburg-Duncan today manufactures a "SmartTool" level, while Butler co-owns D2M (Design To Market), a company that develops new product ideas for the market.

SmartLevel Chronology

1992	Butler negotiates with Macklanburg-Duncan for a merger to save Wedge. In the midst of the negotiations, Butler is fired by his Board of Directors. Butler regains control of Wedge three months later, fires the replacement president, and sells Wedge outright to Macklanburg-Duncan, which dissolves all but the engineering functions of Wedge.
1991	Wedge sponsors a "New Product Development Conference," where numerous designs for new hand tools are worked on. SmartLevel sales and name recognition grows but not quickly enough to meet overhead expenses of new facility or investors' demands.
1990	Yet more redesign work, both in-house and with Kevin Reeder, who also develops idea for "SmartTube" carrying case (not built). Patents granted to Andy Butler et al. for inclinometer sensor circuit and carpenter's level design. Wedge hires Brian Bayley as vice-president for engineering to develop a low-cost model of the SmartLevel. The all-aluminum Series 200 SmartLevel is born. Wedge moves to larger facilities in San Jose.
1989	SmartLevel launched at National Association of Home Builders show in January. Good press coverage, but cannot meet orders. More publicity from Habitat for Humanity project when former President Jimmy Carter uses a SmartLevel. But stability and performance problems plague sensor. More redesign work results in more rugged Pro SmartLevel. The first SmartLevels shipped on September 5, 1989.

1987-1988	Wedge moves to Santa Clara; intends to begin manufacturing and to develop an entire line of "Smart Tools" but encounters financial and engineering difficulties; Wedge consults with independent design engineer, Kevin Reeder, on level design. Intensive redesign effort develops the SmartLevel, made of plastic and aluminum rail.
1986	Wedge Innovations founded in the basement of Butler's house; basic sensor design worked out; teak & aluminum WedgeLevel developed.
1985	Idea for electronic carpenter's level formulated by Andy Butler.

Scope and Contents

The SmartLevel story gives excellent insight into the life cycle of a small Silicon valley start-up in the 1980s. SmartLevel's creator, Wedge Innovations, established a market for a new product, achieved national distribution, off-shore manufacturing, and product licensing, before going out of business due to pressure from profit-hungry venture capitalists.

The records of Wedge Innovations is a "tool biography" that documents the invention and development of a new hand tool, the SmartLevel, an electronic builder's level first conceived in 1985 by Andrew Butler. The SmartLevel Collection is divided into seven series: Corporate Records, Engineering Records, Financial Records, Marketing Records, Operations Records, Product Development Records, and Corporate Culture, reflecting both the organizational structure of Wedge Innovations and the company's working environment.

Series 1, Corporate Records, 1985-1993, address the overall management of Wedge Innovations and document its policies, especially through the company's annual business plans, 1986-1992, and the monthly reports prepared for the Board of Directors' meetings, 1989-1992. This series also details the workings of each department through weekly departmental reports. The staff meetings files, July-November 1989, February 1990-November 1992, are particularly useful for understanding the day-to-day operation of the company.

Series 2, Engineering Records, 1985-1993, document the design and development of the SmartLevel from its conception in 1985 as the WedgeLevel, through its production as the SmartLevel in 1989, and through its refinement into the Pro SmartLevel and the Series 200 SmartLevel in 1991. The design process is particularly well documented through Andrew Butler's and Kevin Reeder's design notebooks and through the detailed technical drawings done by Butler, Reeder, and Ronald Wisnia. Also well documented are the efforts made to solve the many problems associated with the development and quality control of the electronic sensor module that was the heart of the SmartLevel.

Series 3, Financial Records, 1985-1992, include Wedge's summary financial statements from 1985 to 1992.

Series 4, Marketing Records, 1986-1992, document customer and dealer relations through marketing department correspondence, operational records, and advertising campaigns. This series is particularly rich in promotional material (1988-1992), such as advertisements, advertising copy, photographs, product promotion plans, and videotapes that demonstrate the varied features and uses of the products.

Series 5, Operations Records, 1990-1993, document the manufacturing process and the Company's offshore operations.

Series 6, Product Development Records, 1986-1993, document the company's intended development of an entire "Smart Tools" line.

Series 7, Corporate Culture, 1985-1996, contains employee photographs and oral history interviews with key Wedge personnel conducted in 1995 and 1996 by David Shayt, Division of Work and Industry, National Museum of American History. The interviews discuss the background of the participants, the company's origins and history, product development, the Silicon Valley context, and the efforts of Wedge Innovations successor firm, SmartTool Technologies.

Arrangement

The collection organized into seven series.

Series 1, Corporate Records, 1985-1993

Series 2, Engineering Records, 1985-1993

Series 3, Financial Records, 1985-1992

Series 4, Marketing Records, 1986-1992

Series 5, Operations Records, 1990-1993

Series 6, Product Development Records, 1986-1993

Series 7, Corporate Culture, 1985-1996

Names and Subject Terms

This collection is indexed in the online catalog of the Smithsonian Institution under the following terms:

Subjects:

Carpenters -- 1980-2000
Carpentry -- Tools -- 1980-2000
Electronics -- Tools and implements -- 1980-2000
Engineers -- 1980-2000
Industrial design -- 1980-2000
Industrial designers -- 1980-2000
Inventors -- 1980-2000
Investors -- 1980-2000
Level indicators -- 1980-2000
Leveling -- 1980-2000
Merchandise displays
Product demonstrations -- 1980-2000
Silicon Valley -- 1980-2000
Small business -- Management -- 1980-2000
Teak -- Use of -- 1980-2000
Technological innovations -- Hand tools -- 1980-2000
Tools -- 1980-2000 -- United States
Venture capital -- 1980-2000 -- United States
advertising -- Tools -- 1980-2000

Types of Materials:

Advertisements -- 1980-2000

Audiotapes

Correspondence -- 1970-2000

Drawings -- 1980-2000

Financial records -- 1980-2000

Financial statements -- 1980-2000

Interviews -- 1980-2000

Notebooks -- 1980-2000

Oral histories (document genres) -- 1990-2000

Photographs -- Black-and-white photoprints -- Silver gelatin -- 1950-2000

Photographs -- Black-and-white photoprints -- Silver gelatin -- 1980-2000

Videotapes

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- Box 21, Item 534.7 SmartLevel modules, 1, 2 & 3, 1990
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- Box 21, Item 534.7a Sales demonstration, circa 1990
(circa 9 minutes) Rick Feffer demonstrates features and applications of the SmartLevel; dealer services from Wedge Innovations.
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1/2" VHS color 3:24 minutes Rick Feffer demonstrates features of the Series 200 SmartLevel features; Bob Brymer discusses dealer services from Wedge Innovations.
- Box 22, Item 534.10a SmartLevel family introduction, trade show version, 1991
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1/2" VHS color 17 minutes Rick Feffer demonstrates features and applications of the Pro and Series 200 SmartLevels
- Box 22, Item 534.11a Dealer training, circa 1991

1/2" VHS-PAL version color 17 minutes Rick Feffer demonstrates features and applications of the Pro and Series 200 SmartLevels.

Box 22, Item 534.12

Customer introduction, circa 1991

1/2" VHS color circa 1 hour (circa 7 minute segment repeated) Rick Feffer demonstrates features of the Pro and Series 200 SmartLevels.

Box 22, Item 534.13

SmartLevel, McEwan's version, circa 1991

1/2" VHS color 15 seconds Series 200 SmartLevel advertisement

Box 22, Item 534.14

C.S.N. broadcast and SmartLevel dealer introduction, 1992

1/2" VHS color 1 hour Produced by the Cotter Satellite Network for Cotter & Co. (TrueValue Hardware) 6 segments: C.S.N. Update (company news); 3M NewStroke (new paint applicator); SmartLevel Dealer Introduction 4:55 minutes (SmartLevel features); SmartLevel Dealer Introduction 17 minutes (SmartLevel features; dealer services); NRHA Introduction to Selling (instruction); NRHA Greeting the Customer (instruction)

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Box 23	Oral history interviews, 1995-1996 Audio cassette tapes, reference copies without time codes
Box 23	Oral history interviews, 1995-1996 Audio cassette tapes, reference copies without time codes
Box 26, Item 534.1; Box 25, Item 534.1; Box 24, Item 534.1	Interviewees, Ken Gunderson and Ronald Wisnia; Interviewer, David Shayt, National Museum of American history <i>1 Sound recording (Duration 1 hour)</i> Ron Wisnia, a designer of semi-conductors and integrated circuits, described his work at a number of high-technology and start-up companies in the Silicon Valley. He also gave a geographic definition of the area and the sense of community felt by its inhabitants. Wisnia described the "Paharo Dunes" experience [Wedge's New Product Development Conference in 1991], his woodworking experiences, the transition from Wedge to Macklanburg-Duncan, the SmartLevel manufacturing process (particularly the sensor module and the printed circuit boards), Wedge's overseas manufacturing operations, Rick Shade's work at Wedge, and his work for Koala Technologies. Ken Gunderson came to Wedge Innovations in August 1989 to resolve the stability and performance problems of the SmartLevel's sensor. He described working for Macklanburg- Duncan's SmartTools division, the transition from Wedge to Macklanburg-Duncan, other "Smart" tools, Wedge's outreach to and help from the university community, and the SmartLevel manufacturing process (particularly its sensor and printed circuit boards).
Box 26, Item 534.2; Box 25, Item 534.2; Box 24, Item 534.2	Interviewee, Marilyn Crowell; Interviewer, David Shayt, National Museum of American History, 1995 June 20 <i>1 Sound recording (Duration 1 hour)</i> Location: Palo Alto, California

Marilyn Crowell was the executive secretary and office manager at Wedge Innovations for the entire life of the company. She was the first person hired by Andy Butler when he founded Wedge in the basement of his home (218 Cowper St., Palo Alto, CA) in 1985. Crowell experienced the growth of the company as it moved to Scott Road, and later 501 Mercury Road, in Sunnyvale, and lastly to San Jose. She left Wedge on January 31, 1993, having witnessed its sale to Macklanburg-Duncan in November 1992.

On this tape, Crowell discusses how she met Andy Butler when they both worked for Bechtel in San Francisco in 1983, how she came to work at Andy's new company, Wedge Innovations, and what it was like to work there as the company grew. She also describes Butler's efforts to secure venture capital and to finance the company with his own money. She relates many details about corporate culture, such as Butler's personality and management style at length and how he motivated employees. She also discusses SmartLevel packaging design, which was done by Cindy Rogers (Wedge's graphic designer) and Kevin Reeder (an engineering design consultant).

At the end of her interview, Crowell discusses the end of Wedge Innovations. Andy Butler first offered Wedge to Matsushita, who offered only \$50,000 for the company. Crowell describes how Macklanburg-Duncan came on the scene and Butler's decision to sell Wedge outright rather than see it broken up and all the employees unemployed. She also speculates on Butler's feelings about the sale of Wedge.

Box 26, Item 534.3;
Box 25, Item 534.3;
Box 24, Item 534.3

Interviewees, Andrew Butler, Stuart McFaul, Marilyn Crowell and Ronald Wisnia , 1995 June 20
1 Sound recording (Duration 1 hour)
Location: Palo Alto, California

This tape contains the remarks of Stuart McFaul and Andrew Butler, with occasional comments by Marilyn Crowell and Ronald Wisnia. McFaul was responsible for public relations at Wedge, while Butler founded the company [in 1985]. Butler related how he had been fired by the Board of Directors in June 1992, took back control of Wedge in August 1992, fired the replacement president, Richard Couch, and finally sold the company on November 16, 1992 [to Macklanburg-Duncan].

McFaul and Butler together described what they did before coming to Wedge Innovations, how their formal education influenced their work at Wedge, the company's New Product Development Conference [in 1991], Smart tools technology, potential consumer markets for SmartLevel and brand name recognition.

Butler alone discussed his reasons for founding Wedge, the limitations of traditional construction tools, marketing the SmartLevel, hiring Ron Wisnia, the process of building Wedge, and the origin of the Wedge name.

McFaul alone discussed the issues involved in the promotion of SmartLevel, Wedge's direct marketing survey, the cultivation of SmartLevel users, Butler's efforts in the promotion of SmartLevel, and the design of the products and store displays.

- Box 26, Item 534.4;
Box 25, Item 534.4;
Box 24, Item 534.4
- Interviewees, Andrew Butler, Marilyn Crowell and Ronald Wisnia; Interviewer, David Shayt, National Museum of American History, 1995 June 20
1 Sound recording (Duration 1 hour)
Location: Palo Alto, California
- Side one is a continuation of the conversation with Andrew Butler begun on tape 3. Butler discusses how the marketing research for the SmartLevel influenced its design, the influence of venture capital on Wedge Innovations, the patent process, and financing a start-up company. He also discusses his childhood, sailing the Pacific Ocean, the influence of Stanford University, his work before Wedge Innovations, the typical life and work style of people in the Silicon Valley, and the nature of entrepreneurship.
- Side two is an interview with Andrew Butler with occasional comments made by Marilyn Crowell, his former secretary, and Ronald Wisnia, a former engineer at Wedge Innovations. Since this interview takes place in a public place, there is some background noise that makes listening difficult. Butler discusses the move of Wedge Innovations to its San Jose facility and its ensuing costs, venture capitalists, his assessment of Wedge's success and failure, his assessment of the consumer market for the SmartLevel, the proposed development of the "Smart Tool" line of products, the deal with Bosch, Rick Shade, and the decision to make the WedgeLevel rails from teak.
- Box 25, Item 534.6;
Box 24, Item 534.6;
Box 26, Item 534.6
- Interviewees, Andrew Butler, Marilyn Crowell and Edwin "Win" Siepp; Interviewer, David Shayt, National Museum of American History, 1995 June 21, 1995 June 20
- The first interview is a continuation of the one with Andy Butler on tape 5. Butler and Marilyn Crowell briefly comment on the development of the Wedge logo.
- The second interview, which begins approximately 8 minutes into side one and is continued on side two, is with Win Siepp, who joined Wedge in 1989 as Product Manager. He discusses what he did before and after Wedge, his educational background, how he came to be hired by Wedge, key Wedge personnel in 1989, his areas of responsibility at Wedge, the differences between the Pro and Series 200 SmartLevels, the marketing of the Pro and Series 200 SmartLevels, the "materials function" at Wedge, the Home Depot project, Wedge's market research efforts, the successes and failures of Wedge, the use of aluminum alloy, the evolution of the manufacturing process, problems of teak supply and rail manufacturing, Wedge as a typical example of a high-technology start-up company, the effect of investment on the life-span of Wedge, and the working conditions at Wedge.
- Box 24, Item 534.7;
Box 26, Item 534.7;
Box 25, Item 534.7
- Interviewee, Rick Feffer; Interviewer, David Shayt, National Museum of American History, 1995 June 22
1 Sound recording (Duration 1 hour)
Location: Sunnyvale, California
- Rick Feffer discusses his educational and work background, his remodeling work before joining Wedge Innovations, how he came to work for Wedge and appear in the first advertising photographs and videos, the first WedgeLevel promotional video, the Home Builders Show in January 1989, why Macklanburg-Duncan bought Wedge Innovations, the importance of dealer training and product demonstration for selling SmartLevel, working for Wedge, the durability

issue for the SmartLevel, the influence of product demonstration on the evolution of product design and quality control, promoting the SmartLevel, consulting for Macklanburg-Duncan, customer service, Zircon (his current employer), Macklanburg-Duncan's change of SmartLevel design, origin of the Wedge name, the use of owner registration cards by Wedge for market research, brand name recognition of SmartLevel, the "failure" of Wedge Innovations, the influence of investors on Wedge, the New Products Development Conference, sales strategies, alternate uses/markets for SmartLevel, learning on the job, the Habitat for Humanity Project in Milwaukee and meeting Jimmy & Rosalyn Carter [1989], teak for WedgeLevel rails, stand-off clips for WedgeLevel, cherry wood rails, Stabila and Bosch versions of SmartLevel, offshore manufacturing of rails and quality control problems, working the "Christmas rush," the lasting impact of SmartLevel on the hand tool industry, the SmartLevel carrying case, and the early store displays.

Box 26, Item 534.8; Interviewees, Rick Feffer and Stuart McFaul; Interviewer, David Shayt, National
 Box 25, Item 534.8; Museum of American History, 1995 June 22
 Box 24, Item 534.8 *1 Sound recording (Duration 1 hour)*
 Location: Feffer interview: Sunnyvale, California McFaul interview: Milpitas, California

The Feffer interview begins on side one and is a continuation of the interview from tape RTC 534.7. Feffer discusses his age when he started consulting for Wedge, the Series 200 SmartLevel, the durability issue, sales of the Pro and Series 200 SmartLevels, the design of the Series 200 SmartLevel, the weight of the levels, women users of the levels, the purpose and varying uses of the carrying case, his involvement and commitment to Wedge Innovations, working for Wedge, Andy Butler's leadership style, D2M, and his remodeling work today.

The McFaul interview starts on side one and continues on side two. On side one, McFaul discusses the differences and similarities of working for Wedge versus working for a larger company, the New Product Development Conference, knowledge he gained from working for Wedge (his "real life MBA"), the importance of using metaphor and storytelling in gaining public acceptance for the SmartLevel, the use of students to make promotional videos, the importance of promotional videos, public relations at Wedge, and the unexpected or playful nature of SmartLevel.

On side two, McFaul discusses the testing of SmartLevel and its ruggedness, demonstrating and marketing SmartLevel, the appeal of SmartLevel, the high-technology aspects of SmartLevel, measuring marketing success, marketing priorities, the acquisition of Wedge by Macklanburg-Duncan, worker morale at and loyalty to Wedge Innovations, his leaving Wedge and the end of Wedge, breaking into the "old-boy" network of hardware distribution channels, working for a start-up company, the effect of Silicon Valley on Wedge, creating new business processes at Wedge, the development of the Wedge "look" in products and advertisements, the use of teak for rails, and the future of the SmartLevel.

Box 24, Item 534.9; Interviewees, Stuart McFaul and Dale Cheves; Interviewer, David Shayt,
 Box 25, Item 534.9; National Museum of American History, 1995 June 22
 Box 26, Item 534.9 Location: McFaul interview: Milpitas, California Cheves interview: San Jose, California

This tape continues the interview with McFaul from tape RTC 534.8. McFaul discusses automation and computer use at Wedge, the user interface of the Macintosh, simplicity and approachability in technology, the impact of SmartLevel on the construction industry, the ruggedness of the SmartLevel, and Andy Butler's character. The interview with Dale Cheves is also on side one, starting at approximately 10:00. Cheves was hired by Wedge in 1989 to supervise direct sales and customer service. He discusses the 1989 Christmas rush at Wedge, the push to get the product out each year, the 1989 Christmas card idea, direct sales versus dealer sales, his work before and after Wedge, his hiring by George Sun, his educational background, customer service at Wedge, and the 1-800-SMARTLEVEL phone line.

Box 26, Item 534.1;
Box 24, Item 534.1;
Box 25, Item 534.1

Interviewee, Po Chi Wo; Interviewer, David Shayt, National Museum of American History, 1996 August 29
1 Sound recording (Duration 1 hour)
Location: San Francisco, California

Po Chi Wo is a venture capitalist who was a partner in Advent International (Boston) in 1990 when Advent invested in Wedge Innovations. As a result of this investment, Wo had visiting rights to the monthly Wedge Board of Directors meetings. In this interview he discusses Advent's investment in Wedge. He begins on side one with his own educational background and upbringing, how he became a venture capitalist, his early investment efforts, and how he met Andy Butler in 1990.

Wo continues by discussing how Advent came to invest in Wedge, what was attractive and what was risky about the investment in the SmartLevel, how Advent tried to support Wedge's operations in Asia, and the significance of Wedge's Silicon Valley location. Wo also discusses the due diligence process, how venture capital works in general, the "shared risk strategy," how venture capital firms help start-up companies, and how return on investment is calculated by venture capital firms.

On side two, Wo discusses the expectations of investors in start-up companies, the relationship of the Board of Directors to Wedge and their lack of support for Wedge, the "failure" of Wedge, their lack of management experience, the sale of Wedge, and the possible buyers for Wedge.

He also discusses Andy Butler's creativity, Wedge's efforts to promote its growth, marketing and sales of the SmartLevel, appealing to "early adopters" of new technology versus a broad base of consumers, the "FUD factor" (Fear, Uncertainty, and Doubt) by consumers of new technologies, the lack of product stability of the SmartLevel, diversification of Wedge's product line, international marketing of the SmartLevel, and the future of smart tools. He ends by describing what it means to be an inventor and how the inventor's artistic drive pushes him or her to overcome his fear of failure.

Box 24, Item 534.11;
Box 25, Item 534.11;
Box 26, Item 534.11

Interviewee, Rick Feffer; Interviewer, David Shayt, National Museum of American History, 1996 August 29
Location: Palo Alto, California

In this interview, Rick Feffer discusses Macklanburg-Duncan's continuation of the SmartLevel, the future of construction tools and new tool technology, customer resistance to using the SmartLevel, the perception of the SmartLevel

as a fragile tool and its durability, the choice of teak for SmartLevel rails, the wedge shape of the SmartLevel rail, the original stand-off clips, and the SmartLevel's digital bubble.

He also discusses non-construction and machine shop uses for the SmartLevel, its use in Australia, and Andy Butler's new product, a Robo-Laser level.

Feffer continues with the Wedge's appearance at the Chicago Hardware Show [in 1991] and the resulting interest in the SmartLevel by Home Depot, training salespersons and setting up Home Depot stores for the SmartLevel, "guerilla marketing," direct marketing versus retail sales, Home Depot sales of the SmartLevel, venture capital investment in Wedge, other companies interested in acquiring Wedge Innovations, the reason behind the Macklanburg-Duncan purchase of Wedge and the characteristics of Macklanburg-Duncan as a company.

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