INVESTIGATING INVENTION

Results from the
1999 Invention Interview Study

INSTITUTIONAL STUDIES

Smithsonian
Institution
Abstract

This report summarizes work conducted in the summer and fall of 1999 in preparation for a traveling exhibition on invention by The Lemelson Center, National Museum of American History. The purpose of this study was to understand the museum-visiting public's views on the topic of invention and to assemble a database of qualitative interviews that can inform the exhibition planning team's dialogue on the themes and direction of the exhibition. Interviews were conducted at two history museums and a science center, possible future venues for the exhibition.

Attitudes and views on the vast topic of invention differed among interviewees, but virtually all agreed that they, themselves, were not inventors. They generally considered invention an incremental process, from visualization to contemplation, then manipulation, and finally creation. Invention, they feel, takes time, patience, persistence, imagination, and creativity, and may be concrete or conceptual. Invention is considered to be anything "new," though there is some divergence on its relationship to innovation, discovery, or accident. It is driven by "need," whether external or personal.

Although few museum visitors would identify themselves as inventors, most recognized that they, along with a majority of people, are inventive. Children are perceived as more inventive, or creative, than adults, and even at a young age, some children are considered more inventive than others. Some visitors stressed the importance of encouraging and stimulating these inventive processes in children. Younger (age 18 and under) interviewees more easily identified with the image of inventors.

Visitors quickly identified historic inventors (e.g., Edison, Bell), discussed current invention (e.g., technology, medicine, biology), and recognized and expressed hopes and fears of the future of invention (e.g., effects and consequences of invention and the "speed" with which it is moving). They also recognized differences between inventing today and in the past.

Visitors identified some elements they enjoy in exhibitions and those they felt would fit well with this specific topic. Interactives and computers were top suggestions, along with the idea of presenting a problem or some objects and having children "invent" a solution or new invention. Visitors also want to see "real" inventions and inventors (known and obscure), to learn the history of inventions, and to participate in the process of inventing.

The themes and ideas presented in these interviews provide an in-depth look at the perspective of potential exhibition visitors. This report can be used as a guide in planning the traveling exhibition by giving "voice" to visitor thoughts on the topic of invention.
Acknowledgements

*Investigating Invention* was conducted for The Jerome and Dorothy Lemelson Center for the Study of Invention and Innovation in the National Museum of American History (NMAH). The purpose of this report is to share the results with museum colleagues. Lemelson Center staff is using the study as part of planning a traveling exhibition on invention.

We would like to acknowledge the individuals who worked with us on this study of museum visitors’ ideas about invention.

First we wish to thank Arthur Molella, Director, and Gretchen Jennings, Project Director, The Jerome and Dorothy Lemelson Center for the Study of Invention and Innovation, NMAH, for inviting us to participate. Gretchen, together with Michael Judd, Educator, Monica Smith, Researcher, and Anita Cater, Education Specialist, for the Traveling Exhibition on Invention, worked with us to develop the initial line of inquiry, reviewed the incoming data, listened to interviews, discussed the results with us, and provided provocative comments on the draft versions of this report.

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Errors in interpretation are the responsibility of the authors.

Zahava D. Doering, Director
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I. Introduction

In July, 1999 the Institutional Studies Office (ISO) was asked by staff of The Jerome and Dorothy Lemelson Center for the Study of Invention and Innovation at the National Museum of American History (NMAH) to investigate visitors’ views of invention as background research for a planned exhibition on invention and inventors. The purpose of this research was to help inform the dialogue within the planning team that would shape the themes and presentation of the exhibition.

The planning team had invested considerable time and effort preparing for the project before initiating this inquiry. Through their work in the Lemelson Center, and as a result of conferences, workshops, meetings and consultations, and an informal visitor study conducted specifically in preparation for the invention exhibition planning, they already possessed an extensive understanding of the subject. A planning document, called “Mindplay Notes” (Appendix A), summarized preliminary exhibition-related ideas.

The exhibition team wanted to learn where visitors might stand in relation to these ideas. We began this inquiry by compiling a list of questions that the team wanted the research to address with visitors, and by conducting preliminary in-depth interviews in the Engines of Change exhibition in NMAH. After carefully considering possible methods, we concluded that a qualitative approach was most appropriate for two principal reasons. First, the team had already assembled extensive information and had given considerable thought to the subject. Only a qualitative inquiry would be likely to reveal something they did not already expect. Second, preliminary interviews suggested that visitors were willing to discuss this subject in depth. (For details on methods, see Appendix B).

Two ISO staff interviewers, Andrew J. Pekarik and Abigail J. Dreibelbis, completed 19 interviews with visitors to NMAH, 21 with visitors to the Henry Ford Museum in Dearborn, Michigan and 12 interviews with visitors to the Maryland Science Center in Baltimore, Maryland. Interviewees generously shared their ideas and worked together with us to clarify the meaning and significance of invention in their lives.

Although many of the interviews were conducted during busy times and with multiple participants, the interviews in this study were relatively long and, in some cases, surprisingly personal. In talking with visitors about invention and inventors we were struck by how engaged they were with the subject of the interview. The average interview length was 24 minutes, and nine interviews were more than 40 minutes long. It seems that the concept of inventing and the related ideas of creating, innovating, and adapting affect people in a personal way. Interviewees were involved and insightful, and introduced many questions and issues beyond those that the interviewers initially raised. In addition, they freely expressed positive and negative opinions and willingly explained their thought processes.

We were also impressed by the diversity of responses. Even when there are superficial similarities among many interviewees (e.g., the belief that to be an inventor means that invention is one’s job), a closer look reveals rich divergences just beneath that surface opinion. In speaking of the talents and personalities of children, one respondent said, “Each child is different.” The same was true of each visitor we interviewed.
Presentation of Results

In order to encourage dialogue and individual exploration of these rich materials, we have provided the results of this inquiry in a variety of formats. This section (I) contains a description of the study and report.

Section II contains summaries and analyses. First is a summary of interview results. After it comes another discussion of results, structured in response to “Mindplay Notes,” a planning document that had guided the team’s thinking prior to this investigation. We conclude the analysis section of the report with suggestions on how these results could be integrated with the results of other research on Smithsonian visitors that ISO has recently been conducting.

Section III of this report presents a categorization of the ideas raised by interviewees. This categorization is divided into two parts. The first part, called Invention Answers, categorizes visitors’ responses to the questions that initiated the study. The second part, called Unanticipated Ideas, categorizes the ideas that were unexpectedly raised by visitors in the course of the interviews. Each of these is first presented in outline form and then in a fuller version that references individual statements in the interviews.

A series of appendices present the document “Mindplay Notes,” a description of our methods, the interview guide, a list of interviews, and their content. ISO provided team members with a complete set of interviews in a computerized format, so that one could listen to any portion of any interview directly. The team was also given a set of cassette tapes containing edited highlights from the interviews.
II. Summaries and Analysis

A Summary of Interview Results

Although interviewees were diverse and often had different opinions, we can summarize the overall range of their remarks, dividing them between the ideas that were presented in answer to our questions, and those raised spontaneously by visitors.

Answers to our specific questions

Visitors were usually drawn to the exhibition or museum in which they were interviewed by an interest in the subject matter, or by a decision made by someone else in their visit group. When asked directly, “are you an inventor?” nearly all of these interviewees said “no,” often with a laugh. When pressed further, many of them were willing to admit that they were inventive, or had invented some things, but even some of those who were professional engineers and who held patents were unwilling to call themselves inventors. It seems that visitors’ understanding of the word “inventor” is rather narrow, implies a full-time occupation as an inventor, and applies primarily to famous historical figures, especially Edison. Some interviewees identified members of their family as inventors, however. Even when they refused to identify themselves as inventors, a number of interviewees volunteered examples of things that they had invented, either concrete or conceptual.

Most of these visitors consider inventors to be different from people like themselves. They see inventors as people with a special talent, with intelligence, and with an original perspective. Inventors are thought to have curiosity, imagination, intuition, motivation, enthusiasm, and drive. There is a suggestion that inventors live at a higher level of intensity than others. And when they invent, they are considered persistent, patient, systematic and independent. Invention is recognized as being influenced by circumstances, such as having time or luck, and by the possession of material and skill. Socially, the inventor is considered to be an eccentric loner, an outsider, although a number of interviewees mentioned that inventors today must often work in teams.

Visitors disagree as to whether or not we are all inventors. Most said that inventors are different and that we are not all inventors, although they were more willing to accept that we are all inventive. Among the barriers to inventing are the fact that people don’t want to be inventors (because it means going outside conventions), that people don’t want to take risks, that too much education inhibits invention, and that it is too hard today to be a lone inventor.

Interviewees disagree as to whether or not invention can be taught. Some suggested that processes could be taught and inventiveness stimulated, but others felt that invention requires a unique inborn talent. Children were regarded as more inventive than adults and a number of interviewees emphasized the importance of supporting and encouraging this creativity.

Inventions are considered by these visitors to be anything new, whether tangible or not. They recognize that inventions can be developed incrementally through gradual improvement, and some of them questioned where to draw the line between invention,
on the one hand, and innovation or adaptation, on the other. A few also wondered about the distinction between invention and art, and about the difference between intentional invention and accidental invention.

Invention, most of them agree, is driven by need. They frequently cited the adage “Necessity is the mother of invention.” The need can be either external or personal. They noted, however, that in some cases inventions appear spontaneously, without a need, and that inventions do not necessarily have to solve a problem.

The process of invention is considered to include visualization, contemplation, manipulation, and creation. This process is viewed as a positive, satisfying activity for those who engage it.

History is recognized as being valuable because it gives perspective, showing us where we are and how we got here. The inventors mentioned most frequently are historical figures, primarily Edison, Franklin, the Wright brothers, Bell, and Ford. The most frequently mentioned great inventions are the telephone, computers, airplanes, automobiles and the light bulb. More unusual and interesting choices included paper, chairs, the concept of a research lab, and “life.” These interviewees were aware that inventing and inventions have changed over time. Visitors in the science center were no less likely to refer to historic figures, events, or inventions in their interviews than those in the history museums.

These visitors expressed a range of preferences in their museum visiting, including touching things, seeing things, and learning. Their suggestions for the exhibition include a human connection (e.g., demonstrations), hands-on activities (e.g., play and experimenting), media (e.g., virtual reality holograms), and immersion (e.g., things you can go inside.) They said they want to know the stories of inventors, the ideas that inventions represent, the viewpoint of museum curators (i.e., “the spin”), and they want to think about the inventions of the future. They want to see amazing, interesting inventions, important and unusual inventions, and inventions that were failures.

**Unanticipated ideas**

The negative consequences of inventions are very important to most of these interviewees. They emphasized the need to see the “big picture” and to understand how invention impacts our lives and the health of the planet. Major consequences include the environmental (e.g., pollution), physical (e.g., danger of injury), social (e.g., changes in interactions between people), and personal (e.g., relationships within the family). The positive consequences include the fact that inventions make life easier today and that they can be interesting. Since most of these people agree that a particular invention itself is not usually “good” or “bad” but rather the way it is applied or used, they were concerned with how to deal with negative consequences. Most seemed to favor personal, individual regulation and a few called for social solutions (e.g., “management”). One interviewee put the responsibility for consequences solely on the inventor.
Technological anxiety is a related and equally strong theme that unexpectedly emerged in these interviews. Many of them feel that things are changing in a way that can no longer be controlled. Some of those changes are annoying (e.g., unreliability or incompatibility), others are more serious because they involve loss of connection with others, or loss of values.

Visitors interviewed in the science center were no more positive about the consequences of invention and no less anxious about technology than those in the history museums.

These interviewees seemed to feel that invention is fundamentally different today – more incremental, less groundbreaking, more expensive, more team-based, and less visible (i.e., more often on a microscopic level). They recognized the importance of the acceptance and marketing of inventions and are interested in success and failure. Failure was especially interesting to a number of them because they consider it a normal part of inventing, instructional, and ultimately leading to success.

Visitors are interested in future inventions, especially those relating to transportation, biology and medicine.
Responding to "Mindplay Notes"

This reaction parallels the organization of a set of notes and questions presented in "Mindplay Notes" (See Appendix A).

I. Overall Exhibition Objectives

The nature of invention

These interviewees tended to focus more on the circumstances that led to invention (both in the mind of the inventor and in the situation that motivates invention), rather than on the process of inventing itself. This is an area that could be profitably developed in the exhibition. To the extent that they cumulatively described a process of invention, this process had four parts: visualization, contemplation, manipulation and creation.

The importance of invention

These interviews gave no indication that inventions are under-appreciated. Everyone realizes that inventions are important in their daily lives. In fact, some of these people said that they felt pressured to bring inventions into their daily lives when they don't really want to have them. Moreover, the strongest positive response to inventions was that they make life easier. Their value is not in question, which is probably why the negative consequences of invention seem so disturbing to them.

Awareness of inventors

These visitors seemed to know few inventors beyond Edison and Franklin. In particular, they rarely identified anyone contemporary. Partly this may be due to the narrow meaning that the word "inventor" holds, and partly to a lack of awareness of who creates new things and processes today. They would like to know more. Some have even tried on their own to find information about contemporary inventors and were unable to find it. Knowing history helps visitors relate to the topic, and they seem to recognize the importance of history in the process of invention. Visitors said that they enjoy learning about the history of things created and the inventors behind them.

"Inventing" is fun

"Inventing" was generally viewed in a positive way, and children, in particular, linked it with creativity, play, and fun activities, such as building with Legos, drawing, and making things. Who would not enjoy experimenting with their own inventive abilities? (As long as the experiment did not make a user feel stupid and dull.) It is also true, however, that the interest in inventing activities seemed to be limited to children. Adults were more interested in historical, intellectual, psychological, or practical issues.
II. Hoped-for Exhibition Outcomes

"Inventor" is not accessible

Visitors were usually unwilling to identify themselves as inventors, even when they are. “Inventor” is perceived as an occupation, and suggests unique abilities. The “inventor” label does not appear to be desirable or accessible. Edison is the prototypical inventor in their minds. It would be very difficult, if not impossible, to change the meaning and connotation of this word in an exhibition.

Transforming visitor impressions

When we talked with visitors about what they find satisfying or meaningful in museums, we never encountered stories of transformation. The discoveries or experiences that excited them were extensions, enrichments, elaborations, or concretizations of thoughts and feelings that they already had and valued. A museum visit is not about ‘changing minds,’ (an act that presumes that the visitor is currently faulty), but rather it is about developing potential. Visitors do not want new definitions of invention or inventors; they want exhibits that are sensitive to their interests and values.

Reducing distance

Most of these visitors already appreciate that they perform inventive acts, although they were not willing to call themselves “inventors” because of it. There is no sign in these interviews of “distance between visitors and the inventive process” unless you are presuming a specific, systematic, rule-based method of invention. The perceived distance, rather, seems to be between visitors and those they consider inventors. Several people noted that when they see new inventions they say to themselves, “Why didn’t I think of that?” This suggests, we believe, that the distance is less between themselves and the act of inventing, and more between themselves and the person who did the inventing.

There were some visitors who were willing to think of themselves as inventors, although their inventions had never been realized in any physical form. These people seemed to regret that their inventions were only conceptual and not real. For such individuals, it might be valuable to reduce the distance between creative ideas and their realization in some tangible or effective form.

Elucidating the development process

Several people (including both African American men interviewed) with the desire and interest in developing inventions seemed uncertain about how to proceed and wary of the invention development process. Could the exhibition or its web-site offer specific guidance to would-be inventors?
III. Exhibition Concept A: What is Invention?

Use a broad definition of invention

A number of interviewees, when initially presented with the concept of invention focused first on mechanical objects and only later, in the course of discussion, came to express the understanding that processes and other intangibles are also inventions. One woman even proposed CPR as the most valuable invention. The exhibition could enhance a visitor’s thinking process by deliberately encouraging this expanded view of invention. It is the direction that their own thinking is inclined to follow, and an exhibition that does not explicitly include intangible inventions on a par with mechanical devices would tend to retard that natural development and needlessly narrow the definition. It is just such a narrow definition, in fact, that led many visitors (especially women) to laugh when asked, “Are you an inventor?” It appears they believe that in order to be considered an inventor you have to produce some kind of tangible, mechanical object.

One interviewee suggested that the exhibition should show various “types” of invention, such as, social, mechanical, mathematical and theoretical.

“The world beyond patents” is not a potent issue

Patents were mentioned only by those who had them, who wanted to have them, or who considered them to be the criteria for being an inventor. They do not seem to be an important part of what it means to invent. Several visitors who identified themselves as inventors, for example, discussed how others had realized their inventions before they did. They did not seem to think that the absence of a patent affected their own self-concept as inventors. Patents are part of the system of development and marketing that is outside of the act of inventing, but that is an important part of having a career as an inventor. They help to define “success” in inventing, since they are the first step towards getting a profit from an invention. One interviewee pointed out that patents are only necessary if one wants to “get his bread and water” from inventing.

What constitutes an invention

Some visitors were interested in rather philosophical discussions of the differences between invention and discovery, invention and innovation (or adaptation), intentional invention and accidental invention, and invention and art. They seemed to enjoy considering these types of conceptual distinctions, and they would probably be interested in these four oppositions. Although it is unlikely that the museum or the visitors could reach consensus in answering them, the consideration might prove enriching for some visitors.
III. Exhibition Concept B: Who Invents?

Invention is essential

Many of those we spoke with would not accept that we are all inventors, although they were more willing to accept that we are all problem-solvers, or that we are all, to some degree, inventive. In fact, a number of them feel that inventors are special, born with unique talents and abilities, and often at odds with society. One couple remarked that we are fortunate that we are not all inventors.

Can invention be taught?

Our respondents generally disagreed on whether or not invention can be taught. A number of them felt that it can be nurtured, however. This attitude probably tells less about the nature of invention in their minds than about their belief in pedagogy. They recognized that children possess talents to various degrees, and that they are also capable of being educated and developed, especially in directions that they are naturally talented. Judging by their responses, these visitors would have felt more comfortable with the idea that “inventiveness can be nurtured” rather than “invention can be taught.”

Inventors are of diverse ethnicity and genders

This is a valuable point to make. An African American couple interviewed in the Ford Museum had been impressed and moved by prominent labels identifying and describing African American inventors. A female visitor in Dearborn proudly stated that a woman had invented the circular saw. Since a worthy and significant invention is a mark of talent or even genius, one can take vicarious pride in the accomplishment of inventors with whom one can identify in some way.

The Great Inventors

Although the Great Inventors (specifically Edison, Franklin, Bell, Ford, and the Wright brothers) are what people first think of when they hear the word “inventor,” their work was not described as “Great Ideas,” or “Eureka moments.” Instead, these visitors emphasized persistence, dedication (even obsession), and the objects they invented. In other words the ideas seem to be viewed as the result of hard work as well as natural talent or genius. They learned about these people in school (although some read about them in books), and they are distinctly “other.” In other words, whenever comparison was made, it was clear that visitors felt they were different, fundamentally different, from these famous figures. The Great Inventors were not approachable, not role models, and not on the same level as the rest of us. They are great because they were successful and did great things. But visitors probably feel similarly distanced from other famous people. To be a celebrity is to be other.
III. Exhibition Concept C: Process of Invention?

The incremental nature of invention

These visitors so clearly recognize the incremental nature of invention that they often expressed some uncertainty about when something could be called an invention and when it should be referred to as an innovation (i.e., a variation on an invention.) Not all visitors, for example, were willing to call Henry Ford an inventor; the Ford Museum, in the only panel on Henry Ford, insisted that he was not an inventor. Even many of Edison's "inventions" were called into question by one visitor. Some went so far as to say that nothing, in fact, is new – that everything is based on something else. Others felt that it had been possible in the past to come up with something "new," but that today only incremental invention is possible.

Inventions don’t happen in a vacuum

It seems from these interviews that visitors also already realize this, but they don’t dwell on it. The single most common thought among these interviewees was their belief that invention begins in the recognition of a "need." "Necessity," they said again and again, "is the mother of invention." And need never exists in a vacuum. It arises from social and personal circumstances. Compelling examples of the role of context could be very helpful, since visitors’ views on this did not seem especially rich. What were the constraints? What was the alternative? Where did previous, associated inventions stop? When there is a long, evolutionary process of invention, who is "the inventor?" The one who was the best salesperson?

Marketing and business

Without prompting, a number of visitors raised the problem of marketing inventions. It seems to be seen as the great obstacle to individual invention in our times. They feel that either the inventor's ideas are stolen by someone else who has the wealth or knowledge to market them, or the inventor is forced to sell them to some corporation that has that power. Visitors who think of themselves as inventors (or potential inventors) were seriously concerned about the problem of marketing, which they see as a formidable obstacle. One interviewee said that it takes three elements to produce a financially successful invention: the idea guy, the marketer, and the bean counter.

Inventor notebooks

Drawings were mentioned as important devices in the process of invention. Some felt, in fact, that a drawing itself constituted an invention, and that actualization of the drawing into an object was not necessary for something to be called an invention. Children who were reluctant to admit that they invent could often be brought to accept that they invent if invention was extended to include either building or drawing.
III. Exhibition Concept D: Invention as an everyday phenomenon

The things we use were invented

This seems to be accepted by everyone without any hesitation. Although there was a parent who explicitly made this point to her child during an interview, it was because the child did not know what the word “invention” meant.

Inventions visitors already know

Examples visitors gave were all from personal experience and everyday life.

“We” invent on an everyday basis

Not every visitor was willing to accept that our creative, expressive, innovative, or problem-solving behaviors can be called “inventing,” when “inventing” is used in the context of “inventor” and “invention.” Most of these interviewees were more willing to think of themselves as innovating or problem solving on an everyday basis, than “inventing.”
What would people like to learn more about?

No one knows what they like until they encounter it. But we can make suggestions based on what interviewees found interesting enough to raise.

Interesting stories

The stories people told us about invention included accidental discoveries (e.g., discovery of silly putty), interesting personalities (e.g., Edison's failure in marketing the phonograph), and unexpected situations (e.g., an urgent need that gave rise to invention).

Differences between past and present

Interviewees discussed how inventing has changed, how inventions have changed, how inventors have changed, how the culture has changed, and how our lives have changed.

Links between past and present

Several visitors told about their deep interest in the series of British documentaries on the ways that innovations/inventions rippled across time and ultimately had major impacts on our lives.

Big ideas: definitions

Some visitors became intellectually interested in discussions of the difference between invention and innovation, invention and art, invention and discovery, invention and problem-solving, intentional invention and accidental invention, and invention and engineering.

Big ideas: social impact

One of the most important ideas raised by these visitors was the impact of invention on society, both physically (e.g., negative consequences such as pollution, physical harm, etc.) and culturally (e.g., on relationships, values, etc.). These issues also seemed to have the greatest emotional resonance for many visitors.

Big ideas: cultural differences

Some visitors were very interested in the differences in inventing (and the marketing and acceptance of inventions) across cultures.
What would people specifically like to see in the exhibition?

Children said that they are especially interested in building, drawing, touching, using computers, and participating interactively. They want displays targeted to their own age, physical ability, and interests. Some are interested in seeing failed inventions (which either didn’t work or didn’t catch on).

It seems from this study that many adults would be too self-judging to participate freely and profitably in the same kinds of open-ended activities that thrill children. They might, however, appreciate feeling what it is like to see something from an inventor’s perspective. In other words, the fact that visitors feel that they are different from inventors might be used positively to draw them into a different perspective, one that is intriguing precisely because it is different from their own way of seeing things.

Visitors would like to be amazed and to feel that they are having a special, unique experience.

Visitors

Among children, neither interviewer noted any differences in the attitudes or opinions of girls and boys. Among adults, men were more likely to identify themselves as inventors or to be identified by others as inventors.
ISO Suggested Approach

Instead of trying to develop a message or point of view that visitors would be persuaded to adopt, one could approach the planning process more from the point of view of visitors by acknowledging and accepting that people have different, sometimes contradictory views (both different from one another, and, in some cases, different from our views). Instead of seeking to change the views of those who see things differently, we can work responsibly to help each individual enlarge and develop their thinking along the lines that engage them personally.

The two keys to such an approach are variety and access. In a perfect case the variety of the exhibition would match the variety of the visitors ("mass customization"). By access it is meant that the system allows the individual to find the parts of the exhibition that are most desirable and engaging to that individual. Without a system of access variety is perceived as chaos.

The access system can be idea-based or design-based (i.e., linear or intuitive). A design-based, intuitive interface is more fluid and aesthetic by nature but can be more difficult to create without some kind of theoretical framework to guide it.

Our recent research into the experiences that visitors anticipate and find satisfying in museums can offer some guidance for such an intuitive access system. We have learned that visitor experiences can be grouped into four major clusters: Object experiences, Cognitive experiences, Introspective experiences, and Social experiences. Many individuals seem to have a consistent preference for one of these over the others. Some of the interviews done for this study make this preference very clear. It resembles differences in personality (and may, in fact, have a similar origin).

Based on these interviews, we can suggest some of the following ways that an invention exhibition could create the variety that would allow visitors to find "their own place" in the exhibition. Design could signal the four types of experiences as four different areas within the exhibition. (Or, alternatively, major examples could be presented through four different kinds of experiences.)

Object experiences

People who prefer object experiences want to see really interesting things and have direct experiences with them.

Possible contents
Amazing inventions – things that make one say, “Wow! I never thought I’d see that in person!”
Failures – things that one didn’t expect to see
Small things that had huge effects – for example, the smallpox needle
Future inventions – things on the cutting edge – prototypes
Interactives – interesting inventions that one can touch, operate, assemble, disassemble

Mysterious inventions – for example, the very latest holograms (a rotating hologram was the big hit of the recent “Microbes” exhibition at the International Gallery on the Mall).

Cognitive experiences

People who prefer cognitive experiences either want to learn some new information or they seek a new understanding or interpretation of what they already know.

Possible ideas
How it works – use an example where the underlying principle was applied in many ways.

Who invented it – facts about inventors and inventing. In order to make these identifications more accessible, highlight inventors of different ethnicity, gender, backgrounds and times.

How it was received – a number of visitors are sensitive to the relationship between the invention and its acceptance, or lack of acceptance. This is the sort of theme that a cognitive visitor would be eager to address in a history museum.

Why is this invention important – what led the museum to believe that this particular thing was worth collecting and displaying – what’s the fuss about?

How this invention changed our lives – what inventions, especially intangibles, changed our lives without our even being aware of it?

How this invention changed the way we see one another – one of the big issues among visitors was the way that technological change has an impact on our relationships.

Values and invention – another issue among visitors was how the use of certain inventions relates to our values, both in the choices we make among inventions and in the ways that inventions influence our values.
**Introspective experiences**

Visitors who prefer introspective experiences are looking for situations that will give rise to emotions, memories, imaginative projections, or spiritual responses.

**Possible experiences**

**Emotion:**
Inventions that caused problems - People in this study were strongly affected by negative consequences of invention. Show some inventions that caused real problems, preferably unintended. What could have been done to prevent those problems? Anything? Who is responsible? (For example, the Y2K computer glitch cost the U.S. $100 billion to date! All because of some programmers' shortcut. Was this not preventable? If it was preventable, who should have prevented it?)

Inventions that saved lives – Indeed, why not CPR and the Heimlich Maneuver, as well as pharmaceutical, mechanical and procedural medical inventions.

**Memory:**
Forgotten inventions – things that were big new inventions during the 30’s, 40’s, 50’s, 60’s, or 70’s that then were abandoned or forgotten.

Technological sequences – common items that have changed step by step until the last form is virtually unrecognizable beside the first. Put them in a near-circular format, so that the first and last are close to one another (a point made by a visitor at the Ford where the display of historic autos achieves this). Possible items: clothing iron, radio, telephone.

Decorative inventions – inventions that are made not for the purpose of making something work better, but to make it sell better, or just for fun.

Failed inventions – inventions that now give rise to feelings of nostalgia for the innocent days of the past.

**Imagination:**
Dioramas, real or virtual – imagination is most strongly evoked when the visitor is immersed or nearly immersed in a setting of some kind. What are key invention settings – Edison’s lab? Bell labs?
Social Experiences

Visitors who prefer social experiences focus on their relationships with others, especially those that are visiting with them.

Possible Experiences

Seeing children learn:
Interactive units – these can be of three kinds: those that are used individually, those that require the participation of both parent and child (or multiple children), and those that allow a parent to do a related but separate activity at the same location.

Spending time with friends, family:
In order for the exhibition to provide engaging social experiences it needs to be comfortable for groups of people by providing adequate seating and flexible arrangements.

Participating with others:
If the exhibition could contain areas that would offer invention workshops in which teams of visitors (children of nearly the same age) could participate together, the exhibition would not only foster an understanding of invention but would also enhance the museum experience for gregarious children.
III. Interview Contents

This section contains questions and responses from interviews AP-1 through AP-31, and AD-1 through AD-21, following the August 12, 1999 interview guide. (See Appendices B, C, D, and E for details on methods, interview guide, interviews, and their notes.)

Outline of Questions and Answers

Interest/Involvement

What brings you to this section? Or this museum?
   Intentional – interest in subject matter
   Someone else decided
   No particular reason

Do you have a special interest in invention? In inventors?

Are you an inventor? A designer, engineer, etc?
   No
   But...
   Yes
   An Inventor is Special
   An Inventor is not Special

Have you ever invented anything?
Have you ever thought of something to invent?
When you were a kid did you admire any inventors?
Do you know any inventors personally?

Images of inventors and invention

What are some of the characteristics of inventors?
   Psychological characteristics of inventors
      Inventors are different
      They have curiosity, imagination, intuition, motivation, enthusiasm, drive,
      and are persistent, patient, systematic, and independent.

   Contextual characteristics of inventors
      Circumstances
      Material
      Skill
      Social
      Lone
      Team
Can invention be taught?
   Yes
   Support inventiveness and creativity
   No
   Takes a special type
   Differences in children from young age

Invention and the common person
   What we’re told about invention
   We are all inventors
   We are not all inventors
   Barriers to inventing

What defines an “invention”?
   Novelty
   Recognition/Patents
   Is it an accident or on purpose?
   Is it invention or innovation?
      New or an adaptation? Does it matter?
      RE-invention
   Is it concrete or conceptual?
   Is it invention or art?

Does an invention have to solve a problem?
   Not necessarily

What drives invention?
   Psychological Factors
      Perceiving external need
      Responding to personal need
      No reason - inspiration
   External Factors
      Need
      Other
Process of Invention

What do you imagine it is like to invent something?
- Visualization
- Contemplation
- Manipulation
- Creation

History

Inventors mentioned
Inventions named
Need to know history and its effect on contemporary times
- Problems of doing history
- Value of history
- History gives perspective on change

Difference between Past and Present
- Inventions:
  - Inventors:
  - Contemporary Inventions, still in use
  - For people and children

Cross-cultural dimensions of invention
- Invention in America
- Invention in England
- Cross-cultural/Country Differences, Progress

Museum visiting

Visit Preferences
- Touch
- See
- Learn

What do you get out of visiting museums?
What does it mean in the context of your life as a whole?
- Leisure activities that made a critical difference

Museum presentation and Exhibition ideas
- Human connection
- Hands-on/Not hands-on
- Media
- People
- Ideas
- Things
- Action/activity
- Viewpoint
- Organization
Immersion
Diversity

Questions in museums

Admirable interactives

Invention Exhibition/ Kid-Things Suggestions
Building/making
Drawing
Computers
Participation
Targeted presentation
Touching
Demonstration
Wow!
Themed experience

Messages

Titles
Investigating Invention – The Answers

Reference format: interviewer – interview . index

Example: AP-8.1-3 = Andrew Pekarik, interview 8, indices 1 through 3
Example: AD-4.2, 7 = Abigail Dreibelbis, interview 4, indices 2 and 7

Interest/Involvement

What brings you to this section? Or this museum? Is it an accident? Intentional?

Intentional – interest in subject matter
Been here before and liked it AP-8.1-3
Professional interest AP-5.1
Interested in the subject AP-2.3, AP-9.2, AP-12.4
Works with mechanical equipment in job AD-1
Has workshop with similar equipment, is a hobby AD-4.2, 7
Wanted to see the "machinery that made America" AP-15.2
Memory of a visit to a car factory AP-16.5-8
Here to see antique cars etc AD-7.1
Likes open things, fun to watch, which mean old things AD-4.6, 10
She loves this place (Science Center) AD-16.1
Likes seeing how invention has allowed us to see the stars AD-16.4
Came to see the exhibit (Music), visits often AD-21.2
(Family) are all "learning junkies" AD-21.4

Someone else decided
Related to a relative's profession AP-12.1
Came to see cars with mom and grandparents AD-11.1
Father wanted to see Kennedy car AD-7.2
School trip AD-6

No particular reason
Wandered in AP-11.5
Doing the first floor AP-14.1

Do you have a special interest in invention? In inventors?
Love gadgets AP-14.2
Amazed by inventiveness AP-14.2
Steam Engine hobby AD-4
Wanted to be an inventor AD-4.8
Knows about Edison AP-4.17, AP-8.4-6, AP-10.4, AP-12.14
Knows about Franklin AP-5.9, 12.4-7, AP-13.48
Maybe someday when she is an inventor there won’t be any difference between her and Edison, except accomplishments AD-16.57
Are you an inventor? A designer, engineer, etc?

No
Not an inventor, an adapter “putting what you have to a needful use” AP-5.31
Not an inventor, an artist AP-8.7
No, more entrepreneur AD-9.52
Not an inventor, a problem-solver AP-15.16-20
Not an inventor, a designer AP-15.15
Not an inventor, an engineer AP-3.3, AP-8.68
Not an inventor, inventor is a job AP-8.10, AP-9.30
A handy man AP-23.3-5
Not an inventor, a collector AP-10.1
Not an inventor, a cook AP-11.13
No, it’s not my job AP-20.79
Not themselves inventors AD-7.4
Haven’t met an inventor AD-9.4
Not an inventor... AD-16.15
Don’t know what it takes, isn’t an inventor AD-19.2
No, it’s not my self-image AD-20.46
Am and am not an inventor, don’t make a living by inventing AD-21.25, 26
Not in the classic sense (Edison) AP-27.1

But...
No, ideas never get out of my head, always think of things to make me rich, but
never get past my mind AD-1
Doesn’t have time to be an inventor, hobby takes time AD-4.12
No, but, lay at night thinking, and then get up and do something AD-4.78
No, but likes to think could come up with idea AD-5.7
Sees tools, wish would have thought of it AD-5.8
Some (fourth grade girls) want to be inventors AD-6.33
  Want to be in the paper AD-6.34
  interested in invention AD-7.3
  Likes starting ideas AD-16.16
Could do it if she set her mind to it, but too much school work AD-16.51
“I need balance” AD-16.107
But (his) life involves being inventive AD-21.27

Yes
Yes, invented improvements at work AP-16.21-22
Invents with his dad AP-9.22, AP-12.8
A little bit – I’m mechanically oriented AP-15.31
No, NOT an inventor, just a hobby AD-4.7
But sort of, but more like “better way to wash dishes” AD-4.94
Image of crazed inventor – he fits it AD-21.70

An Inventor is Special
Not that kind of person AP-4.2
You are either born that way or not AP-2.9, AP-17.1-3
Takes someone special AD-18.9
Respondent 1: “If everyone could invent, what kind of world would it be?”
  Respondent 2: “Mass confusion.” AP-16.66
Where would we be without inventors? AD-10.1
Can’t just take someone off the street and tell them to invent AD-16.85

An Inventor is not Special
Everyone is an inventor AP-13.33, AP-24.45-47, AP-25.35
Inventors don’t have to be special AP-20.7
Anyone can do it, as long as they have a certain level of knowledge AD-16.86
No special mind AD-11.18

Have you ever invented anything?
Invented lots of things AP-1.2
Applied for a software patent AP-3.10
invented thing for bedroom door AD-6.3
invented house of marshmallows AD-6.6
Would be great to invent if it was accepted AD-11.56
If not, would fix so people would like it AD-11.57
Wants to invent – will for science fair AD-11.12
Invents food and “crazy pictures” AP-25.1-10
Invents with Legos AP-9.16, AP-11.7
Likes working with gears, had designed a lot of things AD-16.18, 19
Invented a song, called the “Doughnut Song,” AD-17.9, 16
Invents lesson plans, way to teach (for music students) AD-20.47
As a child invented physical things – third story dumpster system AD-21.29
(now) is an inventor, but not mechanically AD-21.37
Applies inventiveness to social dimensions AD-21.38
Commune that lasted 1964-1989 AD-21.41
Battered wife hotline AD-21.42
Divorce alternative AD-21.115, 167-169
Makes breakfast an invention AD-21.53
Invented a “Go-Go-Gadget” mobile AP-26.8
Backpack invention – cardboard, tinfoil, flag AP-26.13
Market things, use science, what’s best AP-27.2

Have you ever thought of something to invent?
Make wider wheelbase for go-cart AD-7.23
Remote control for toaster AD-11.13
Thought up bicycle powered buzz saw AD-12.2
Idea – kitchen sink inventor who thought invented better fridge, but really time travel AD-12.74
Idea-remote controlled light AD-12.88
Cool future invention: “clap-on” lights AP-11.20
Simple things like an elevator AD-16.20
Draws pictures of things to invent AP-26.5

When you were a kid did you admire any inventors?
Admire discoverers more than inventors AP-2.15-25
Yes, wanted to be one, but told there was no such thing, that his inventions weren’t good, so joined the family business AD-4.8
Do you know any inventors personally?
Father AP-3.4
Father invented anti-collision devices, has patents AP-24.1
Husband and children are inventors AP-18.4
Cousin might grow up to be an inventor AP-20.3
Father’s friend AD-2
A friend inventing something medical AP-13.41, 42
Grandfather knew slinky inventor AP-20.1
Girl, with father invented bacon cooker AD-16.117
Partner is an inventor AD-20.57
Father was inventor-minded AP-31.1

Images of inventors and invention

What are some of the characteristics of inventors?
Inventor = full time profession; invent, patent, develop and market AD-4.11
Inventors are willing to “Dance like no one is watching, love like it’s never going to hurt” AD-21.127
Live at a different level of intensity AD-21.29

Psychological characteristics of inventors

Inventors are different
Different from others AP-16.30, AP-17.5, AP-17.25
A special intellect AP-13.36
A talent, like musical talent AP-3.23
Innate tendency to see solutions AP-3.24
takes brains, creativity to invent AD-6.5
Inventors are dreamers AD-9.81
Inventors have different approach to life AD-9.83
takes a special person AD-13.22
It’s the way they think AD-20.8
Understanding of what you have to work with and what you want to do AD-16.24, 25
An artist wouldn’t say “I found the connection between subatomic particles and the Universe.” AD-16.142
Is like a lot of gifts, some can’t help it AD-20.31
He doesn’t have a choice AD-21.49
Most inventors can’t NOT invent AD-21. 51
Is the way he lives and breathes AD-21.52

They have curiosity, imagination, intuition,
Curious, questioning AP-3.15, AP-4.11, AP-5.43, AP-13.44
inventors can’t keep hands off stuff AD-6.9
Wouldn’t it be nice if... AP-8.69
Imagination AP-2.6, AP-8.18, AP-11.8, AP-14.4
imagination, can’t give up AD-6.10
If you can visualize, see it, you can do it AP-20.100
like to solve problems AD-7.11
Must be able to think of things and conceptualize AD-9.84
Must be intuitive AD-10.2
Have ideas AP-11.9
Well-read, sees different angles AP-20.115
Creative, imaginative AD-19.1
Invention is a form of creativity AD-21.69
Think how it can be used (what they’ve stumbled upon) AP-31.22
Someone who is curious and realizes other uses AP-31.23

**motivation, enthusiasm, drive,**
You have to want to do it AP-8.20
You have to be into what you are drawing AP-8.19
Have to have passion for putting stuff together AD-11.16
Enthusiasm, creative mind AP-23.29
Creativity, risk, practicality, insight, imagination AP-19.14
Drive, desire to create new AP-19.20
Obsessed with a problem AP-20.109
Willing to tinker on the side AP-20.110
Have to believe you can do it AD-16.81
Character, believe in yourself AD-16.88
Every inventor has a million ideas AD-21.63
Be motivated and open to try new things AP-27.30

**and are persistent, patient, systematic,**
Experimental AP-5.39
Persistence AP-9.28
Perseverance AP-14.4, AP-23.32, AP-23.39
Patience AP-10.11, AP-17.19
Need patience AD-11.19
Need patience, intelligence AD-13.23
Have to have time and patience, try again AD-11.22
have to keep going AD-7.9
Work out kinks AD-7.10
Trial and error AP-4.11, Stick-to-it-ness, AP-27.29
Keep track of failures AP-8.67
Need to think ahead AP-25.91-92
Initial idea can pop up, think and work hard AD-16.138
And think, “Oh, I’ve got it!” AD-16.139
Have to be ready for it, and have to be interested AD-16.40,41
Persistence, goal, and keep going at it AD-20.8
Come up with ways to solve problems AP-31.2

**and independent.**
Risk-taker AP-20.113-114
Taking new approaches to things AP-22.6
Get past society’s taboos – government, peers AP-20.116
Not listening to those who say you can’t do it AP-5.96
Finds different ways to do things AP-4.4
Inventors “think outside the box” – not same old way AD-10.3
To do things that are a little different AP-25.36

-26-
Inventors are rebels AP-1.16, AP-15.114
Inventors must take it a step further (past creating) AD-10.6
In science class – she designs, and others copy her AD-16.87

Contextual characteristics of inventors

Circumstances
Have the time AD-11.17
takes time and thinking to invent AD-12.87
Need to sit and think of things AD-4.76
Opportunity is key AP-23.34
Lucky AP-2.6, AP-2.48-50
Know what you want to invent, but can’t have work (money, time) AD-16.96
Inventors can’t be worried about money AD-10.7
Must financially have the time, time to let mind wander AD-19.3,4
Experience AP-27.12
Idea comes, making it work is hard AP-30.16

Material
Have tools AP-11.9
Wants things she can work with, won’t design a telescope cause she can’t get those things easily AD-16.21,22
Math- limitless materials to work with AD-21.140
Having stuff you need is important AP-26.27
Can use tools to be creative AP-27.48

Skill
Physical skill AD-7.12
Invention takes balance (social, personal, time) AD-16.95
Science minded or creative AD-19.6

Social
Eccentric man, absent minded AD-4.66
“Mad Professor,” hair disarrayed AD-4.67,68
Can’t be both a good family man, and inventor, have to sit and think a lot, and be absorbed in ideas AD-4.75
Great inventors could be peculiar AP-24.75
Inventors not usually popular AP-20.150
Inventors are outsiders AP-19.15
If spend time they need with family, not enough time to do what they did (speaking of past inventors and inventions) AD-4.72
Invention takes balance (social, family) AD-16.75
Edison decided invention was most important, versus social, slept in a chair AD-16.106
Image of mad inventor for a reason AD-21.81
Are socially isolated because life experiences are different AD-21.82
Lone
Loners, hard to be married to, shouldn’t be married AD-4.69
Some use community, others are loners AD-20.29
Lone doesn’t mean Alone (Edison) AD-21.89
Inventors don’t make good team players AD-21.90

Teams
Sometimes it takes teams – they are all inventors AD-16.79
Can’t just give credit to Mr. Hubble, even though he had the initial idea, there are a lot of people behind the invention AD-16.76-78
Girl with father created bacon cooker – small team AD-16.117
Teams that do the best – have a leader AD-21.91
Idea guy, Marketing guy, Bean counter (Apple computer) AD-21.189

Can invention be taught?

Yes
Through holistic presentation (cause and effect) AP-5.61-66
Can be taught by example and helping AP-8.16
Start with a book and then go to harder things AP-9.20,23
Problem solving can be taught AP-15.81-84
Show the satisfaction in problem solving AP-5.89
School can enhance talent AP-15.88
Teach, but don’t force them AP-25.37
If you have a good teacher AD-20.34
Person who walks through the world with their eyes open AD-20.35
Can get people to be more creative, reduce fear AD-21.129
Can teach to be thinkers AP-31.18

Support inventiveness and creativity
By not helping kids all the time AP-18.10-12, 17-18
Teachers can stifle or encourage AP-27.42
Have two kids – creative and fact-minded AP-27.46
“Staying within the lines” is harmful to creative mind AP-27.39
Teach them there is more than one way AP-27.33
There is no right or wrong AP-27.34
But given the right setting, can teach, start in school, make kids think in different ways AP-30.8, 9
“Invent America”- kids keep log of invention AP-31.16

No
Can’t teach someone how to come up with ideas AP-10.15
Can’t take an uncreative person and make them so AD-21.130
Is like teaching someone to breathe AD-21.120

Takes a special type
A talent, a God-given gift AP-16.29, 66
can support inventive mind AD-13.42
But still takes special mind AD-13.43
Lots of people have ideas, but don’t take action AP-16.71-72
Have a attitude of “can do” AD-20.36
When it (creativity etc) is dominant, can call them inventors AD-21.111
As a child, could “see things others would never in a million years.” AP-27.18
People are born inventors AP-30.6

**Differences can be seen in children, from young age**

“Every child is different.” AP-18.69
Kids who were poor as students could use their hands AP-17.20-23
“inventor-type” kids often love art/music AP-17.28-36
Kids are “geared up to it” or not AD-18.20
Is important to recognize (inventiveness), if not, use same assumptions as “others,” that can get them in trouble AD-21.112-114
Children are most inventive, are out of the box AD-21.138
Mom: age difference between sons, also personality - one’s room is full of inventions AP-26.22, 21
Mechanically oriented vs. nature oriented – difference between boys and girls AP-30.27
Sister and she didn’t “get the bug” AP-31.4
Kids with parents that encourage them are deeper thinkers AP-31.13
There is more than one road, there is seed in children AP-27.31, 32
Some kids have set thoughts, memorize AP-27.36
Others are more open, don’t want to be told AP-27.37

**Invention and the common person**

**What we’re told about invention**
People are told they can’t invent AP-1.77
Told inventors were not real AD-4.8

**We are all inventors**
Common people invent, but aren’t aware of it AP-8.72
In the sense that we have different views we are all inventors AP-2.56-57
If being creative means being an inventor, we are all inventors AP-3.5-9
Cooking can be invention AP-2.55
Singing can be invention AP-11.12
Dressing can be invention AP-13.35
Seeing everyday people creating together AP-19.27-28
anyone with patience and time can be inventor AD-12.109
Can invent everyday AD-6.19
Daily inventors: give tools and put together AD-6.22
Anyone can do it, as long as they have a certain level of knowledge AD-16.86
Doesn’t matter what age you are AD-16.136
Just know what your idea is and have it on paper AD-16.137
Everyone has their piece to add AD-20.43
Men and women are inventive by nature AD-20.50
Everyone is creative in some way AD-21.110
We all solve problems every day AD-21.134
We are not all inventors
Common everyday person cannot be an inventor AD-4.74
Can’t just take someone off the street and tell them to invent AD-16.85
Someone different than me AD-18.10
Invention is inborn AD-21.47

Barriers to inventing
People don’t want to be inventors AP-1.92
So many people have ideas but won’t risk trying them AP-15.107-109
Need to sit and think for long time, wouldn’t communicate with family AD-4.75
One man married a less intelligent women over a more loved and intelligent one
so he would be able to devote more time to inventing AD-4.71
He invents in private, but is more like reinventing the wheel AD-4.79
example: can’t invent new boiler, any design has already been done AD-4.81
Over-education kills inventiveness AP-19.24
Inventors need education AP-20.9
Inventors often not well-off AP-20.111
Who has time to invent – money on their mind AD-10.8
Could do it if she set her mind to it, but has too much school work AD-16.51
People have to deal with the burden of daily living AD-19.12
Number one thing: reduce fear AD-21.121
Way to get people to think outside the box AD-21.136

What defines an “invention”?
Definition is very vague. Some people have a strict definition, some say “oh,
great invention” at anything AD-16.68, 69
Idea is on the way, but AD-16.39
Making it work is actually the invention AD-16.40
Thinks of a person when she thinks of invention AD-17.1
Is not an event, but a way of being AD-21.68

Novelty
“Anything that is created by someone for the first time” AP-12.45
Inventions don’t need to be named AD-6. 18
But is still invention, even if not financially successful AD-7.18
Uncle – discovery versus invention (electricity) AD-7.37
Invention = something new, prosperous AD-3.1
Invention is the idea (not necessarily the thing) AP-19.8-10
Invention can be a profession, but can be just for kicks AD-16.61

Recognition/Patents
Inventor means recognition as an inventor AP-3.12
Must have a patent to be an inventor AP-24.48
Importance of recognition AP-25.11-14
Patents don’t define an invention AD-16.72
Person who gets credit isn’t necessarily the inventor AD-16.74
Likes how it feels to be an inventor AD-17.10
People recognize you for the invention AD-17.11
Patents are good to make a living, AD-21.45
If trying to change society, don’t want a patent AD-21.46
Recognition is a random event AD-21.183
To be an inventor, don’t need recognition AP-27.11
When only one person, don’t need name (on it), when others around, need to put name on it AP-27.23, 24

Is it an accident or on purpose?
Sometimes you stumble upon things AD-16.28
If you’re trying to invent you need to know what you’re looking for AD-16.32
Both types are inventors, one is trying, the other by luck AD-16.33
Come up with idea and be able to show that it work AD-16.38
Initial idea can pop up, think and work hard, AD-16.138
And think “Oh!, I’ve got it!” AD-16.139
Two ways to go at it AD-20.5
Mess around or driven by idea AD-20.6
Some just invent, others have goal AD-20.32
“Wow” factor is more of a discovery AD-21.145
When you stumble on something, it is a step, but is discovery, less creativity AD-21.149-150
A lot of inventions were stumbled upon AP-31.21

Is it Invention or Innovation?
Is something new or is it an adaptation of something previous?
Does it matter?
“Old, New, Borrowed, Blue” AD-21.178
fixing little things to get by AD-9.2
“Jerry rigging” AD-9.5
Ford wasn’t an inventor AD-9.6
Innovative in combining assembly line and auto AD-9.7
Many of Edison’s ideas and patents were innovations AD-12.108
New and improved, but is it new? AD-10.31
Parts on it may be invented AD-10.32
But isn’t completely new AD-10.33
Invention takes more imagination AD-9.3
Edison was more inventive AD-9.8
developed light bulb and made it good AD-9.9
electrical system AD-9.10
Strobe light is both new and not AD-11.32
Is using light, but is now in intervals, is still bulb AD-11.33
Is an invention, it’s new, but is innovation of old AD-12.40
New is a utilization of previous AD-12.41
Invention can be both new and an adaptation AD-12.35
Innovation – old and make something new AD-13.18
Invention – new from beginning AD-13.19
Innovate cause they come across something AD-13.20
They can see it different way than others AD-13.21
Fixing up apartment. – is innovation AD-13.25
Stoplights are both innovation and invention AD-9.77
Anyone can innovate, solve problem, change rules AD-9.82
“Edison Lab” – he was “supervisor” of lab, got credit for inventions AD-2
Edison-Westinghouse Competition AD-4.25
Edison brought together ideas AD-4.86
Edison couldn’t have invented if someone hadn’t done something before AD-12.34
Isenbard Kingdom Barnell took existing inventions and bettered them
   Example – very low arch bridge, wide gauge railways AD-4.95
   Wasn’t really an inventor, carried other’s to an extreme AD-4.96
Most inventions are just improvements AP-16.48
Invention isn’t completely new, Edison worked with someone else’s ideas AD-16.66, 67
Invention is creating something new AD-16.62
Every invention is an example AD-16.63
If you go by that rule, the Universe is an invention AD-16.64
Can’t copy, has to be something new AD-17.24
No invention is completely new AD-21.179
New uses of old things AP-27.17

RE-invention:
Hard to reinvent the wheel AD-9.35
But sure can improve it AD-9.36
Wright’s made it (the plane) practical, but invent? AD-9.62
Contribute progress and birth of industry AD-9.63
Re-invent when there is something wrong AD-21.175
Every invention re-uses concepts and ideas AD-21.52
Stockings before nylons – silk AD-21.53
(Inventive son) Always re-inventing the rules (of football) AD-21.86

Is it concrete, or can it be conceptual?
But don’t need to actually make something to be an inventor AD-16.37
Discovery – find something AD-13.15
Invented a song AD-17.9
Don’t have to create something concrete AD-17.3
Can invent an idea or saying AD-17.4
Invent machine or therapy, teaching skills AD-19.7
(Have) concept, way to implement, way to deliver AD-21.43
Applied inventiveness to social dimensions AD-21.38

Is it invention or art?
If doesn’t have purpose is more like art AD-7.14
Art as invention – creativeness AD-7.127
DaVinci – thought of as artist, but thought of powered flight AD-9.59
Leonardo DaVinci ahead of his time with art AD-9.39
Artists invent without knowing it AD-9.22
Both (artists and inventors) are visionaries AD-9.23
Art is invention AP-24.49
People who create are artists AP-20.101
DaVinci has lots of ideas but never produced AD-20.11
Was an inventor; was part of the phase, envisioning AD-20.12, 13
DaVinci could only draw, but is an inventor AD-21.100, 101
Inventions are pretty and work well AP-26.26
Art and invention are equal, come up with idea, different medium AP-30.17, 18
Getting idea into reality AP-30.19

Does an invention have to solve a problem?

Not necessarily
Inventions are not always filling need AD-13.33
No, Buckminster Fuller (Inventor) wasn’t solving a problem. AD-9.30
He thought up new things AD-9.31
Inventions can be improvements on things AD-7.24
Better way of doing things AD-7.25
Inventions are evolving things AD-7.105
Invention is coming up with new methods of solving problems AD-7.129
Be willing to look at things differently AD-7.131
creative, hardworking, don’t give up, time AD-7.134
He sat and thought and envisioned AD-9.28
Brought them to life AD-9.29
Inventions can solve problems but also create them AD-16.43
Might be a problem solver AD-20.7
Others just live and say “cool, that’s a good idea” AD-20.8
Invention solves a problem of some kind AD-21.59
If nothing for it to do, what is point of creating it? AD-21.60
Something useful AP-30.3

What drives invention?

Psychological Factors

Perceiving external need
Ability to perceive a need AP-3.14
Ability to see a new use AP-5.34
Know that there is a better way AP-1.11
Want to make things people need or want AD-16.111
Inventing so people have to buy AD-19.29

Responding to personal need
Interest AP-4.11-12
Desire AP-13.46
Greed AP-2.12
“Urge for fame, money, recognition drives invention” AD-2
People were driven to invent AP-24.41
If you want to make money AD-16.112
Most inventors are less interested in money AD-21.67, AP-1.37, AP-2.12
Always looking for easier way AP-29.2

No reason - inspiration
What made person make the leap to make new thing AP-20.103
Comes automatically AP-23.37
Just hits you – don’t know how AP-24.52
“Ideas pop up” AP-8.17
No control over inventive thoughts AP-16.69, AP-17.12
Don't know what you’re going to do, then it comes to you AP-25.17-20
Something comes naturally, get enthusiasm, obsessed AP-23.27-28
Inspiration AP-12.10
Vision AP-15.30
Given any circumstance, approach in a different perspective AD-21.56
Look at something and new ideas come to him AD-21.50

External Factors

**Need**
Invention comes out of need AP-22.8
“Necessity is the mother of invention” AP-14.6-7, AP-16.27, AP-23.26
Have a need, problem, break it down AP-24.51
Problem in society drives someone’s passion AP-20.107
Development and need for it drives invention AD-16.125

**Other**
Improving things- “better mousetrap” AP-14.30-32
War AD-1
Marketing AD-4.107
Invention = Progress AD-2
Can be from necessity or excess AD-19.11
Competition is good for invention AD-20.18
Process of invention

What do you imagine it is like to invent something?
Not a conscious process AD-21.57
The creative mind puts it all together AP-27.16

Visualization
You see a problem, an idea comes to you in sleep AP-16.62
Inventor (father) took lots of naps 17.13
Seeing better way to do things are tips AD-6.23
Put pieces together to work AD-6.17
Solving a problem – product or process AD-7.13
have to recognize problem exists AD-7.79
What you want to do AD-16.25
Paper clip inventor could have been a wire manufacturer AD-19.10
Playing with grass, realize what you can do with it AD-20.9

Contemplation
Lots of time to think, sit and think AD-4.76
could find different way for them (gears) to work AD-6.2
Would fiddle and conceptualize with things AD-9.38
Inventors come up with original ideas AP-10.10, AP-12.9, AP-13.45
Have idea...AD-20.26
Idea...AD-21.44
Type(s) outlines and directions on computer AP-26.12
Idea, how can it work...AP-30.14

Manipulation
Constant tinkering, thinking through processes AP-9.29
Invention is putting the thoughts into action AP-16.63
Understanding of what you have to work with AD-16.24
Likes working with gears AD-16.18
...Gather supplies... try AD-20.26
...way to do it...AD-21.44
...make it work AP-30.14

Creation
Individuals invent AD-2
Inventing can be very satisfying personally AP-15.140
Knowing you built something to better lives AD-11.6
example: Like locks on cars – automatic locks AD-11.7
House alarm systems AD-11.8
Helps people understand things AD-11.9
Show you how things work AD-11.10
Feels funny and important to be an inventor AP-25.16
Making it work is the actual invention AD-16.40
Edison had a deadline to meet...told people he could do it, so he had to AD-16.53, 54
Taking old ideas and putting together in new way AD-20.1
...get it out AD-21.44
Can’t invent in a vacuum AD-21.186
History

What 20th century invention would you put in a time capsule?  
What recent invention has made an important difference in your life?

Thinks of invention in historic sense, people, things  AP-27.5

Inventors mentioned: (in approximate order of frequency)
Edison,  
Bell, Franklin, Ford, DaVinci  
Einstein, Morse, Wright brothers, Booker T. Washington, George Washington Carver,  
Buckminster Fuller, Hero (Ancient Greek), Helen Keller, Lee Iacocca, Clive Sinclair,  
DeLorean, Hershey brothers,  
Greatest inventor – Franklin AD-7.48  
Buckminster Fuller biggest inventor AD-9.25

Inventions named:
- Paper is the top invention of all time AP-8.45  
- Airplane AP-8.95, AP-13.54, AP-18.24  
- 19th century – type-setting machine AP-5.28  
- CPR is a great invention AP-18.23, 25  
- Phonograph AD-6.13, AD-12.107, AD-21.181  
- Wright bros.’ bike and plane AD-6  
- Wristwatch is improvement over hand held AD-7.26  
- Reinvent – steam engine AD-7.22  
- Methods of creating electricity is invention AD-7.36  
- Franklin stove – didn’t patent on purpose AD-7.49  
- Helped the common person AD-7.50  
- Lightning rod AD-7.51  
- Concept of research lab – Invention AD-7.57  
- Geodesic dome and form in everything AD-9.26  
- Buttons and zipper AP-19.39  
- Car AP-20.25  
- Phone, car, AOL, TV AP-22.12  
- Typewriter AP-25.68  
- Light bulb AP-25.68  
- Phone, bulbs, computer, chairs, glasses, Legos, Wizbits AP-25.80-81  
- Hubble Telescope AD-16.7  
- Invention of flint/cooking vegetables AD-16.13, 14  
- Post-It Notes AD-16.30  
- Ninja Turtle saying “Kowabunga!” AD-17.5  
- Mathematics is purest form of invention AD-21.139  
- WWW (World Wide Web) – information is free, available to everyone AD-21.36  
- Computer programs AD-21.33
Need to know History and its effect on contemporary times

Problems of doing history
There is no pure history AP-9.74
History should be an accurate account of the details AP-9.73
You have to do sociology and philosophy AP-9.72

Value of history
History teaches us about today AP-9.48
How we went from point A to point B to where we are now AP-13.53
Appreciating what people before us have done AP-16.39
To see how things used to be AP-24.15
To see where things came from AP-24.43
Need it to understand where things came from AD-1
Take the best from the past AD-4.119
Always something before AD-4.87
Like chess, any chess move has already been done AD-4.82
Important to know where we came from and what it took to get here AD-12.29
(by showing children) will broaden minds of what is still possible AD-12.31
Everything started somewhere AP-19.34-37
Need to know how people avoided problems in past AP-25.15
Computers started as things for the elite AD-21.18
Didn’t want to be part of a priesthood, got out of business AD-21.19

History gives perspective on change
All of them have problems AP-5.26, AP-9.35
Know about earlier ways to produce energy – is important as predecessor of electric power AD-4.41
Hydraulics produced a lot of energy, without electricity AD-4.14
Invented at different times, things change AP-20.39
How far we’ve come since then AP-22.22
Should see what they did before electricity, do to same chores AD-4.43
“What was it like to live back then?” AD-7.86
“Things weren’t always this easy” AD-12.30
Took time and effort to make it beautiful AD-12.20
And artistry to make it, proud of product AD-12.21
old machines, steam engines are like living animals, the closest you can get AD-4.112
Can see it working, work with it, requires food, men to take care of it AD-4.113
Old things in museums don’t work well anymore, but people don’t realize history and power of these things, how good they were AD-4.117
Hubble Space Telescope is great invention to help us see the past AD-16.7

Difference between Past and Present

Inventions:
Take today’s technology back to 50’s – couldn’t use it AD-12.65
Three-dollar pocket calculator would be wonder AD-12.66
Meant you had money or sincere need, now in cereal boxes AD-12.67
At the time, these things were cutting edge technology AD-7.84
Jump in technology in one machine AD-12.4
Eased life, and had definite purpose AD-12.5
There was a perceived improvement AD-12.6
In past, on farm, change was great labor saver AD-12.10
Decreased effort by 100%, now it’s fractionally less AD-12.11
Don’t need mechanical knowledge AD-21.30
Now need concept, little mechanical AD-21.31
Most great inventions are computer programs AD-21.32

Inventors:
Very few people can say that today (i.e., that they are inventors) AD-7.5
Era of lone inventor is gone AD-7.6
Now it takes teams AD-7.7
Inventing today is a profession AD-7.27
example: medicine – takes many people, money AD-7.29
Children are inventors of the future AD-9.96
Have to have teams to create today AD-16.110
Are in the middle of history, in future, we’ll recognize the “person” AD-21.106, 107
Inventors today are entrepreneurs AD-21.95

Contemporary Inventions, still in use
Daily inventions: hairdryer, dishwasher, microwave AD-6.38
Computer in homes – more advances AD-7.38

For people, children
Can’t invent in garage, at home anymore AP-20.122, AP-20.152
Kids are less inventive now than earlier AP-16.25
Kids used to be deeper thinkers, didn’t have instant answers from computer AP-31.9
Unless kids take own interest, don’t have thinking skills AP-31.14

Cross-cultural dimensions of invention

Invention in America
American inventors are arrogant AP-1.18
American inventors don’t consider consequences AP-13.62
Americans more eager to invest in new, unproven inventions AP-14.14
Entrepreneurs, problem-solvers, made America great AP-15.3-8
Marketing is an American invention AD-4.107
American cities have grown up based on the car AD-4.53
Americans underestimate the past, think it’s bad AD-4.118
Americans accept change more easily AP-9.70

Invention in England
Good at inventing, bad at marketing and exploiting AP-14.12

Cross-cultural/Country Differences, Progress
Invention is good, but differences in progress from country to country AD-4.18
American interested in progress, British in keeping things same AD-4.19
Marketing is an American invention AD-4.107
English is more beautiful, modern is ugly, but works better AD-4.21
example: American steam engines use all newest equipment, new look, English do too, but keep historic look/model AD-4.20
Australians mix -- want well working, get American; want to look good, get English AD-4.22
America is more advanced, but need to see what others are doing too AD-4.62
Has gone far with progress, but all progress isn't good AD-4.26
example: Father toured city, noticed block full of vegetation, saw beauty; taxi driver saw lack of progress AD-4.45
Germans are most efficient inventors AD-4.102
Have high standards, but people pay in discipline AD-4.104
English invention in a bit disorganized, French worse, America not as efficient as Germany, but not quite as serious AD-4.103
America is at its peak of civilization etc., Africa will be last, China will peak after America falls AD-4.127
History of country affects what interests them and display of museum AD-4.63
example: America--west and agriculture, Indians; Rotterdam--water AD-4.64

Museum visiting

Visit Preferences
What did you enjoy most (on this visit, on a previous visits, on other visits to places with inventions)? What do you enjoy more: seeing things, learning, thinking, imagining, remembering or being with others?
(How does that affect the way they look at this section?)

Touch:
Touching things AP-5.52, AP-9.10, AP-12.34
Loved touching Dino poop AP-25.48
Likes to touch things AP-25.64
Likes hands-on stuff AD-11.2
Likes history, putting things together AD-11.34

See:
Likes to see old things (what they look like, how big they are, And how they got them to work) AP-10.18, AP-29.35, AP-12.34, AP-13.22
See old things, open, can see them working AD-4.6
How things evolved/how they work AP-2.35, AP-15.10
Introspective; likes to see how things were AP-14.24-27
Seeing things AP-3.27, 32
Seeing old things, reading AP-12.29-30
Likes to see actual thing AP-25.63
Seeing things from the personal past AP-16.40
Mom is object type AP-31.40

Learn:
Likes to read and learn AP-8.22-25, AP-9.11, 14, AP-12.34
Likes to learn the stories about people AP-8.30
Cognitive; how things developed AP-14.30-33
Cognitive: respect for past, ideas in depth AP-15.69-75
Learning things AP-3.27, AP-12.30-33
Likes facts, signs, labels AP-25.53, AP-25.62
Son is cognitive type AP-31.40

What do you get out of visiting museums?
- Kids in an art museum AP-12.35-43
- Museum is for education AD-4.35
- Museum peaks curiosity AP-24.71
- Put questions in their heads as you go (kids) AP-31.38

What does it mean in the context of your life as a whole?
- Professional development AP-13.2
- Getting a better overall understanding of our world AP-3.28
- Took children to museums to “instill culture” AP-16.36
- They still talk about visit to SI AP-16.38
- Like seeing how invention has helped us see the past AD-16.5
- Remembers childhood trips well AP-31.36

Leisure activities that made a critical difference
- Visiting factories deeply affected him AP-16.12-18
- Whale watching led to desire for science career AP-18.59

Museum presentation and Exhibition ideas

Human connection
- Needs a human connection AP-5.75-79, 6 (model with projected face)
- People can answer questions AP-9.79

Hands-on/Not hands-on
- Hands-on helps if there’s reading too AP-8.50
- Kids need to be able to play and experiment in museums AP-18.47-48
- Is good that it is not toward children, or hands-on AD-4.36
- Hands-on places aren’t really museums AP-20.17-18

Media
- Video o.k. if it is explaining directly, personally AP-8.56, 109
- When you push a button, voices explain AP-10.30

People
- Tell the stories of inventors AP-4.27-30, AP-8.56
- Who, why, and story behind AD-10.19

Ideas
- Pay tribute to the idea, not the person AP-1.39-42
- what is in our future? AD-9.85
- Where are inventions going to go? AD-9.86
- Sci-fi pictures one style of future AD-9.87
- Whole idea – make people think and question AD-10.34

Things
- Seeing things affects you – you don’t know how AP-24.39
- More interested in invention, not inventor AD-4.65
See how the machine works, people don’t know how computers work AD-1
DaVinci pictures AD-7.42
Pictures of his inventions AD-7.43
See modern inventions in exhibition AD-10.16
Daily items that you use AD-10.20
Less mechanical and more technology today AD-10.21
Important and unusual inventions AD-11.26
Exhibit of old inventions that have become modern AD-11.29
example: light bulb then, and strobe lights now AD-11.30
Steps and years, change through time AD-11.31
Inventions people know but don’t know who invented AD-17.20,21
Explain how Inventor got their idea AD-17.26

**Action/activity**

Don’t want his things in museum; collect dust AD-4.61
If privately owned, can still be used, people can see things move AD-4.61
invent something small in exhibition AD-7.60
Toothpick puzzle, think out of the box AD-21.137, 138

**Viewpoint**

Whose spin is presented here? AP-9.76-78

**Organization**

Inventions be categorized – travel, food, medicine, etc AD-9.97
What to invent to solve problems AD-9.98
Last 20 years and next 20 years AD-10.22

**Immersion**

Things you can go inside AP-11.32, 33

**Diversity**

Different age groups, diverse interests AP-15.136-139
Inventions by African-Americans in the Ford museum AP-16.9

**Questions in exhibition**

What is it? AP-10.32, AP-11.25
What does it do? AP-11.24
Steps and years, change through time AD-11.31
Who, why, and story behind AD-10.19

**Admirable interactives**

San Diego science museum: put together an arch AP-3.39
Electricity generation at Baltimore science center AP-8.54
Electricity generation at Ft. Collins science center AP-9.3
Static electricity generator at Boston Science Museum AP-11.15
Interactive hologram T-Rex at Nat. Geo. AP-12.26
(Microbes?) Molecule virtual reality AP-12.28
School chemistry lab AP-2.42
Tornado maker (Chapel Hill science center) AP-18.63
Bubble-making place (Chapel Hill) AP-18.64
Space shuttle model interactive AP-18.65
Static electricity AP-23.11
Baltimore Discovery Center – liked finding things AP-25.70
Made musical instruments AP-25.71

Invention Exhibition/ Kid-things Suggestions

Building/making
Let them use Legos AP-9.24, AP-11.21, AP-18.58
Let them play with sand and water AP-18.57
Let them build with “K-nex” AP-8.38
Materials with many colors that match design AP-19.30
Play-doh that’s also bouncy AP-20.46
Create weight-lift AP-20.49
Two-story car AP-20.72
Wood and tools, cooking, Play-doh, clay, markers, paper AP-25.87-90
Have kids custom make something AD-16.143

Drawing
Let them draw AP-8.38

Computers
Interactive video AP-8.108

Participation
Put in things made by kids for the exhibition AP-8.31
Attracted to inventions that help people AP- 8.37, 60

Targeted presentation
There should be separate room for little kids AP- 12.48-50
There should be interactives at a low height for kids AP-12.47
Figure out goal of exhibition AD-21.131

Touching
Kids want to handle things AP-17.41, AP-18.21, AP-18.49
Hands on can be dangerous, and is someone else’s property AD-4.38
Hands-on things—liked light bulb interactive here AD-11.27

Demonstration
Demonstration is good, but not interactive AD-4.39

Wow!
Something that makes them go “wow” AP-17.44
Show process and then suddenly something arises AP-17.45

Themed experience
pretend kids are on an island AD-13.36
Make them think of invention to help survive AD-13.37
help imagination AD-13.38
But they must have something in their mind AD-13.39
Children are better at being inventive AD-13.40
Mind is more open AD-13.41
give kids tools and problem, have an hour AD-7.61
Make new things out of things that were invented 20.50
Present a problem and materials, how can you solve it? AD-16.144
Challenges, brainstorm AD-20.37

Messages
Make children realize the bottom line is not $$ AD-9.101
Problem and tools – makes you think AD-7.73
Support kids that think, “I can do that” AP-19.26
Focus on how risk shuts down creativity AD-21.132
Bring out all kinds of invention – social, mathematical, conceptual, mechanical
AD-21.173, 174

Titles
“Blast from the Past” AD-11.28
Be an inventor AP-20.64
Kids are inventors too AP-20.70, AP-22.34
“Inventions from the Last Century” AP-22.37
You too can be an inventor AP-24.55-56
“Amazing inventions of history and modern” AP-25.78
“How invention has screwed up our lives” AP-27.67
Outline of Unanticipated Ideas

Moral Responsibility and Consequences of Invention

Seeing the big picture

Consequences

Examples of negative consequences
  Environmental consequences
  Physical consequences
  Social consequences
  Personal consequences
  Uncertain consequences

Examples of positive consequences
  A better life
  New things are interesting

Dealing with consequences

Ethics of inventing
Ethics of using inventions

Good inventions
Bad inventions
Inventions neither good nor bad

Attitudes toward technological change

Technological anxieties
  General
  Unreliability
  Incompatibility
  Mystery
  Dependence
  Out of control
  Source of disconnection
  Future
  Loss

Technological satisfaction
  Interesting
  Makes life easier/better
  Creates progress
  Connects people
  Change is good
  Mystery
  Increasingly inexpensive and available

Technological neutrality
Future of Invention

This can't go on forever

Ideas for future inventions
  Energy
  Transportation
  Biological
  Medical
  Other

Process of invention today

Incremental improvements, not big leaps
Invisible invention
Like the past
Different from the past
Accidental invention
Other remarks

Success and failure

Acceptance of Invention
  Marketing inventions

Inventors and Inventions "In their Time"

Success
Failure
  Is part of inventing
  Is instructional
  Is not a problem
  Can lead to success
  Can be interesting
  Can lead to new inventions
Unanticipated Ideas

Moral Responsibility and Consequences of Invention

Seeing the big picture
  Need to see the big picture AP-5.69
  Inventions can be used for good or bad AP-5.23
  Have to find balance that is socially constructive AD-21.10
  Balance invention AP-27.54
  Space program – federal money – public doesn’t realize value AP-29.11, 12

Consequences
  All inventions affect us AP-24.30
  Anything man has to do with is faulty AP-13.15
  Inventions are always a disaster and create problems AP-1.22-24
  Unexpected consequences (e.g., airbags) AP-16.55
  By accepting inventions, we accept their consequences AP-8.77
  We need to understand consequences AP-9.61
  A lot of things we take for granted but are bad for whole AD-9.104
  Inventions can solve problems, but also creates them AD-16.43

Examples of negative consequences

Environmental consequences
  Inventions create more waste AP-23.21-22
  Need to care for the earth AP-23.25
  Cars give off CFC’s AP-22.13
  Cars are bad for money reasons, environment AD-13.11
  Population is growing; using resources AD-11.50
  Wars make people inventive, environmental destruction AD-1
  Factories and smog AD-11.53
  Don’t want world to get unbalanced AP-25.55-60

Physical consequences
  (Educate kids so) kinds of mistakes that cause problem won’t be made AD-9.02
  example: rush to get medicine out on the market AD-9.103
  Doesn’t like motor car, likes more public transport, more exercise AD-4.49
  Too lazy to walk since have car AD-4.51

Social consequences
  Fundamentalists are repercussions (of effect of technology) AD-12.69
  Can’t understand it and don’t know how to deal, you reject it, try to stop AD-12.70
  Old woman friend reflected that in old times men could get mentally and physically challenging jobs, not any more AD-4.47
  People now have access to things that mislead AP-23.15
  Invention makes people jealous AD-16.122
  Going to be a stopping point, will have to be better people to each other AP-27.7
  We are losing our “roots,” are losing personalities AP-29.14, 15
**Personal consequences**
You are smarter if you do it yourself AD-7.109
Rather than sit and do it on the computer AD-7.110
We are going fast, but can’t stop it AD-12.68
Application of technology vs. invention today AD-12.13
  example: use calculator in school AD-12.14
Is learning tool, not process AD-12.15
  example: baby walking, give them wheels to get around AD-12.16
Don’t learn to walk, use legs AD-12.17
Kids using calculator is same, not using mind AD-12.18
Computers have taken a lot away from people AD-12.72
Are a tool, but are now almost on deity status AD-12.73
Having all this contact on Internet is not so good AD-12.80
Like giving them keys to museums, but not giving them appreciation AD-12.81
Give them the keys, but not the understanding of how to use it AD-12.82
Emphasize computer, doesn’t teach about what is there AD-12.83
Can’t appreciate it if you don’t understand how it was made AD-12.84
Has to get over built in dislike and learn to work with computers AD-12.71
If don’t know how to use your mind, how you got here, can you appreciate what
you have? AD-12.85
Airplane inventor killed himself AD-12.94
Was upset how plane was used-war AD-12.95
TV inventor also depressed AD-12.96
Absent minded mistake hurts many AD-12.99
Computers were for elite, didn’t want to be part of a priesthood AD-21.18, 19
(Divorce) is social invention which is untamed, needs re-invented AD-21.159-161

**Uncertain consequences**
Nuclear power will cause problem in future AD-11.52
don’t get so into technology that we are too dependent on computer AD-7.108
We are “losing our heads” to computers AD-1
Book – “The Mouse that Roared” – Nuclear fear AD-16.46
Computers could go either way AD-21.16
Things are determined by profit, lets just hope the benefit to humanity and profit
go together AP-29.32, 33

Examples of positive consequences

**A better life**
Life is easier now – you don’t have to use physical work AP-10.20

**New things are interesting**
Young person feels new is good AP-19.56-61

Dealing with consequences
Inventions need to be “managed” AP-9.61-67, AP-18.32
Y2K isn’t a problem – just challenge for others AD-7.102
Not a detriment, something for another inventor AD-7.104
Need to bring people back together AP-19.49-55
Won’t stop it though, take and do your best with them (changes) AD-20.54, 55
Ethics of inventing

- Figure it out if it’s worthwhile to do AP-23.30
- Invention should make society better AP-15.140-143
- Inventions should benefit People AD-3.2
- Edison invented for others, not himself AP-19.48
- Desire is wrong AP-20.133
- Shouldn’t be possessive and selfish AP-19.46
- The inventor has moral responsibility AP-15.148
- Inventors are responsible for consequences AP-13.62-65
- Is a moral dilemma AD-4.73
- Can have it, but if it does no good, what good is it? AD-7.41
- Inventions not always good AD-12.90
- Social inventors are not into technology AD-21.155

Ethics of using inventions

- Can invent for good, but someone use it for bad AD-7.94
- It depends on the people AD-13.5
- Content is the issue, not the technology AP-20.140-146
- If they use it for good, or they can use it for bad AD-13.6
- Invention has been misused AP-22.42-44
- Nothing bad about nuclear power, used wrong AD-7.95
- Technology doesn’t breed corruption AP-20.134-136

Good inventions

- Good inventions help society change AP-19.40-41
- Good inventions are fun or useful, e.g. Nintendo AP-20.28-29
- Depends on purpose for the invention too AD-13.7
  - Example: Biological warfare – is bad from start AD-13.8
- Crayons are a good invention AP-25.26
- Living is the best invention AP-25.28
- Inventions are mostly good AD-18.13
- Radio and phone are almost all positive AD-21.14
- TV is good – get information AP-27.49
- Car is good - get there faster AP-27.52

Bad inventions

- Not all inventions are good AP-19.38
- Gun-bad invention AD-12.91
- Atomic bomb not good AP-19.42-43
- Bad invention – Dustbuster AP-23.23-24
- Bad: a new type of land mine AP-5.144
- Particularly don’t like cars AD-12.97
- Pfizer made pill for cardiac patients but found it could kill someone with that condition – Viagra AD-16.131,132
- TV is 99% bad AD-21.15
- Divorce is unconscious, destructive AD-21.159
- TV is bad – entertainment, mindless AP-27.50
- Car is bad – smog, congestion AP-27.53
Inventions neither good nor bad

Inventions are not inherently good or bad AP-20.124-132
Application of inventions is where goes bad AP-20.132
Use is the issue not the invention AP-24.28-29
Money is not good and not bad AP-25.30-34
Medicine is an invention, but not all good AD-16.130
Computers could go either way AD-21.16

Attitudes towards technological change

Technological anxieties

- General
  Creating stress cause we expect more of ourselves AP-27.60
  impact not clear – “is life better today?” AP-15.43-44
  So much technology; life is chaotic AP- 19.53
  Yet people have gone nowhere quick AP-23.16-17
  Now changes affect so many AP-8.93
  Cars have changed cities AD-4.54
technology going too fast, AD-3.3-4
Technology going too fast, if computer doesn’t know, we don’t know AD-1
Speed of invention is a problem for future, systems change quickly AD-3.5,14
People are worrying about their health (and technology) AP-29.20

Unreliability
new things are good but not dependable AP-13.6-9
Everything run by computer AD-5.16
Doesn’t work, have to replace with computer AD-5.18
It breaks, and replace again with another computer AD-5.19

Incompatibility
New systems can’t read old information, access old data AD-3.8, AD-9.13

Mystery
Average person knows nothing about how things work AD-12.64
Can see how machine works, but not computer chip AD-12.62
All inventions are good, but can’t figure out computer AP-30.13

Dependence
Society is so dependent on it, can’t live without AD-12.101
Working on cars is more difficult AD-5.15
Is putting others out cause she doesn’t have a phone AP-27.66
Satellite TV – kids watch TV, lose touch, while parents are working, trying to afford the satellite AP-29.18,19

Out of control
Technology needs to be tamed AP-19.64
“All of us wish it was not this way, but it continues to progress” AP-9.57
Manage in family and if balanced, don’t have control out of house AP-27.58, 59
Source of disconnection
technology separates people AP-15.48-49
the more difficult technology gets, the less human we are AP-27.16,17
Separation in family is true AP-31.29

Future
We don’t need much more AP-20.40
Dad wants him to learn, son will have to use them AD-12.60
there’s still room for improvement AP-16.51
More complications require more inventions AP-23.18-20
Inventors are too busy with new things AD-3.15

Loss
it’s a value issue: we’re paying a price AP-15.46-47
Workmanship is gone, cause easier to use computer AD-12.19
Now computers do it - looks the same, but is far inferior AD-12.22
Technology can change behavior negatively AP-20.137-144

Technological satisfaction

Interesting
no fear of technology AD-7.106
Makes life more interesting AP-24.33-34
most fascinating time AP-15.41

Makes life easier/better
How easy it is now AP-24.9, AP-24.15-19, AP-24.32-33
Where would we be without these things AP-9.35
Good: Microchip to identify cancer AP-15.143
We have such satisfying life AD-7.107

Creates progress
Invention has been key to expansion of American industry AP-9.71

Connects people
technology can bring people together AP-18.34-37

Change is good
change is good AP-18.41-45
Space Race is good – drives invention AD-2

Mystery
Is almost magic how they work AD-12.63

Increasingly inexpensive and available
The advances in availability are almost more important than invention AD-7.40
Smaller, quicker AD-18.16

Technological neutrality
There is no black and white AD-10.35
How can you say life is better today, than yesterday? AD-20.51
Not going to stop technology, are the only way to solve some problems, but also creates some. AD-21.7-9
Can only go so far with global communication AP-29.6

Future of Invention

Some interests hold back inventions AP-16.52
Wonder what is to come AD-10.23
People don’t understand what’s going on, but it is coming AD-12.74

This can’t go on forever
  In future when civilization is poor, we will go back to old methods, since won’t have money for technology AD-4.124
  Civilization won’t go forever AD-4.126, nothing except universe does AD-4.127
  Will “go back” to “older” way of tradesman and specialists, by necessity (war, collapse of systems) AD-1
  Is fair to be nervous for future AD-20.53

Ideas for future inventions

Energy
Use natural forces to create new sources of energy AD-1

Transportation
hovering cars AD-7.98
Solar car – people are still using gas cars AD-11.49
Car will run on light, won’t run out of it AD-11.51
Medical, electronic, space AD-10.24

Biological
Discuss genetically engineered foods AD-10.25
Is this invention or science? AD-10.26
Invention to save animals AP-25.85
Invention to shrink pet dog AP-25.86
A Dalmatian dog that is always nice AP-20.59-63

Medical
Prolong life AP-22.38
Just isn’t enough time in life span for humans AP-29.26

Other
Machine to make tailored clothes AP-23.41
A way not to go to school AP-24.20
Want to make a bible in every language AP-20.57-58
Process of Invention Today

**Incremental improvements, not big leaps**
- we are reinventing – little new, just improvements AD-7.87
- example: Horse to car to something else AD-7.88
- Inventions are pouring out, but more subtle AD-7.92
- Not as many huge leaps AD-7.93
- Challenge for inventors – fix inventions of before AD-7.97
- economic improvements AD-12.7
  - example: digital reads on car dashboard AD-12.8
- Does same thing, but different way, perceived improvement AD-12.9
- Think what great minds could do today AD-12.51
- We built upon them AD-12.52
- Ancient inventions are repeated today AD-4.89

**Invisible invention**
- Not noticeable AD-7.89
  - example: memory chip and medicine AD-7.90
- Are small things (inside computer) AD-7.91
- Now we improve the technology we have, new ways of doing things AD-17.23
- Have re-invented society, but haven’t with relationships AD-21.172

**Like the past**
- Still have “kitchen inventors,” lots of great minds AD-12.54

**Different from the past**
- Example: medicine is expensive to make AD-13.30
- Now there are more groups working on invention AD-13.31
- Led by a team leader AD-13.32
- Can’t afford to produce and manufacture:
  - Big Companies buy the rights, get credit, earnings AD-2
  - Public fuels invention today AD-16.129
- In the past it was a big deal to invent AD-17.22
- Now we improve the technology we have, new ways of doing things AD-17.23
- Corporate image of inventors today, people design for profit AD-19.33,34
- Community of ideas – Internet AD-20.16
- Used to be one brand, now are many different products AD-20.21, 22
- Now have critical mass, start inventing AD-20.24

**Accidental invention**
- Are working on something; come across new thing AD-13.34

**Other remarks**
- Opinions of inventors not much difference between countries AD-13.35
- Public isn’t necessary for invention AD-16.128
- Very consumer driven AD-19.30
- Takes a lot of money to invent AD-29.10
Success and Failure

Acceptance of Invention

Good invention starts slow, people accept slowly AD-11.41
Don’t know how people will take invention AD-11.42
If people don’t like it, have to “watch out” AD-11.43
Will be used more after they make more, make it cost efficient AD-11.44
Most inventions are for economic gain AD-12.53
Corporate doesn’t like new ideas AP-8.86
People resist new things AP-8.88, 91
The system doesn’t want invention/change AP-1.78-91
The “not-invented here” syndrome AP-14.10
Idea to object to acceptance AP-19.17
Creates in own life, but does it go beyond you? AP-22.10
Some things are before their time AD-11.48
Nonsense invention: Bike with 10 seats AP-20.27
Public is always wanting quicker, better AD-16.127

Marketing inventions

Ideas stolen by others AP-16.21-23
Need patents so people don’t copy idea AD-11.61
Now marketing is difficult AP-16.42-46
Marketing failure: Sinclair C-5 AP-14.42-44
Have to get people to back and support you AD-11.45
Inventions take money — get idea out AD-10.9
Can go so far with idea, then need someone to back you AD-10.12
Solar car isn’t cost efficient, hasn’t developed enough AD-11.39
Others got there first AP-19.3
Some have elbow grease, but others were able to sell it AD-9.55
Others had dirty fingernails, they sold it AD-9.53
Have to push product AD-9.50
Girl and dad made bacon drier, publicized it, producer liked it and made it AD-16.117,118
Anyway inventor by profession can “get bread and water” is to sell invention AD-16.120
Inventions must be successful or no one will pay for them AD-18.24, 25
Inventing so people have to buy AD-19.29
Such as the music industry – 8-track to tape to CD AD-19.28
Edison was an inventor and marketer AD-21.185
Is not a good example of inventor cause of number of inventions and marketing abilities AD-21.193, 194
Sold invention to mom for 5 cents AP-26.29

Inventors and Inventions “In their Time”

Was ahead in his concept, but technology wasn’t there to support AD-12.45
Thinking ahead of his time, but limited by it AD-12.48
Ford – ordinary man, luck, of the time AD-7.31
If 100 years before, wouldn’t have Ford AD-7.33
Still would have auto AD-7.34
Success
Money is necessary to be successful AD-7.30
Everything today is built upon success and failures of people before AD-12.37
No economic demand, wouldn't float AD-7.124
Hard to distinguish true inventor AD-9.57
Not inventing unless you thought you could sell it AD-9.21
Money is important in invention AD-13.29
Doesn't have to be successful to be good AD-11.46
Have to realize that it's good yourself AD-11.47
Czech man who invented contacts AD-13.26
He was too poor to make it AD-13.28
Money is necessary for inventing AD-4.122
Doesn't have to be successful AD-19.31

Failure

**Is part of inventing**
Takes failure to be inventor AD-6.31
Edison failed a lot AD-6.32
Try all things till it works AD-6.36
Inventions do go wrong, lots of evidence AD-9.99
So let children know it is ok to fail AD-9.100
Invention requires trial and error AP-20.112
999 failures, one works AP-23.38

**Is instructional**
Inventors learn from it AP-8 67, 70, 80
You have to keep trying until you get it right AP-10.12
Failure is good – it teaches AP-15.101-105
Learn more from your mistakes AD-6.29
Making mistakes is learning tool AD-9.91
Don't be afraid to make mistakes AD-9.92
Edison tried over 1000 things for filament in light bulb AD-9.93
Edison felt they were just a 1000 ways that didn’t work, not mistake AD-9.94
Mistakes are actually good – relax, feel ok, with it AD-9.95
Failure is good; you learn from it AP-25.76
Can learn from Failure and make something new AD-17.7

**Is not a problem**
If you fail, it's not a big deal AD-11.20
Some think it is, and won’t try again AD-11.21

**Can lead to success**
Motor company was after two failures AD-9.15

**Can be interesting**
Failures are interesting, e.g. cars that didn’t work AP-10.23
Another failure: the Sinclair C-5 (powered bike) AP-14.36, 41-44
Stanley Steamer car AP-20.37
show light bulbs that do and don't work AP-25.79
Can lead to new inventions
Inventions that were mistakes – Silly Putty, Superballs AP-20.34-35
surprises can be bad, but can help too AP-25.21-22
Post-it Note inventor was looking for a strong glue AD-16.30
   Ended up with a mistake that created a whole industry AD-16.35
Appendix A.

MINDPLAY\(^1\) NOTES
(Post-Feasibility Study)\(^2\)

I. Overall Exhibition Objectives (relates to p. 2 of the study):
To encourage visitors...
- to explore the nature of invention and its importance in their daily lives;
- to learn about inventors and invention throughout this country’s history (and the connections of this history to our future); and
- to experiment with their own inventive abilities.

II. Hoped For Exhibition Outcomes (relates to p. 3 of the study):
- to transform visitors’ existing impressions--new ideas and perspectives, new approaches to invention and inventiveness (shift away from “heroic model”);
- to reduce the distance between visitors and the inventive process, allowing visitors to share in and “own” a bit of invention and innovation themselves;
- to provide visitors with sources for further study of invention, for its inclusion in class activities, for assistance to the would-be inventor, and for creative involvement by family members at home; and
- to provide exposure and recognition for the Lemelson Center itself and other programs.

III. Exhibition Concept (relates to p. 4 of the study):
The four main thematic questions in the feasibility study remain useful as organizers:

A. What is invention?
- many of the 1996 Charrette participants felt that an invention must be tangible, contain a clear expression of an idea, be capable of execution, have clear consequences and come to some fruition or completion
- use a broad, inclusive definition that is interdisciplinary and involves key elements of problem-solving and creativity
- invention is often incremental and based on collaborations, competitions, and borrowings; frequently done in company settings with lots of resources

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\(^1\) The title “Mindplay” is previously trademarked. A new title is needed.
\(^2\) A commentary to the document “Mindplay” - Creativity and Invention in Everyday Life, A Lemelson Center Traveling Exhibition,” produced by The Jerome and Dorothy Lemelson Center for the Study of Invention and Innovation (Spring 1997). On file at the Institutional Studies Office.
could have a hands-on workshop where visitors have to work together to solve some problem
- talk about the world of invention beyond patents (patents are not infallible evidence of "firsts" nor are they the only defining factor of inventions)
- visitors should be able to discover for themselves what constitutes an invention; perhaps we should provide choices for the visitor to test out their definitions of invention

B. Who invents?
- invention is an essential human capacity [and aspiration ?]
- questions to think about: can inventiveness be learned? nurtured?
- inventors in the past and today include people of both genders, of all ages, and from all racial and ethnic groups
- need to tell stories of a range of inventors and innovators, some of whom are familiar icons, others of whom are less well known; important to show the "hidden history" of invention, looking at women and minority inventors in particular
- what most people learn about invention are the Great Inventors--Edison, Bell, Ford, the Wright brothers--and their Great Ideas (often portrayed as "Eureka!" moments)
- image of the inventor is usually a white male, hard-working, working alone or nearly alone, without much money, often self-educated--the heroic model
- need to address who inventors really are, what motivates them, the different contexts/settings they work in, and the many steps of the invention process

C. What are the processes of invention?
- explore the incremental nature of invention, recognizing that inventors build on a base of available knowledge and that inventions frequently have long pedigrees; look at evolution of inventions--predecessors to an inventor, antecedents to an invention
- inventions do not happen in a vacuum; instead, environmental, political, internal and social constraints influence inventors, the process of inventing, and the uses of the invention; also constraints of time, materials, marketplace/demand, people, priorities
- talk about the importance of marketing, the business side of invention
- show examples of inventor notebooks, sketches, computer designs, other methods used in process of invention
- could use the history of television as a case study, showing how inventions sometimes fail and take off again in a new direction

D. Why is invention an "everyday" phenomenon?
- the things we use every day were invented by someone and quite possibly reinvented and modified many times
• discuss invention using what visitors already know, e.g. clothing and shoes, cooking, sports equipment and games, office technology, the schoolroom
• demonstrate that "we" the visitors invent on an everyday basis

IV. Exhibition Design (relates to p. 5 of the study):

The main traveling exhibition will be 2500-3500 square feet in size, with a range of artifacts, computer interactives, and hands-on activity stations suitable for larger museums.

In addition, there might be one or two smaller versions of the exhibition with discovery kits and smaller manipulatives that could travel to small museums, libraries, schools or community centers.

Desired design elements:
• engaging and inviting;
• unique, creative;
• beautiful, aesthetically pleasing;
• non-linear, approachable from many directions;
• accessible;
• plenty of seating;
• portable;
• well lit;
• mix of computer interactives with tactile, manipulative components;
• labels with a large font and good color contrast that are well lit; layered text, chunked, with varied lengths

V. Exhibition Sections (relates to pp. 6-10 of the study):

We need to find another way to thematically group the case studies--the pods are rather arbitrary, unnecessarily dividing inventions (and their inventors) into categories when in fact a lot of inventions are used in many different settings for different purposes.

Many of the case study examples need to be rethought--add some more recent Lemelson Center projects and delete ones that don’t fit in well with the themes and objectives of the traveling exhibition.

VI. Educational Objectives (relates to p. 16 of the study):

The working group re-endorsed the feasibility study’s educational objectives:
• The exhibition will provide an informal learning opportunity that will encourage visitors of all ages to:
  • examine important questions about invention;
• expand their understanding of invention and innovation;
• link their own experiences to invention, innovation, history, science, and technology;
• use a variety of exhibit formats and learning styles;
• explore their own creativity and inventiveness; and
• find out more about inventors in their own communities.

VII. Audiences (relates to p. 16 of the study):

...that we are sure to have:
• school groups (grades 3-8); and
• families (parents in 30s and 40s, children ages 7-12)--keep in mind that women are often the learning leaders in family groups.

...that we want to cultivate:
• families with very small children, often ignored in exhibition development; and
• older adult visitors, a growing segment of the population.
VIII. Our Exhibition Visitors (relates to p. 16 of the study):

- we need to do some front-end evaluations with our museum visitors, including finding out what they think about invention and inventors, what they'd like to learn more about and what they'd specifically like to see in the exhibit
- need to address popular myths and misconceptions about the nature of inventors and invention that many people are taught
- exhibit needs to be about the exhibition visitors ("us") as much as about inventors ("them")--address different perspectives of diverse museum visitors (cross-gender, cross-generational, cross-cultural)
- as children most people tinkered with objects and created "new" things (from model-making to inventing games and plays), but boys are much more likely than girls to think of themselves as inventive
- important to have lots of objects, images and hands-on activities as well as words to communicate to different types of learners
- each visitor should be able to do at least one inventive thing while in the exhibit

IX. Suggestions for Educational Products and Services (relates to p. 17 of the study):

- use as many technologies as possible to reach many different audiences
- post "progress reports" on the Web about stages of the exhibit and ask for input from the public
- have distance learning activities before and after the exhibit to maximize impact of actual exhibit presence in town/city -- could be a kind of purchased kit/take-home exhibit that could be interactive with Web-based activities; could have a CD ROM virtual tour of exhibit and have access to the Center's website through it
- don't make take-home activities completely dependent on internet use because many people still don't have access to internet or CD-ROMs
- other possible products/materials include: a random-access audio guide; printed family gallery guide and/or exhibition brochure; videos; museum theater programs; teacher materials; docent-training materials; Innovative Lives programs
- look for challenge grant(s) to fund kit, Web activities, videos, etc.

X. Anticipated Schedule (relates to p. 19 of the study):

The exhibition is scheduled to open at NMAH in summer 2002 in the "Views to the Collection" space on the third floor of the National Museum of American History.

Tour length will range from 3 to 5 years, depending on location of appropriate sites, durability of exhibition itself, and the ability to sustain the technical and educational support required for an optimum tour experience.
Tentative Schedule Outline:

- Feb. 1999-August 2000: Research & Concept Development
- Sept. 2000-March 2002: Design & Production (incl. prototyping & fabrication)
- April 2002-May 2002: Installation at NMAH
- June 2002: Display at NMAH
- Jan. 2003: Exhibition Tour Begins
Appendix B.

Methods

We began this inquiry by compiling a list of questions that the planning team wanted the research to address with visitors, and by conducting preliminary in-depth interviews in the Engines of Change exhibition in NMAH. After carefully considering possible methods, we concluded that a qualitative approach was most appropriate for two principal reasons. First, the team had already given considerable thought to the subject. Only a qualitative inquiry would be likely to reveal something they did not already expected. Second, preliminary interviews suggested that visitors were willing to discuss this subject in depth.

Researchers use many different types of qualitative research, with varied assumptions, intentions, and practices, and the terminology used to identify these approaches is neither consistent nor obvious. This note presents an explicit description of both the viewpoint and the concrete activities that comprised this inquiry.

We began with the belief that qualitative research is a “systematic empirical inquiry into meaning.” Here this applies to the meanings of “invention” and “inventors” that are held by potential visitors to the planned exhibition.

We respected the fact that the planning team already had a rich understanding of the meaning of invention and inventors. As qualitative researchers we set out to discover something new that would make their picture even more complex. We assumed that there is always more to be seen, that this extended vision is independent of how many people see it, and that it must be pursued through concentrated, individual contact with visitors.

In addition to finding new perspectives, we also wanted to give voice, texture and focus to what was already understood. We saw the interviews as a way of documenting what is known in the language of visitors themselves. By recognizing and adopting this language, where appropriate, the planning team could significantly enhance the accessibility of the exhibition to its potential users.

Finally, we aimed to influence the intuitive responses of the planning team towards the people who were likely to visit their exhibition. By listening to these interviews, even if only partially, they could join us in entering the minds of interviewees and adopt, however briefly, their visitors’ ways of seeing the world. We felt that this would enhance the team’s appreciation for the diversity of their audience, and help them develop an emotional feel for the needs and perspectives of visitors that could guide the difficult decisions they will need to make as they develop the exhibition.

Interviews. The questions initially raised by the planning team were categorized into topics. The interview guide for this study identified the six major areas of inquiry. Three address invention: the image of inventors, the process of invention, and history.

and invention. Three address the use of museums: draw, visit preferences and museum-going benefits (See Appendix C).

Questions were used to initiate areas of discussion and to control the flow of the interview. Not every question on the interview guide was asked of every interviewee, although each main topic was addressed in some way. Interviews were conducted as shared investigations of meanings perceived by the interviewee, not as accumulations of answers to questions, and not as conversational exchanges. Interviewers emphasized an exploratory approach that followed the cues introduced by interviewees, and special attention was given to remarks that diverged from expectations.

It soon became apparent that there were a number of ideas that were critical for visitors in considering the meaning of invention and inventors but that had not been raised by the planning team. As they were identified, these unanticipated ideas were added to the interview guide as topics for exploration under four headings: the consequences of invention, technological change, failure, and the future of invention.

Interviewees were very generous in sharing their time, their ideas, their feelings, and their experiences in these interviews. Out of the 52 interviews, eight were under 10 minutes, 29 were between 10 and 30 minutes, and 15 were over 30 minutes in length. Overall average interview length was 24 minutes.

Interviewees. The exhibition will open at the National Museum of American History. Visitors to this large museum typically select, from among all available exhibitions, the ones they wish to see. We felt that the visitors who would decide to see the invention exhibition in the future were likely to be those in the current exhibitions that emphasized invention and innovation. Accordingly, our interview tactical plan at NMAH called for interviews to take place in either of two existing exhibitions on the ground floor: Engines of Change, an exhibition about the industrial revolution that includes patent models and discussions of invention, and its neighbor, Electricity, an exhibition with an extensive presentation on Thomas Edison. (One interview took place on a different floor of the museum, at the display of printing presses.)

After the initial 19 interviews at NMAH, the planning team asked that we conduct interviews at the Henry Ford Museum in Dearborn, Michigan. Since the exhibition is expected to travel to other history museums and to science centers, the team wanted to see if there were significant differences in the responses of visitors elsewhere. After 21 interviews in Michigan, the interviewers concluded that the Ford Museum visitors were virtually indistinguishable from NMAH visitors.

There still remained some question, however, about whether science center visitors might have a different perspective, particularly regarding issues of history. Accordingly, 12 interviews were conducted at the Maryland Science Center in Baltimore, Maryland. The interviewers determined that there were no real differences in this location, either. They also noted that the content of interviews had become so repetitive that it was no longer resource-effective to continue interviewing on this subject.

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At each site, the two interviewers worked in different locations, out of sight of one another. Specific interview locations were usually selected by interviewers on the basis of the availability of seating or of an area convenient for extended discussions. Once a position was taken, the interviewer approached whoever entered or passed that area as soon as the interviewer was prepared. Selection was not random, however. As suggested by the planning team, we gave preference to children and to people of color. When they were visible, they were selected, even if others entered the interview area ahead of them. In doing so, we were able to bring some diversity of age and ethnic background into what would otherwise have been a fairly homogeneous sample in terms of age and ethnic diversity.

Most of the interviewees were visiting in groups. Interviews usually focused first on children in the group, since they were a priority. Many interviews shifted during their course from one primary respondent to another. Often there were other group members, either adults or children, who did not participate in the discussion. The complete list of interviews (Appendix D) identifies only principle interviewees within a group, not the composition of the entire visit group.

Through the course of the study, only two individuals declined to be interviewed.

**Analysis.** All but six interviews were tape-recorded in their entirety. In the first stage of analysis each recorded interview was converted into an audio computer file, using MicNotePad 4.5 software, and each major idea or topic of discussion was indexed on the audio file. In addition, a list of these index markers, along with the interviewer’s comments about the interview, were combined into a text file for each interview (See Appendix E). Both interviewers entered interviews into the computer and created indices from the tape recordings. Sometimes they entered their own interviews and sometimes they entered the other interviewer’s.

Both interviewers listened carefully to all interviews using the audio files. Repeated listening was simplified by the indexing system, which made it easy to move instantly to different points in the interview and across interviews. The analytic method employed in this study emphasized repeated listening to the audio files, both in their entirety and in excerpts, and interviews were not transcribed.

As interviews were processed, the planning team was provided with complete audio files and index files and encouraged to explore the interviews themselves. They were also provided with cassettes of edited interview highlights, constructed from the audio files.

In the second stage of analysis, the two interviewers used the interview indices as codes and independently compiled content categorizations of interviews. These content categorizations were divided into two parts: Invention Answers (ideas regarding the initial questions of the planning team) and Unanticipated Ideas (ideas introduced by interviewees). After the two interviewers agreed on categorizations, sample index references were added. (See Outline of Invention Answers, pg. 18, and Outline of Unanticipated Ideas, pg. 45). These content categorizations were first prepared after the NMAH round of interviews and a working copy was provided to the planning team. They were expanded after the Ford Museum interviews, and again after the Maryland Institutional Studies Office
Science Center interviews. At each stage the planning team was given an updated version.

At the third stage of analysis, the two interviewers independently produced written summaries of the interviews and these were combined into a final summary. (See A Summary of Interview Results, pg. 3). In addition, comments were prepared in response to the contents of the "Mindplay Notes," that had guided the team before this inquiry began. (See Responding to "Mindplay Notes", pg. 6). The point of these comments was to highlight how this investigation either confirmed, expanded, or disagreed with the ideas in that earlier report. Finally, the team was given written suggestions on how the results of this inquiry could be combined with other recent ISO research to guide the development process (See ISO Suggested Approach, pg. 14).
Appendix C.

Interview Guide (version 2, August 12, 1999)

Investigating Invention

The overall aim of this first phase is to try to determine how people are interacting with the current invention section of NMAH, in order to understand what visitors “get” out of considering inventions or inventors and how that fits in with their broader preferences and museum-visiting goals.

The interview focuses on six lines of inquiry:

Draw
What brings you to this section?
Is it an accident? Intentional?
Do you have a special interest in invention? In inventors?

Image of inventors
Have you ever invented anything?
Are you an inventor? A designer, engineer, etc?
What would have to be different you to think of yourself as an inventor? ? What’s true of inventors that’s not true for the rest of us?
What are some of the characteristics of inventors?
Do you know any inventors personally?
When you were a kid did you admire any inventors?

Process of invention
What do you imagine it is like to invent something?
What part of the process interests you the most?

History and invention
What 20th century invention would you put in a time capsule?
What recent invention has made an important difference in your life?

Visit preferences
What did you enjoy most (on this visit, on a previous visits, on other visits to places with inventions)?
What do you enjoy more: seeing things, learning, thinking, imagining, remembering or being with others?
(How does that affect the way they look at this section?)

Museum going benefits
What do you get out of visiting museums?
What does it mean in the context of your life as a whole?
Is it really important? Or just a diversion?
If it is really important, how do you hope to change as a result of visiting museums?
(Is there any way that this, too, can be related to invention?)
## Appendix D. Interview List and Interviewee Characteristics

<table>
<thead>
<tr>
<th>Interviewer No.</th>
<th>Date</th>
<th>Museum Location</th>
<th>Time (min.)</th>
<th>Gender(s)</th>
<th>Est. Age(s)</th>
<th>Interviewee(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abigail Dreibelbis</td>
<td>AD 1</td>
<td>NMAH Engines of Change</td>
<td>15</td>
<td>M</td>
<td>50s</td>
<td>Mechanic, FL (not recorded)</td>
</tr>
<tr>
<td></td>
<td>AD 2</td>
<td>NMAH Tire making exhibit</td>
<td>10</td>
<td>M</td>
<td>22</td>
<td>Israeli man (not recorded)</td>
</tr>
<tr>
<td></td>
<td>AD 3</td>
<td>NMAH Engines of Change</td>
<td>7</td>
<td>M,M</td>
<td>30s</td>
<td>from Holland</td>
</tr>
<tr>
<td></td>
<td>AD 4</td>
<td>NMAH Electricity</td>
<td>60</td>
<td>M</td>
<td>50s</td>
<td>Steam engine collector</td>
</tr>
<tr>
<td></td>
<td>AD 5</td>
<td>Ford Diner car/Cars</td>
<td>6</td>
<td>M</td>
<td>70s</td>
<td>Retired banker</td>
</tr>
<tr>
<td></td>
<td>AD 6</td>
<td>Ford Play Area</td>
<td>12</td>
<td>F,F,F</td>
<td>10</td>
<td>on school trip</td>
</tr>
<tr>
<td></td>
<td>AD 7</td>
<td>Ford Electricity</td>
<td>41</td>
<td>M,M</td>
<td>13,40s</td>
<td>boy and uncle to see cars, learn</td>
</tr>
<tr>
<td></td>
<td>AD 8</td>
<td>Ford Play Area</td>
<td>2</td>
<td>F</td>
<td>10</td>
<td>quiet, no talker (not recorded)</td>
</tr>
<tr>
<td></td>
<td>AD 9</td>
<td>Ford Model T</td>
<td>31</td>
<td>F</td>
<td>50s</td>
<td>employee of Museum</td>
</tr>
<tr>
<td></td>
<td>AD 10</td>
<td>Ford Furnishings</td>
<td>11</td>
<td>F,M</td>
<td>30s</td>
<td>couple, from Chicago</td>
</tr>
<tr>
<td></td>
<td>AD 11</td>
<td>Ford Play Area</td>
<td>18</td>
<td>M</td>
<td>13</td>
<td>with mom and grandparents</td>
</tr>
<tr>
<td></td>
<td>AD 12</td>
<td>Ford Farm machinery</td>
<td>38</td>
<td>M,M,F,F</td>
<td>10, 35, 38</td>
<td>Family</td>
</tr>
<tr>
<td></td>
<td>AD 13</td>
<td>Ford Play Area</td>
<td>12</td>
<td>F,F</td>
<td>22,22</td>
<td>Czech women on work trip</td>
</tr>
<tr>
<td></td>
<td>AD 14</td>
<td>Ford Entrance</td>
<td>7</td>
<td>F,F,M,M</td>
<td>30, 8, 12, 13</td>
<td>from area, no talkers</td>
</tr>
<tr>
<td></td>
<td>AD 15</td>
<td>Ford Electricity</td>
<td>4</td>
<td>M,M</td>
<td>40s, 17</td>
<td>not cooperative</td>
</tr>
<tr>
<td></td>
<td>AD 16</td>
<td>MDSC Music</td>
<td>41</td>
<td>F</td>
<td>12</td>
<td>Inventor in formation, great</td>
</tr>
<tr>
<td></td>
<td>AD 17</td>
<td>MDSC Space Link</td>
<td>14</td>
<td>F</td>
<td>14</td>
<td>quiet girl, inventor of a song</td>
</tr>
<tr>
<td></td>
<td>AD 18</td>
<td>MDSC Hubble</td>
<td>9</td>
<td>M, M</td>
<td>6, 40</td>
<td>kid/dad, gave nothing new</td>
</tr>
<tr>
<td></td>
<td>AD 19</td>
<td>MDSC Math</td>
<td>13</td>
<td>M</td>
<td>40s</td>
<td>interesting ideas, less educated</td>
</tr>
<tr>
<td></td>
<td>AD 20</td>
<td>MDSC Music</td>
<td>16</td>
<td>F</td>
<td>40s</td>
<td>musical, artistic, articulate</td>
</tr>
<tr>
<td></td>
<td>AD 21</td>
<td>MDSC Music</td>
<td>57</td>
<td>M</td>
<td>40s</td>
<td>&quot;Mike the Inventor&quot;</td>
</tr>
<tr>
<td>Andrew Pekarik</td>
<td>AP 1</td>
<td>NMAH Engines of Change</td>
<td>41</td>
<td>M</td>
<td>60s</td>
<td>inventor from South Africa</td>
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<tr>
<td></td>
<td>AP 2</td>
<td>NMAH Engines of Change</td>
<td>21</td>
<td>M,M</td>
<td>60,30</td>
<td>from Scotland</td>
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<tr>
<td></td>
<td>AP 3</td>
<td>NMAH Engines of Change</td>
<td>16</td>
<td>M,F</td>
<td>30s</td>
<td>from Texas, software engineer</td>
</tr>
<tr>
<td></td>
<td>AP 4</td>
<td>NMAH Engines of Change</td>
<td>9</td>
<td>F</td>
<td>40s</td>
<td>with family</td>
</tr>
<tr>
<td></td>
<td>AP 5</td>
<td>NMAH Printing presses</td>
<td>58</td>
<td>M</td>
<td>20s</td>
<td>Mennonite printer</td>
</tr>
<tr>
<td></td>
<td>AP 6</td>
<td>NMAH Electricity</td>
<td>30</td>
<td>M,M,F,F</td>
<td>30,30,10</td>
<td>Canadians (Not recorded)</td>
</tr>
<tr>
<td></td>
<td>AP 7</td>
<td>NMAH Electricity</td>
<td>30</td>
<td>M,M</td>
<td>40,8</td>
<td>from Minnesota (Not recorded)</td>
</tr>
<tr>
<td></td>
<td>AP 8</td>
<td>NMAH Electricity</td>
<td>56</td>
<td>M,M,M</td>
<td>11,70</td>
<td>eloquent and thoughtful boy</td>
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<td></td>
<td>AP 9</td>
<td>NMAH Electricity</td>
<td>35</td>
<td>M</td>
<td>40,7</td>
<td>Minister from Colorado</td>
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<td></td>
<td>AP 10</td>
<td>NMAH Electricity</td>
<td>15</td>
<td>F,M</td>
<td>13,10</td>
<td>from Boston, quiet</td>
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<tr>
<td></td>
<td>AP 11</td>
<td>NMAH Electricity</td>
<td>15</td>
<td>M,M,F</td>
<td>12,930s</td>
<td>from Boston</td>
</tr>
<tr>
<td></td>
<td>AP 12</td>
<td>NMAH Electricity</td>
<td>15+</td>
<td>M,M,F,F</td>
<td>10,630s</td>
<td>from San Francisco</td>
</tr>
<tr>
<td></td>
<td>AP 13</td>
<td>NMAH Electricity</td>
<td>23</td>
<td>M,F</td>
<td>30s</td>
<td>from Texas with church group</td>
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<tr>
<td></td>
<td>AP 14</td>
<td>NMAH Electricity</td>
<td>21</td>
<td>M,F</td>
<td>40s</td>
<td>from London</td>
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<tr>
<td></td>
<td>AP 15</td>
<td>NMAH Electricity</td>
<td>46</td>
<td>M,F</td>
<td>60</td>
<td>from Pennsylvania</td>
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<tr>
<td></td>
<td>AP 16</td>
<td>Ford Manufacturing</td>
<td>27</td>
<td>M,F</td>
<td>60</td>
<td>from Ohio</td>
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<tr>
<td></td>
<td>AP 17</td>
<td>Ford Tavern</td>
<td>11</td>
<td>F,F,F</td>
<td>70,70,40s</td>
<td>three teachers</td>
</tr>
<tr>
<td></td>
<td>AP 18</td>
<td>Ford Play area</td>
<td>31</td>
<td>F</td>
<td>30s</td>
<td>from Ohio</td>
</tr>
<tr>
<td></td>
<td>AP 19</td>
<td>Ford Automobiles</td>
<td>23</td>
<td>M,M,M</td>
<td>60,40,17</td>
<td>local, 3 generations</td>
</tr>
<tr>
<td></td>
<td>AP 20</td>
<td>Ford Automobiles</td>
<td>58</td>
<td>F,M</td>
<td>11,30s</td>
<td>from Pennsylvania</td>
</tr>
<tr>
<td></td>
<td>AP 21</td>
<td>Ford Turbine</td>
<td>4</td>
<td>M,F</td>
<td>30s,10</td>
<td>local teacher and daughter</td>
</tr>
<tr>
<td></td>
<td>AP 22</td>
<td>Ford Henry Ford</td>
<td>17</td>
<td>M,F,F</td>
<td>40,40,12</td>
<td>not local</td>
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<tr>
<td></td>
<td>AP 23</td>
<td>Ford Train</td>
<td>15</td>
<td>M,M</td>
<td>30,8</td>
<td>local - boy wouldn't talk</td>
</tr>
<tr>
<td></td>
<td>AP 24</td>
<td>Ford Furnishings</td>
<td>31</td>
<td>F,F</td>
<td>40,16</td>
<td>not local, mother is an architect</td>
</tr>
<tr>
<td></td>
<td>AP 25</td>
<td>Arlington, VA</td>
<td>39</td>
<td>M</td>
<td>6</td>
<td>local, very familiar with SI</td>
</tr>
<tr>
<td></td>
<td>AP 26</td>
<td>MDSC Electricity</td>
<td>18</td>
<td>M,M,F</td>
<td>5, 6, 30s</td>
<td>creative boy and helpful mom</td>
</tr>
<tr>
<td></td>
<td>AP 27</td>
<td>MDSC Music</td>
<td>19</td>
<td>M,F</td>
<td>30s, 30s, 7</td>
<td>from Virginia</td>
</tr>
<tr>
<td></td>
<td>AP 28</td>
<td>MDSC stairway</td>
<td>30</td>
<td>M</td>
<td>30s</td>
<td>enviro conscious(not recorded)</td>
</tr>
<tr>
<td></td>
<td>AP 29</td>
<td>MDSC Math</td>
<td>11</td>
<td>M</td>
<td>40s</td>
<td>Well-driller</td>
</tr>
<tr>
<td></td>
<td>AP 30</td>
<td>MDSC Space Link</td>
<td>18</td>
<td>F,F,F</td>
<td>30s, 8, 3</td>
<td>from New Jersey</td>
</tr>
<tr>
<td></td>
<td>AP 31</td>
<td>MDSC Music</td>
<td>17</td>
<td>F</td>
<td>40s</td>
<td>dad was inventor-type</td>
</tr>
</tbody>
</table>

Institutional Studies Office

Smithsonian Institution
Appendix E.

Interview Notes

Notes for Interviews AD-3 through AD-21
(Conducted by Abigail J. Dreibelbis)

Notes on INV 9.22.99 AD-3

Two Dutch men, mid-30’s
Were hesitant to talk, due to language barrier, but were able to give some good ideas

1. Something new, and prosperous
2. benefit people
3. going very fast, too fast
4. today you have a computer, and tomorrow it is old
5. problem for future – systems are changing so quickly
6. as Keeper of Records, old records have not been changed, so now, with computer’s as records, can’t get to old info
7. Archives are outdated, use old technological record keeping, isn’t compatible with new technology, can’t read old records from just 20-40 years ago
8. LP’s, before CD’s, were the record keepers – now are no machines to read these old records. Is a real problem for Europe, can’t get to old information
9. Inventors are too busy with new things, and not looking back at old machines etc.
Notes on INV 9.22.99 AD-4

50-ish Australian man. Very talkative, a little far out, round-about in conversation, but good tid-bits, though far apart and hard to get to!

60:00 minutes

INTEREST IN STEAM ENGINES, MACHINERY
1. from Sydney
2. have steam driven work shop, likes display, more modern and bigger
3. coal, steam driven trucks, do 60 mph, shovels, three-stories high, cars, etc
4. 73 yr. old friend making “Dynamo” replica
5. to drive steam yacht
6. interested in mechanical, interesting, open, fun to watch machines
7. hobby steam engines, etc, but not an inventor
8. told as a child was no such thing as inventor, also wanted to be a steam engine driver
9. went into family business of importing
10. likes open things which mean old things

DISCUSSION OF INVENTOR/INVENTION
11. inventor – full time profession, invent, patent, find people to develop and market
12. doesn’t have time to be an inventor, hobby of steam engine takes too much time – man hours, initial overhaul, maintenance
13. interested in pre-electricity, hydraulic machines
14. provided a lot of energy, without electricity
15. London thousand pound bridge lifted by these
16. Amish- without electricity – very wealthy and functioning, except batteries, lights for buggies
17. Use compressed air instead, or hydraulic
18. Invention is good, but differences in progress from country to country

DIFFERENCES BETWEEN COUNTRIES
19. Americans interested in progress, British interested in keeping things the same
20. Americans have steam engines, but are brand new, English do too, but is as similar as possible as historic model
21. English is more beautiful, modern is ugly, but works better
22. In Australia, there is a mix, If you want an engine to work well, get American, if you want it to look good, get English
23. Likes the look, so tries to keep English, but modernizes it
24. Anything not Electric

WHAT TO INCLUDE IN EXHIBITION, WHY TO SI
25. Don’t cover Edison-Westinghouse competition
26. DC versus AD
27. Electric chair developed by Edison and termed to “Westinghouse” someone
28. Hydraulics bigger and better, but electricity took over.
29. Can step up voltage, and run far distances
30. Hydraulics are hard to take a distance
31. DC had same limitations
32. Came to technical part of SI, was disappointed
33. Heard of SI size, but technical part is very small compared to other places
34. Interests are not the same as public’s
35. Museum is for education
36. Is good that it is not toward children, or hands on
37. Other museums have become too hands-on
38. Can be dangerous to have this, and is someone else’s property
39. Demonstration is good, but not interactive
40. Every museum in the world overlooks hydraulics because it doesn’t excite anymore
41. Is important as the predecessor of the electric power

CHANGES/ DIFFERENCES IN ENERGY MANUFACTURE
42. Difficult to store energy without electricity
43. See what they did before electricity to do same chores of today
44. Berlin still has gas lights – brand new lights, 48,000 marks, copies of pre-war ones
45. Father saw vacant city block full of vegetation in American, saw beauty, taxi driver saw lack of progress
46. America has gone far with it, but all progress isn’t all good
47. Old woman friend – in old times men can get mentally and physically challenging jobs, not any more
48. “bad Old times” of shipping and boats – was good till end of era
49. New steam boats made some leave the business, just wasn’t the same
50. Don’t like motor cars, wishes there were more public transport, and get more exercise
51. Am too lazy to walk since he has a car
52. Australia has followed American manner of city lay-out, spread out, less public transportation
53. American cities have grown up based on the car
54. Cars have changed cities
55. Spend so much on roads, not rails
56. Like electric trains, buses, trams
57. Are quite
58. Most countries have gone wrong way, think trains are expensive and cars are cheap
59. Don’t take into account highways, and accidents
60. Steam engines are obsolete, except for interest

MORE INVENTORS/INVENTION/MUSEUMS
61. Doesn’t want his things to go to a museum, collect dust, if privately owned can still be used, people can see things moving
62. America is more advanced, yet need people to tour other countries to see what else is going on
63. History of country affects what they are interested in and hence display in museums
64. Example – America – west and agriculture, Indians; Rotterdam – water
65. Not very interested in “inventor” more interested in the Invention
66. English invented things – known as being eccentric
67. “Mad Professor”
68. Hair disarrayed, liked and accepted eccentric scientist
69. Inventors are often slightly out of the normal, abnormal, difficult to be married to, shouldn’t be married
70. Isenbard Barnell – steam passenger engine, widest railway in the world
71. Married a less intelligent woman, versus loved more and more intelligent, so able to devote more time to work
72. If spend time they need to with family, not enough time to do what they did
73. Moral dilemma
74. Ordinary average family man wouldn’t produce much inventions
75. Need to sit and think for a long time, wouldn’t communicate with family
76. Sit and think of things
77. Someone did it all in his head

HIS POSITION AS AN INVENTOR/PERSONAL
78. He lies at night thinking of things, then can’t sleep
79. Personal private inventing – but reinventing the wheel
80. When they invent new design for a boat, not really new
81. Can’t invent new boiler, any design has already been done
82. Like chess, any chess move has already been done
83. Underestimates himself
84. Dumb in some ways, clever in others
85. In WWII used chess players to decipher codes
86. Edison brought together ideas
87. Always something invented before
88. Hero, before Christ, invented turbine, which is used today, invented by someone recently
89. Ancient inventions are repeated today
90. Spent too much time thinking by himself, very serious
91. Figure out things as he thinks, talks
92. Being shy since I (Interviewee) am female.....
93. As a child his invention/being an inventor was a dead end road

FAMOUS INVENTOR, RELATION TO WORLD
94. Sort of inventor, but more like “better way to wash dishes”
95. Isenbard Kingdom Barnell took existing inventions and bettered them
96. Wasn’t really an inventor, but carried other’s inventions to an extreme
97. Very low Arch, still standing
98. Built one rail tunnel at very steep incline, one day (his b-day) a year, the sun shines the whole way through it
99. Given building permit (?)
100. Very wide rail roads
101. American missed out on this, with shorter rails
102. Interesting what French g-pa said (1870’s) – felt Germans are most efficient
103. English bit disorganized, French worse, America not as efficient as Germany, second, but not as serious as
104. Germans have high standards, but people pay in discipline
105. Tragedy of Germany destroyed during and after WWII, wiped out and scrapped by Americans
106. Very modern and advanced, but gone, destroyed
107. Marketing as an American invention
108. Dislikes progress to a degree
109. Likes inventing, but not new and modern things

FUTURE OF INVENTION
110. Also futuristic, say colony on Mars, and then wanting independence
111. Like older engines, can see things working
112. Like a living animal, closest you can get
113. See it working, work with it, require food, men to take care of it
114. Steam engine is closest machine to animal
115. Electricity is good, but boring, just flick a switch
116. Gas lights are more interesting to look at
117. Old things in museums aren't as good, but people don't realize history and power of these machines, how good they were
118. Americans underestimate the past, think it's bad
119. Take the best from the past
120. Electricity has taken over, but in Africa isn't as prominent
121. In city and near house, but not used in individual homes, near city, but can't connect, cause can't afford it
122. Money is necessary too
123. In declining countries, give up cars to get by
124. In future when civilization becomes poor, will go back, since people won't have money
125. Like Roman Empire
126. Civilization won't go forever
127. America is at its peak, Africa will be last to catch up, China will peak as America falls...
128. Nothing except the universe goes on for infinity
129. Museums underground to last long
130. Eventually all will be destroyed and go to dust, so keep it underground
131. At least some archives in granite mountains
Notes on INV 10.15.99 AD-5

Older man, 70's. From the area, not very interested in talking, though he seemed to be a chatty guy from watching him in Diner. Tracked him down after that. An ex-banker took over father's auto repair shop. Interested in autos and history of them. Loosened up a little, but kind of hard to get him on invention track.

6:01 minutes

1. since 1970 – more cars
2. Knows Flooring company of museum
3. Worked for bank that financed it
4. Likes Auto and Air craft
5. History of elements
6. Not innovative or inventor
7. Likes to think could come up with idea
8. Sees tools, wish would have thought of it
9. Saw it first
10. Deal with things, so can see what would be useful
11. He’s retired…
12. Enjoys wood working and carving
13. Have to want to invent
14. Runs auto repair in spare time
15. Working on cars is more difficult
16. Everything run by computer
17. Can't just fix a carburetor anymore
18. Doesn't work, have to replace with computer
19. Breaks again, and replace again with computer
20. Cars run better
Notes on INV 10.15.99 AD-6

Four girls, fourth graders. At kid's "hands on" station. Pleasant, eager, excited to be interviewed. Teacher stepped back and actually brought me two of the girls. This is their second day at the museum. Enjoyed the Innovation Station.

12:19 minutes

1. playing with gears
2. could find different way for them to work
3. invented thing for bedroom door
4. so cat couldn't chew on it
5. takes brains, creativity to invent
6. invented house of marshmallows
7. made bagel structures
8. with Stephen Keaney (??)
9. inventors can't keep hands off stuff
10. imagination, can't give up
11. invention – light bulb
12. Edison invented lots of stuff
13. Phonograph
14. Tape recorder invention of today
15. Invention is just created and thought of
16. Invented big structure at this area
17. Put pieces together to work
18. Inventions don't need to be named
19. Can invent everyday
20. In exhibition: light bulb
21. Wright bro.'s bike and plane
22. Daily inventors: give tools and put together
23. Seeing better way to do things are tips
24. Triangles are stronger than squares
25. Explain how homes are built this way
26. Can make anything of anything
27. As long as it works
28. Learn new things
29. Learn more from your mistakes
30. Learn what doesn't work
31. Takes failure to be inventor
32. Edison failed a lot
33. Some want to be inventors
34. Want to be in the paper
35. How people invented
36. Try all things till it works
37. Liked working in Innovation Station
38. Daily inventions: hairdryer, dishwasher, microwave
Notes on INV 10.15.99 AD-7

7th grader (J) and 40-ish Uncle (U), From Michigan. Uncle very talkative, controlling, but kid got his good ideas in, very thoughtful comments. Talked to them in the Steam and Electricity area. They had been very engaged in the light bulb interactive (you spin a wheel to create enough volts to light up as many light bulbs as possible – 5, 10, 15).

41:28 minutes

MUSEUM VISIT REASON
1. Here to see Antique cars etc
2. Father wanted to see Kennedy car
3. U – interested in invention
4. Not themselves inventors

INVENTORS/IONS ARE...AND PROCESS
5. Very few people can say that today
6. Era of lone inventor is gone
7. Now it takes teams
8. Still possible, but generally past
9. J – have to keep going
10. Work out kinks
11. U – like to solve problems
12. Physical skill
13. Solving a problem – product or process
14. If doesn’t have purpose is more like art
15. Is out there, intellectually satisfying
16. EX: mobile, or nearby machine
17. Not absolutely necessary
18. But is still invention, even if not financially successful
19. Inventors before their time
20. Greek man invented steam engine
21. But wasn’t needed – slaves cheaper
22. Reinvent – steam engine
23. Make wider wheel base for go-cart
24. J-Inventions can be improvements on things
25. U -Better way of doing things
26. J - Wrist watch is improvement over hand held

INVENTION TODAY AND YESTERDAY
27. Inventing today is a profession
28. Work for large Corporation
29. EX: medicine – takes many people, $
30. Money is necessary to be successful
31. Ford – ordinary man, luck, of the time
32. Technology wasn’t available for cars before
33. If 100 years before, wouldn’t have Ford
34. Still would have auto
35. Ford made it available to masses
36. Methods of creating electricity is invention
37. Uncle – discovery versus invention
38. Computer in homes – more advances
39. Advances due to technology and people
40. The advances are almost more important than invention
41. Can have it, but if it does no good, what good is it?

EXHIBITION
42. J - Exhibition – DaVinci pictures
43. Pictures of his inventions
44. Flight machines
45. U – just pictures, just in his mind
46. Didn’t have gas, engines
47. Might have happened in right time
48. Greatest inventor – Franklin
49. Franklin stove – didn’t patent on purpose
50. Helped the common person
51. Lightning rod
52. J – Edison
53. U – inventor of research laboratory
54. Gathered together groups of people
55. Teams of people to help him
56. Couldn’t have done it all in one lifetime
57. Concept of research lab – Invented
58. Used to be lone guy in his garage
59. Now bright people working together
60. J – invent something small in exhibition
61. U – give kids tools and problem, have an hour
62. Egg drop by 7th graders
63. Have to build device to protect egg from breaking
64. Some rules and limitations
65. J – tested it, but still didn’t work
66. U – didn’t pretest enough
67. Race cars – class in high school
68. Elements of invention
69. Not just given book and told to do it
70. No right or wrong
71. Might come up with better way
72. J – wanted chance to redo it
73. Problem and tools – makes you think
74. Likes to think
75. Father thought it would be valuable
76. J – learned how machine works (nearby)
77. Show how electricity was produced

HISTORY AND FUTURE AGAIN
78. Ford had to build generator for his plant
79. U – have to recognize problem exists
80. Don’t see that “the way its always has been” is not always right
81. Be creative
82. Do things the same, not good inventor
83. Improve lots of stuff, printing press, etc
84. At the time, these things were cutting edge technology
85. In 100 years, will be us
86. "what was it like to live back then?"
87. J – we are reinventing – little new, just improvements
88. Horse to car to something else
89. U – not noticeable
90. Ex: memory chip and medicine
91. Are small things (inside computer)
92. Inventions are pouring out, but more subtle
93. Not as many huge leaps
94. J – can invent for good, but someone use it for bad
95. U – nothing bad about nuclear power, used wrong
96. Steam soot – another comes to invent answer
97. Challenge for inventors – fix inventions of before
98. Future – J – hovering cars
99. U – not likely
100. Around for 100 years, just improved them
101. Still resemble the original (grandfather)
102. Y2K isn’t a problem – just challenge for others
103. Computers have done so much
104. Not a detriment, something for another inventor
105. Inventions are evolving things

DISCUSSION BETWEEN INTERVIEWEES ON MERITS AND FUTURE OF INVENTION
106. U – no fear of technology
107. We have such satisfying life
108. J – don’t get so into technology that we are too dependent on computer
109. You are smarter if you do it yourself
110. Rather than sit and do it on the computer
111. U – but you like calculator
112. J – still something good about not depending on it and doing it yourself
113. Years down road and we have only used calculators to do problems
114. And then it breaks....
115. U – will be using your head to do more productive things
116. J – needs to stay in balance
117. Still like to use your head
118. Kids cheat – try to think of answer
119. Give up and use calculator
120. U – aren’t you better off being able to know how to use it
121. J – yeah, but needs to be a balance
122. U – Ford – society needed something better, he was there
123. J – inventor needs a problem to solve
124. No economic demand, wouldn’t float

ART AS INVENTION
125. Would be art
126. J – like trying to sell car to society that doesn’t use them
127. Art as invention - creativeness
128. Artist come up with and express something new
129. Invention is coming up with new methods of solving problems
130. U – commonality = creativity
131. Be willing to look at things differently
132. DaVinci may have done ok if in the right time
133. J – ask how could you improve this? (from art)
134. U – creative, hardworking, don’t give up, time
135. In certain business – will better it, invent
Female employee, 60's, monitoring Model T car. She approached me, asking if I was looking for something, as I had paused and was fiddling with my tape recorder. Very cooperative and willing to talk. Good insight to museum and ideology, history of Ford. Discussed difference between innovation and invention.

31:07 minutes

INTRODUCTION TO MUSEUM, FORD
1. Discussing how to be innovative
2. Ex: fixing little things to get by
3. Invention takes more imagination
4. Haven't met an inventor
5. “Jerry-rigging”
6. Ford wasn't an inventor
7. Innovative in combining assembly line and auto
8. Edison was more inventive
9. Developed light bulb and made it good
10. Electrical system
11. And how to get from plant to home
12. But light bulbs were all over
13. Edison was Ford’s mentor
14. Edison encouraged Ford
15. Motor company was after two failures
16. Ford liked Edison more than the reverse
17. Spent time together

INNOVATORS/INVENTORS/ENTREPRENEURS
18. Edison was an entrepreneur
19. Always out getting money
20. Financing and funding more
21. Not inventing unless you thought you could sell it
22. Artists invent without knowing it
23. Both are visionaries
24. Inventors and entrepreneurs could “see”
25. Buckminster Fuller biggest inventor
26. Geodesic dome and form in everything
27. Was ahead of his time
28. He sat and thought and envisioned
29. Brought them to life
30. Wasn't solving a problem
31. Thought up new things
32. Almost everything on display is innovation
33. Everything on display was top of the line
34. Most improved, best you can buy
35. Hard to reinvent the wheel
36. But sure can improve it
37. Fuller was inventor
38. Would fiddle and conceptualize with things
39. Leonardo DaVinci ahead of his time with art
40. Pictured motorized flight
41. Ford – learn by doing

MORE ON MUSEUM IDEOLOGY, EXAMPLES
42. Whole museum and Village is based on this
43. Discuss colonial and country homes
44. Differences in $ distribution
45. Daget Farm vs. Giddings home
46. Ford revolutionized Auto industry
47. Ford was all business
48. Owned wealthiest business in world
49. Ford family history – private

WHAT MAKES AN INVENTOR
50. Have to push product
51. Ex: Whitney cotton gin
52. More entrepreneur than inventor
53. Others had dirty fingernails, they sold it
54. Elevator inventor was outshone
55. Some have elbow grease, but others were able to sell it
56. Some are idea people, others build
57. Hard to distinguish true inventor
58. DaVinci – thought of as artist
59. But was thinking of powered flight
60. Wright bros. did actual flight
61. Greek tail of flight
62. Wright’s made it practical, but invent?
63. Contribute progress and birth of industry

ELEMENT IN MUSEUM GOOD FOR EXAMPLES
64. (play area) Can color at home...
65. Employees must facilitate
66. Computer games help
67. “Connections” between topics can be far fetched
68. discuss Jacquard looms
69. idea by watching music box
70. created key punch card to run loom
71. now computers do the same
72. Learn, make connections from working here
73. looms innovation looked like tapestry
74. linotype machine replaced human type-setters
   (interruptions by visitors)
75. Museum is of: Innovation and resourcefulness
76. Making all exhibits relate
77. Stop lights are both innovation and invention
78. Problem solving like innovator – is invention?
79. If are problem solving and completely new – invention
80. DaVinci was thinking of something new
81. Inventors are dreamers
82. Anyone can innovate, solve problem, change rules
83. Inventors have different approach to life

Institutional Studies Office
-80-  Smithsonian Institution
84. Must be able to think of things and conceptualize

EXHIBITION IDEAS
85. Exhibition – what is in our future?
86. Where are inventions going to go?
87. Sci-fi pictures one style of future
88. Orson Well’s and how it has followed
89. Children should not feel limited
90. Anyone can invent
91. Making mistakes is learning tool
92. Don’t be afraid to make mistakes
93. Edison tried over 1000 things for filament in light bulb
94. Edison felt they were just a 1000 ways that didn’t work, not mistake
95. Mistakes are actually good – relax, feel ok, with it
96. Children are inventors of the future
97. Inventions be categorized – travel, food, medicine, etc
98. What to invent to solve problems
99. Inventions do go wrong, lots of evidence
100. So let children know it is ok to fail
101. Make children realize the bottom line is not $$$
102. Kinds of mistakes that cause problem won’t be made
103. Ex: rush to get medicine out on the market
104. A lot of things we take for granted but are bad for whole
Notes on INV 10.15.99 AD-10

Man (H) and wife (S) – 30-40 ish. In home and domestic area. Hesitant at first, but opened up a little. Fairly local. Not interested in children. Lost them on this topic.

11:18 min

INVENTORS, IDEOLOGY AND CHARACTERISTICS
1. (S) Where would we be without inventors?
2. Must be intuitive
3. Inventors “think outside the box” – not same old way
4. See history of invention
5. Creating is different than inventing
6. Inventors must take it a step further
7. (H) Inventors can’t be worried about money
8. Who has time to invent – money on their mind
9. Inventions take money – get idea out
10. (H) Like drag-racing: can go so far, then need financing
11. Can go so far with idea, then need someone to back you
12. Ex: Celine Dion – went so far, then husband helped her
13. Now both are millionaires
14. (S) can compare, whether career or invention
15. Get others to listen

EXHIBITON
16. See modern inventions in exhibition
17. And history of them
18. Ex: computers, and technology
19. Who, why, and story behind
20. Daily items that you use
21. Less mechanical and more technology today
22. (H) Last 20 years and next 20 years

FUTURE AND WHAT IS INVENTION?
23. Wonder what is to come
24. Medical, electronic, space
25. Discuss genetically engineered foods
26. (S) Is this invention or science?
27. People are troubled by it
28. (H) Which are people going to want?
29. Is something new
30. (H)- (machine nearby) Not invention
31. New and improved, but is it new?
32. (S) Parts on it may be invented
33. But isn’t completely new
34. Whole idea – make people think and question
35. There is no black and white
Notes on INV 10.16.99 AD-11

This was a 7th grade boy, sitting in the "Kids Create" play area. Was wasting time till the Innovation Station started. Was very helpful and friendly. From state and here with mother and grandparents.

18:19 minutes

INVENTION EXAMPLES
1. Came to see cars with mom and grandparents
2. His hands-on stuff
3. Wants to go to Innovation Station
4. Likes things you can touch
5. Enjoys invention
6. Knowing you built something to better lives
7. Like locks on cars – automatic locks
8. House alarm systems
9. Helps people understand things
10. Show you how things work
11. Light bulb – plug it in, flip switch
12. Wants to invent – will for science fair
13. Remote control for toaster
14. Science and math are favorite subjects
15. Light bulb, train, microscope

INVENTOR CHARACTERISTICS
16. Have to have passion for putting stuff together
17. Have the time
18. No special mind
19. Need patience
20. If you fail, it's not a big deal
21. Some think it is, and won't try again
22. Have to have time and patience, try again
23. Look up to Edison
24. He helped us have light – so we can do stuff

EXHIBITION IDEAS
25. Exhibition – brainstorm major inventors
26. important and unusual inventions
27. Hands-on things –liked light bulb interactive here
28. Titles – “Blast from the Past”
29. Exhibit of old inventions that have become modern
30. Ex: light bulb then, and strobe lights now
31. Steps and years, change through time
32. Strobe light is both new and not
33. Is using light, but is now in intervals, is still bulb
34. Likes history, putting things together

FUTURE AND INVENTION
35. Future – lots of weird stuff
36. So we can live on moon
37. Changes – train – run on light
38. Idea from solar car
39. Solar car isn’t cost efficient, hasn’t developed enough
40. Like phone, at first people didn’t get into it

PROCESS OF INVENTION
41. Good invention starts slow, people accept slowly
42. Don’t know how people will take invention
43. If people don’t like it, have to “watch out”
44. Will be used more after they make more, make it cost efficient
45. Have to get people to back and support you
46. Doesn’t have to be successful to be good
47. Have to realize that it’s good yourself
48. Some things are before their time
49. Solar car – people are still using gas cars
50. Population is growing using resources
51. Car will run on light, won’t run out of it
52. Nuclear power will cause problem in future
53. Factories and smog
54. Computers help – store things, don’t rewrite
55. Liked cars, hands-on, planes
56. Would be great to invent if it was accepted
57. If not, would fix so people would like it
58. Breakfast making tool
59. Inventors need time each day to work on it
60. Think of Edison as Inventor
61. Need patents so people don’t copy idea
62. Keep old inventions to remind how things change
Notes on 10.16.99 AD-12

This began with a father (D) and son (N), and finished with the mother and daughter. I had seen the whole family earlier in the agriculture exhibit but when I was able to corner them, only the father and son were around. Mom (M) and daughter (G, 2nd grade) came back later. Realized the boy (4th grade) was a inventor, but he wouldn’t talk, frustrating! The man was very talkative and thoughtful, a little long winded. I’m afraid I let him ramble a bit. The mother and daughter were more reserved. Fun discussion though, nice people.

38 minutes

DEVELOPMENT OF INVENTION
1. N - not really an inventor
2. Thought up bicycle powered buzz saw
3. D-progress of machinery, improvements
4. Jump in technology in one machine
5. Eased life, and had definite purpose
6. Perceived improvement
7. Today – economic improvements
8. EX: digital read-outs on car dashboard
9. Does same thing, but different way, perceived improvement
10. In past, on farm, change was great labor saver
11. Decreased effort by 100%, now it’s fractionally less
12. Diminishing return nowadays

AFFECT OF TECHNOLOGY ON MIND
13. Application of technology vs. invention today
14. Ex: use calculator in school
15. Is learning tool, not process
16. Ex: baby walking, give them wheels to get around
17. Don’t learn to walk, use legs
18. Kids suing calculator is same, not using mind

QUALITY VERSUS QUANTITY
19. Workmanship is gone, cause easier to use computer
20. Time and effort make it beautiful
21. Took time, artistry to make it, proud of product
22. Now computers do it-looks the same, but is far inferior
23. Touch of button can put same thing out
24. Is artistry still there?
25. Connection between tool and making it
26. Artistry, craftsmanship in producing machine
27. Now people don’t know what made their clothes
28. Are divorced from it, no appreciation of effort
29. Important to know where we came from and what it took to get here
30. “Things weren’t always this easy”
31. will broaden minds of what is still possible
IMPORTANCE OF UNDERSTANDING HISTORY, PROCESS OF INVENTION

32. James Burke on PBS – “Connections”
33. How everything is so interconnected
34. Edison couldn’t have invented if someone hadn’t done something before
35. Invention can be both new and an adaptation
36. No light bulb without knowing how vacuum works
37. Everything today is build upon success and failures of people before
38. Ex: Stationary engines
39. From two horse to steam process
40. Is an invention, it’s new, but is innovation of old
41. New is a utilization of previous

CHARACTERISTICS OF INVENTORS

42. Barnell again! Steam ship-laid Trans-Atlantic cable
43. Conceived of continuous travel around world without refueling
44. Economically disaster, not efficient
45. Was ahead in his concept, but technology wasn’t there to support
46. Steam wasn’t as efficient as what came in 20 years
47. Used as luxury, instead of immigrant transit
48. Thinking ahead of his time, but limited by it
49. Like Stephen Hawking
50. Great mind, good body, but technology wasn’t there
51. Think what great minds could do today
52. We built upon them
53. Most inventions are for economic gain
54. Still have kitchen inventors,” lots of great minds
55. Man created cylinder head for car, Ford bought patent,
56. Mercedes didn’t want, but used concept, being sued by “kitchen inventor”

INVENTORS TODAY, FUTURE OF INVENTION

57. Still people on small level developing things
58. Son went to show, thought of inventions on way home
59. But doesn’t like computers
60. Dad wants him to learn, son will have to use them
61. Dad doesn’t understand how they work
62. Can see how machine works, but not computer chip
63. Is almost magic how they work
64. Average person knows nothing about how things work
65. Take today’s technology back to 50’s – couldn’t use it
66. Three dollar pocket calculator would be wonder
67. Meant you had money or sincere need, now in cereal boxes
68. We are going fast, but can’t stop it
69. Fundamentalists are repercussions
70. Can’t understand it and don’t know how to deal, you reject it, try to stop
71. Has to get over built-in dislike and learn to work with computers
72. Computers have taken a lot away from people
73. Are a tool, but are now almost on deity status
74. Idea – kitchen sink inventor who thought invented better fridge, but really time travel
75. People don’t understand what’s going on, but it is coming
76. Wife is more against it, he knows you can’t stop it
77. Has old apple computer
78. Has more things to do than sit in front of computer
79. Internet is too disorganized
80. Having all this contact on internet is not so good
81. Like giving them keys to museums, but not giving them appreciation
82. Give them the keys, but not the understanding of how to use it
83. Emphasize computer, doesn’t teach about what is there
84. Can’t appreciate it if you don’t understand how it was made
85. If don’t know how to use your mind, how you got here, can you appreciate what you have?
86. N-tells how invention would work

TO MOM AND DAUGHTER
87. G-takes time and thinking to invent
88. Idea-remote controlled light
89. Ben Franklin – bifocals
90. Inventions not always good
91. Gun-bad invention
92. Because people shoot others
93. M-good and bad applications

EFFECT OF INVENTIONS
94. Airplane inventor killed himself
95. Was upset how plane was used-war
96. TV inventor also depressed
97. Particularly don’t like cars
98. Society’s dependence on it
99. Absent minded mistake hurts many
100. Son lost car to accident with pregnant woman
101. Society is so dependant on it, can’t live without
102. Can live some places without
103. But then people are stacked on top of each other
104. Cars will always be used, people any find ways not to use it as much
105. Edison lab-invention usually actually innovation
106. Taking docent’s definition
107. Phonograph is true invention
108. Many of Edison’s ideas and patents were innovations
109. G-anyone with patience and time can be inventor
110. M-some things will disappear
111. Figure out they aren’t labor saving, not worth the work, take up room
Notes on INV 10.16.99 AD-13

This interview was with two girls (1 and 2) from the Czech Republic. In their early twenties, they work for a vacuum cleaner sales company as interpreters. Are in the U.S. on business, and had some free time. They were sitting in the Kids Create area, writing post cards. They were very friendly and had some interesting insights. Was a little loud, as the Innovation Station started up during our interview. I approached them, as they looked pretty young, I thought they were in high school at first, but actually just graduated from University this year.

12:02 minutes

DEFINITION OF INVENTIONS, PROCESS
1. Translators for company, traveling through U.S., have afternoon off
2. 1 - liked seeing Kennedy
3. Thought she wouldn't like it - "only cars"
4. 1-not easy to say how feels about invention
5. Can be good and bad
6. It depends on the people
7. If they use it for good, or they can use it for bad
8. Depends on purpose for the invention too
9. Biological warfare - is bad from start
10. In Czech Rep. - more cars
11. Cars are bad for money reasons, environment
12. 2-are different kinds in different countries
13. U.S. has automatic, versus "standard"

INVENTION/DISCOVERY/INNOVATION
14. 1-Invention : fire
15. Discovery - find something
16. Invention - work on something
17. Ex: planes not visible on radar
18. Innovation - old and make something new
19. Invention - new from beginning
20. Innovate cause they come across something
21. They can see it different way than others
22. 1/2 - takes a special person
23. Need patience, intelligence
24. They are not inventors
25. 1 - fixing up apt. - is innovation

LIFE OF INVENTOR, CHARACTERISTICS OF
26. Czech man who invented contacts
27. 1-While under communism, sold to Germany
28. 2-He was too poor to make it
29. 1 - Money is important in invention
30. Ex: medicine is expensive to make
31. 2 - now there are more groups working on invention
32. 1-lead by a team leader
33. 1-inventions are not always filling need
34. Are working on something; come across new thing
35. Opinions of inventors not much difference between countries

EXHIBITION IDEAS
36. Exhibition – pretend kids are on an island
37. Make them think of invention to help survive
38. 2-help imagination,
39. But they must have something in their mind
40. Children are better at being inventive
41. Mind is more open
42. 2-can support inventive mind
43. But still takes special mind
This interview seemed promising. Mom with four kids-ages 7-12. Second oldest (2) spoke the “most.” They were wandering near the front of the museum, and I got them to go sit on one of the couches with me. The kids seemed talkative but ended up being clams as I started the interview. Stood away from mike, seemed intimidated by it. The girl (4) would only whisper to her mother, who was standing back from them. Didn’t get much out of them. They are from Cincinnati.

7:26 minutes

1. 2 – is an inventor
2. but won’t specify anything
3. takes brains, imagination to be an inventor
4. 2 – anyone can invent
5. Cars are a good invention
6. Edison is good inventor
7. 1-improve cars by running on water or light
8. Into a time capsule –(3)washing machine
9. Show how inventions were made, how they work
10. Have someone show what it does
This was a group of three men, probably father, son, and uncle. The Uncle didn't talk at all. Dad (D) was the most talkative. The son (S) summed up his feelings with the comment about not wanting to "think" today. I approached them for the reason that there was a teen, and they had seemed involved in the pieces of machinery in the Steam and Electricity section. They were not very interested in talking.

4:17 minutes

1. (D) Takes common sense, brains, patience
2. Common sense so no one gets hurt
3. (S) can be bad – Atomic bomb
4. (D) went too far out of proportion
5. (S) Einstein – was smart, great inventor
6. No comment on exhibition
7. (D) new good invention – dishwasher
8. It's a lot different today
9. Ex: planes, trains
10. Progress is good
11. Not inventors, but doesn't take special mind
12. (D) have to be in certain mode
13. Have to be patient and think, draw things out
14. He's not like that, is always moving
Notes on INV 11.11.99 AD-16

This interview began after I had followed a family through part of the music exhibit on the second floor. They all seemed engaged, and I tried to get the family, but finally approached the mother. She immediately referred me to her 12-year-old daughter (A). This girl was wonderful. An aspiring inventor, who sees herself as different from her classmates due to “inventor” characteristics. Very literate. I learned from her! Great interview. Was cut “short” by time.

41:07 minutes

MUSEUMS, AFFECT OF HISTORIC AND FUTURE INVENTIONS
1. She “loves this place,” the science center.
2. Is from Arlington, goes to SI a lot
3. Likes Natural History, and Air and Space
4. Likes seeing how invention has allowed us to see the stars
5. And how we can go into our past
6. Light bulbs were great invention
7. Hubble was great invention to help us see past
8. (had been through the Hubble display)
9. people said car wouldn’t amount to much,
10. also, movies
11. learned about in school and on own
12. airplane has helped us
13. before time was recorded, invention of flint
14. or cooking vegetables

HER INVENTIVENESS
15. not an inventor
16. likes starting ideas,
17. but has so many, can’t finish them
18. likes working with gears
19. has designed a lot of things
20. simple things like an elevator
21. wants things she can work with easily
22. won’t design a telescope-can’t get those things easily

CHARACTERISTICS OF INVENTORS, PROCESS OF INVENTION
23. invention takes creativity,
24. understanding of what you have to work with,
25. what you want to do
26. Edison wanted to find material that burned for long time
27. Went through a lot of things, but knew what he was looking for
28. Sometimes you stumble upon things
29. But can’t expect it
30. Post-it-note inventor – looking for strong glue
31. Is a different type of invention
32. If you’re trying to invent, you need to know what you’re looking for
33. Both are inventors, one was trying, the other by luck
34. Wasn’t trying to get the result he did
35. Ended up with a mistake that created a whole industry
A lot of inventions are making something
But don’t need to actually make something to be an invention
Come up with idea and be able to show that it works
Idea is on the way, but
Making it work is actually the invention
If it doesn’t work is still invention, but isn’t useful
Should work to be a good invention
Inventions can solve problems, but also create them
A-bomb is an invention that created problems
Helped us win war, but now created industry of deadly weapons
Book - “The mouse that roared” – story of Q-bomb
Created a lot of unnecessary problems
Quality of “hair-pin” in bomb was bad, didn’t work
don’t actually try to be an inventor,
but has a lot to do
could do it if set her mind to it, but too much school work
if not so many deadlines could do it
but Edison did have a deadline to meet and did it
He told people he could do it, so he had too
Expectation is a problem of being an accomplishments inventor
Differences between – his livelihood, but not much difference
Maybe someday when she’s an inventor won’t be difference
Only accomplishments
Has a lot of things to invent (designs), but not time yet
Edison slept on lab bench a lot
Can be a profession, but can be just for kicks
Inventing is creating something new
Every invention is an example
If go by that rule, universe is an invention
Car is invention, no one else had thought of it
Invention isn’t completely new
Edison worked with someone else’s ideas

WHAT IS AN INVENTION
Definition is very vague
People have strict definition or just say “oh, great invention”
Paper press – Chinese may have invented long before
Government has tried to get definition so can do patents
Patent doesn’t define an invention
Such as DNA-people who got patent stole from someone else
Person who got credit isn’t necessarily the inventor
Back to Hubble – lot of inventors for it
Can’t just give credit to Hubble
Even though he had the initial idea
There are a lot of people behind the invention
Sometimes takes teams – are all inventors
Helped perfect initial idea
WHO CAN INVENT, PERSONAL CHARACTERISTICS, NATURAL
81. Have to believe that you can do it
82. Kids at school do that, she gets sick of it
83. She tells them they can
84. Can be an inventor if they know what they're talking about
85. Can't just take someone off the street, tell them to invent
86. Anyone can do it, as long as they have a certain level of knowledge
87. In science – she designs, others just copy her
88. Difference – character, believe in yourself
89. Each depends on the other
90. Is just her, and parents help
91. Sister is like that, but they're different
92. Sister likes sports, she likes math
93. Hates everything she likes, but same personality
94. Sister is very social
95. Invention takes balance
96. Know you want to invent, but can't have worries
97. (we move and her sister (K, age 9 or 10, joins us)

WHAT IS AN INVENTION, INVENTION TODAY
98. sister – have to make something
99. Recent invention – computers
100. Helps to do homework, science
101. Creates new science – "Fractals"
102. Helped make telescopes
103. Lots of people invented the computer
104. Lone inventor is still around
105. But teams are becoming popular
106. Edison decided that invention was most important, versus social
107. "I need a balance"
108. K – saw play on Edison – partner did light bulb
109. Have to have teams to create today
110. Anything we want invented takes teams
111. Want to make things that people want or need
112. If you want to make any money
113. Such as the color red, is already invented
114. Everything we have now was invented by lone inventor

WHO INVENTS, SUCCESS OF INVENTIONS
115. K – “American Girl” – two handed vacuum
116. Girl invented it, but took many to produce
117. A – girl and dad who made bacon drier – small team
118. Was publicized, producer liked it and made it
119. Lots of things today are marketed
120. Anyway inventor by profession can “get bread and water” is to sell it
121. Is too bad
122. Invention makes people jealous
123. Franklin inventions
124. Could have done without revolver
WHAT DRIVES INVENTION, GOOD AND BAD OF INVENTION
125. Development and need for it, drives invention
126. Want quicker things
127. Public is always wanting quicker, better
128. Public isn’t needed for invention
129. But the public fuels invention today
130. Medicine is an invention, but not all good
131. Pfizer made pill meant for cardiac patients
132. But realized that could kill someone with condition – Viagra
133. Inventions can just be there, people find different uses for them
134. Inventors to have in exhibit – regulars
135. Examples of inventions, names of all types of inventors

WHO INVENTS
136. Doesn’t matter what age you are,
137. Just know what your idea is and have it on paper
138. Initial idea can pop up, think and work hard,
139. And think, oh! I got it!
140. Have to be ready for it
141. Have to be interested in it
142. Artist won’t say – I found connection between subatomic particles and the universe
143. Have kids custom make something
144. Present problem and materials, how can you solve it
145. Kids wouldn’t have to participate
146. Thanks for interview and my summary
Notes on Invention 11.11.99 AD-17

This young girl (8th grader) was in the Space Station area of the second floor Hubble/Space exploration exhibition. She was working at a station trying to fulfill a “mission” of some sort by putting things together. She was rather shy and quiet, but seemed to be thinking, and struck me with her idea of the invention that she created for school, a song. And though the first thing she mentioned was people we produced successful inventions, it was clear that an invention does not have to be an object.

14:14 minutes

WHAT IS INVENTION, WHO INVENTS
1. Thinks of a person when thinking of invention
2. Such as Bell, Wright brothers
3. Don’t have to create something concrete
4. Can invent an idea or saying
5. The Ninja Turtles say “Kowabunga”
6. Doesn’t have to be successful
7. Can learn from failure and make something new
8. She could invent

BEING AN INVENTOR, HER INVENTION
9. Has invented a song
10. Likes how it feels to be an inventor
11. People recognize you for the invention
12. First visit to museum, with family
13. Made song for Invention Convention
14. Recorded song and wrote lyrics
15. Sang about inflatable tube she got for Xmas
16. Called the “Doughnut song”
17. Wrote a background story to how she did it
18. Wrote down the lyrics and recorded song
19. Thought of it a few years ago and presented it at Invention Convention

EXHIBITION
20. Exhibition – inventions people know
21. But don’t know who invented it
22. In the past it was a big deal to invent
23. Now we improve the technology we have, new ways to do things
24. Can’t copy something, has to be new
25. Her song is still an invention, though not sold
26. Explain how the inventor got their idea

TITLES
27. ABC Invention – too pre-school
28. Invention Exhibition - good
29. Build a Better Mousetrap - no
GOOD AND BAD OF INVENTION

30. Inventions are good in a way
31. Car – good for travel, but pollutes
32. Future – flying cars
33. Doesn’t take a special person, anyone can invent
Notes on INV 11.11.99 AD-18

Two boys, ages 9 and 6, and father in Hubble exhibition. With school group, but were on their own it seemed. I tried to sit and engage the boys, but one wouldn’t talk, and the younger was just wired. Dad finished the interview, but with typical responses. We got washed over by people exiting the Imax theater, so the interview ended, which was just fine. I felt I wasn’t conducting the interview as well as I could either.

8:38 minutes

1. Not inventors
2. Have invented lawn mower with dad
3. Boys were ineffective
4. Dad about children
5. Exhibition – things that are easy to relate to
6. Everyday things
7. Think about daily inventions
8. Takes creativity, imagination
9. Takes someone special,
10. Thinks differently than he
11. Isn’t that creative
12. People have a need, things are created
13. Are mostly good
14. See equipment that inventor used
15. Brand new, different, unique
16. Technology – smaller, quicker
17. Is a good thing
18. Here with a school group
19. Teach invention? Don’t know
20. Kids are “geared up to it” or not
21. Is an investor
22. Research and developers are making people money
23. Technology and medical
24. Inventions must be successful
25. Or no one will pay to make them
Notes on INV 11.11.99 AD-19

40-ish man in Math Exhibition, third floor. He was working on a puzzle and sat with me willingly. I felt I lost this interview, I lost my train of thought and couldn't get good questions going.

12:59 minutes

IMAGE OF INVENTORS
1. Thinks of creative and imaginative person
2. Doesn’t know what it takes, Isn’t an inventor
3. Person must financially have the time
4. Time to let mind wander
5. Be able to think of new ways to do things
6. Science minded or creative
7. Invent machine or therapy, teaching skills
8. Albert Ellis, B.F. Skinner
9. Endless fields of inventors
10. Paper clip inventor could have been wire manufacturer

DRIVE OF INVENTION
11. Can be from necessity or excess
12. People have to deal with burden of daily living
13. People who invent may have time to work and think
14. Likes Electricity as an invention

SOFTWARE STORY
15. Softball inventions – wooden to aluminum bats
16. Bats with thinner and thinner walls
17. Bats are so good, now making balls softer, don’t go as far
18. Now bats aren’t as good
19. Or is dangerous, balls are hit too hard, far
20. Now creating whole new industry
21. PA company is using Russian alloy
22. Technology making bats thin, but then are weaker
23. Changing the hobby of softball
24. Then create balls that take away from advance of bat

DRIVE OF INDUSTRY
25. Is all about what? I’m not sure
26. Guess it’s just about people who make money
27. Technology made game different, now want to change back
28. Like Music industry – 8-track, tapes, CD
29. Inventing so people have to buy
30. Very consumer driven, from our economy

SUCCESS OF INVENTION
31. Invention doesn’t have to be successful
32. But won’t get out of workshop
33. Corporate image of inventors today
34. People designing for profit
35. Companies have whole departments of research and development
36. Invention has to be new
37. Using things from different areas
38. Bat material was from air craft
39. Things from space used in food packaging
40. Invention gone wrong – A-bomb
Notes on INV 11.11.99  AD-20

I chose this woman as part of a family that looked like particularly good candidates for an interview. I ended up being very right. The family consisted of a mother, father, and son. They had been interacting together on various instruments, etc in the Music Exhibition. I was able to corner the mother initially, the son only approached to request a penny, and the father came at the end of the interview. She was quite insightful and willing with her responses. I felt comfortable talking to her, but found it interesting that she didn’t mention her partner’s inventor status.

15:38 minutes

IMAGE OF INVENTORS
1. Taking old ideas and putting together in new way
2. New way to do something
3. Messing around and being surprised
4. Persistence, goal and keep going at it
5. Two ways to go at it
6. Just mess around or driven by idea
7. Might be problems-solver
8. Others just live and say “cool, that’s a good idea”

INVENTOR’S DIFFERENCES
9. Playing with grass, realize what you can do
10. Make something they weren’t looking for
11. DaVinci had lots of ideas, but never produced
12. He was an inventor
13. Was part of the phase, envisioning
14. Science fiction writers are too
15. Didn’t have the technology to do it
16. Community of ideas – internet
17. People in field, to friends, get feedback
18. Competition is good for invention
19. “To get to the moon first”

ADVANCE OF TECHNOLOGY
20. Was a competitive Kayaker
21. Used to be one brand
22. Now are many different products
23. Now are many more involved in sport
24. Now have critical mass, people start inventing
25. Community of people experimenting

PROCESS OF INVENTION
26. Have idea, gather supplies, try
27. Try again if you fail
28. Research phase – find help etc
29. Some use community, others are loners
30. Loners are fascinated by internal process
31. Is like a lot of gifts, some can’t help it
32. Some just invent, others have goal
33. Lots of ways to invent

TEACHING INVENTION/EXHIBITION/FUTURE
34. Teach invention – if have good teacher
35. Person who walks through world with open eyes
36. Have an attitude of “can do”
37. Challenges, brain storm solutions
38. Ex: build solution to cross divide (bridge)
39. Then show other’s inventions
40. Automobile, light bulb
41. Future – medical, genes, biotechnology

UNIQUENESS OF PEOPLE/HER INVENTIVENESS
42. Doesn’t like generalizations
43. Everyone has their piece to add
44. Not an inventor
45. Does a little inventing
46. Not here self image
47. But does invent lesson plans, way to teach
48. Take walks, brain storm, read others
49. Can’t access creative energies in “hub-bub”
50. Men and women are inventors by nature

FUTURE OF INVENTION
51. How can you say life is better today, then yesterday
52. Depends on what you like
53. Is fair to be nervous for future
54. Won’t stop them, though
55. Take and to your best with them

INVENTOR
56. Enter inventor dad!
57. He is an inventor
58. Question – Yes, I am
Notes on INV 11.11.99 AD-21

This man is an Inventor. He approached as I was interviewing his "wife" and willingly spoke to me about what his world is like. I don't know what to say about this interview more than this man was an Inventor, one of the few people to accept and embrace this label. He fit the "mold" and gives insights to the process, characteristics, and generalities proffered by previous interviewees. He blew my mind. From Arlington, VA.

56:26 minutes

REASON FOR MUSEUM VISIT
1. Everyone in family is oriented toward music
2. Came to see the exhibit, visits often
3. Goes to SI often too
4. Are all "learning junkies"
5. Uses new science junkies to stop fights
6. Discussed eyebrows on the trip to museum

DEALING WITH ADVANCE OF TECHNOLOGY
7. Not going to stop technology
8. Are the only way to solve some problems
9. But also create some
10. Have to find balance, that is socially constructive
11. Ex: auto - mixed results
12. Break up of families and small towns
13. But created free choice
14. Radio and phone are almost all positive
15. TV is 99% bad
16. Computers could go either way
17. (Son with instrument he made)

HIS DEALING WITH TECHNOLOGY
18. Thought computers would be for elite
19. Didn't want to be part of a priesthood
20. Didn't work with computers till PC
21. Supports non-profit orgs. that help that
22. PC means you can't control information
23. (His phone ringing)
24. Opened first PC store – 1970s

DESCRIBES INVENTIVENESS
25. Am and am not an inventor
26. Doesn't make a living by inventing
27. But his life involves being inventive
28. As a child he made physical things
29. Third floor trash dumpster system
INVENTING TODAY
30. Today, don’t need mechanical knowledge
31. Now need concept, little mechanical
32. Medicine is doing great
33. Most great inventions are computer programs
34. Ex: WWW
35. Technically trivial, but concept will alter world
36. Information available to everyone, free

BACK TO BEING LIFE OF AN INVENTOR
37. Is an inventor, but not mechanically
38. Applied inventiveness to social dimensions
39. In High School, didn’t like how men and women related
40. Invented new way to relate
41. Commune lasted for 25 years – 1964-1989
42. Invented Battered wife hotline

PROCESS OF INVENTION
43. Concept, way to implement, way to deliver
44. Idea, way to do it, get it out
45. Patents are good to make a living
46. If trying to change society, don’t want patent
47. Invention is inborn
48. Can do things to make people a little more inventive
49. He doesn’t have a choice
50. Looks at something and new ideas come to him
51. Most inventors can’t NOT invent
52. Is the way he lives and breaths
53. Makes breakfast an invention
54. Is an elaborate combination of nutrients
55. (Demonstration of his inventiveness today)
56. Given any circumstance, approach in a different perspective
57. Not a conscious process
58. Set up crisis intervention company
59. Invention solves a problem of some kind
60. If nothing for it to do, what is point of creating it

OTHER INVENTORS, DIFFERENCES, BEING
61. Buckminster F. was helping the housing situation
62. He was an idea person not a marketer
63. Every inventor has a million ideas,
64. Out of which 5 might be good
65. Not all his are good
66. Wants ideas to go out
67. Most inventors are less interested in money
68. Is not an event, but a way of being
69. Is a form of creativity
70. Image of crazed inventor—he matches
71. They live at a different level of intensity
72. Comes from your core
CREATIVITY AND INVENTIVENESS
73. Pearl Buck quote
74. Applies to all creative minds
75. Not as gifted artistically
76. Is for human contact
77. A lot of his doings has artistry, but in another field
78. He comes up with a beautiful solution

CHILDREN AS INVENTORS
79. All children are very inventive
80. Why they’re in trouble in school
81. Image of mad inventor for reason
82. Are socially isolated cause life experience is different
83. Oldest son is creative, found a friend similar
84. Is fun to watch them play football
85. After every 10 sec. They have 5 min break
86. Always re-inventing the rules

“LONE INVENTOR” OR “MAD SCIENTIST” OR TEAMS
87. Inventors are not good at applying idea to society
88. Are too different, isolated
89. Lone doesn’t mean Alone (Edison)
90. Inventors don’t make good team players
91. Teams that do the best – have leader
92. “skunk works” – off the books work
93. lots of exciting things came out of it
94. Paid to be creative
95. Inventors today are Entrepreneurs
96. And the solo inventor
97. Hyper text in 70’s – no technology to do it

ARTIST OR INVENTOR?
98. DaVinci came up with things “before his time”
99. Edison produced things in a week
100. DaVinci could only draw
101. But is an inventor
102. Most inventors invent in their time
103. Non-inventor said “teams”
104. All kinds of things invented all the time
105. WWW browser invention – one man
106. We are in the middle of history
107. In future, we’ll recognize the “person”
108. Edison was extraordinary, affected us everyday
109. Lots of creative people who don’t call selves inventors
110. Everyone is creative in some ways
111. But when is dominant to them, can call inventor
112. Is important to recognize
113. If not, use same assumptions as “others”
114. That can get them in trouble
ANOTHER SOCIAL INVENTION
115. "wife" and he are divorced
116. Live separately in same house, kids have parents
117. Another invention

TEACHING INVENTION
118. Can't say how to "teach" inventiveness
119. He is too "far to one side"
120. Is like teaching someone to breathe
121. #1 thing: reduce fear
122. Fear is the number one stifler of creativity
123. Get in mode of not taking risks
124. Ex: wasn't fearful of loosing goods under box
125. If had more valuable things would have gone standard way
126. But wasn't fearful, so could be creative
127. Quote – dance like no one is watching, love like it's never going to hurt
128. Uncreative in dance, cause people are watching
129. Can get people to be more creative, reduce fear
130. Can't take an uncreative person and make them so

EXHIBITION
131. Figure out goal of exhibition
132. Focus on how risk shuts down creativity, safety extends it
133. Ex: "Why Man Creates"; Sol Bass and associates
134. We all solve problems everyday
135. But risk-taking is a part
136. Is way to get people to think out of the box
137. Toothpick puzzle
138. Children are most inventive, are out of the box

ANOTHER FORM OF INVENTION; "Oops!"
139. Mathematics is purest form of invention
140. Have limitless materials to work with
141. "guy who made the (math) rules" is the inventor
142. Any mathematical "solution" is no longer interesting
143. Math geniuses were teenagers
144. Is rare to have inventor that invents whole life
145. "wow" factor is more a discovery
146. Ex: Vulcanized rubber
147. Was trying to invent, but was an accident
148. While he was trying to invent, he discovered something
149. When you stumble on something is a step
150. But also discovery, less creativity
151. Rubber was an "oops"
152. Never got idea to do it, discovered it

TECHNOLOGY AND SOCIETY
153. Technology creates new society
154. And also causes problems
155. Wanted to be part of it, to affect social change
156. Radio, lights, TV, what will computers do?
Wanted to be part of it – opened store
Social inventors are not into tech.
Divorce is a unconscious, destructive
social invention which is untamed
Needs to be reinvented
Historically was for raising children
Divorce was uniformly socially destructive
Also wasn’t hard to have life long marriage – death at 35
Today people live longer, don’t have kids
Divorce should be a lifelong process and change
Could be positive social thing
Wrote an announcement for divorce
Had completed marriage and awarded “bachelor degrees”
Have to reinvent social relationships
Live longer, won’t have kids, more diverse jobs
Have reinvented society, but haven’t with relationships
Bring out all kinds of inventions in exhibition
Social, mathematical, conceptual, mechanical

RE-INVENTION
Re-invent when there is something wrong
Every invention re-uses concepts and ideas
Stockings before nylons – silk
“Old, New, Borrowed, Blue”
no invention is completely new
re-inventions are for things that aren’t working well
Phonograph is a true invention
Tesla discussion

RECOGNITION AND INVENTION
Recognition is a random event
Also has to do with self promotion
Edison was inventor and marketer
Can’t invent in a vacuum
Have to part of a team, or...
Firms with three names:
Idea guy, Marketing guy, Bean counter
“Apple” is example
don’t know bean counter, but he funded it
Successful are both idea and good marketer
Edison is not a good example since he is extraordinary
His range and number of things invented, marketing abilities
Notes for Interviews AP-1 through AP-31
(Conducted by Andrew J. Pekarik)

Notes on INV 7.28.99 AP-1

NMAH: Engines of Change (bench outside machine shop)

This interview is with a man, early 60's, from South Africa. He was the first person I saw when I arrived at the machine shop bench. He was together with a younger man, perhaps his son, who never joined in the conversation (he was carrying a video camera). The interview ended when this companion indicated that he wanted to move on. The interviewee was very engaging and obviously likes to talk. He thinks of himself as an inventor, and has thought a lot about invention and what it means.

40:51 minutes

INVENTING (00:19)
1. From South Africa
2. Has invented a lot of things
3. Has not marketed them
4. Just “something useful at the time”
5. “always had a flair for it”
6. you don't have to have a flair for it
7. you don't have to have a flair for anything
8. we’re all the same; it’s how you visualize things
9. we’re all the same bag of tools; it’s how you use it
10. you could teach invention
11. the key: just know that there is a better way to do that
12. “the best inventions are radical”
13. the incremental changes are for the “polishers”
14. they'll make it more efficient
15. the path is set by the inventor
16. the inventor is a rebel
17. because the successful inventor can’t think conventionally
18. so many US inventors were arrogant, thought system was against them
19. Inventors invent concepts
20. A revolutionary breaks things down
21. The inventor makes something better and the alternative dies
22. Inventions are always a disaster
23. Whatever we invent solves one problem and creates a bigger one forward
24. Inventions create problems
25. Inventions give society opportunities for short-term survival
26. Academic engineers, designers, doctors learn a set thought-pattern
27. The mob isn't gone, it's running legitimate drug companies
28. Academics always tell you why something happened
29. Being an inventor is a mental commitment
THE MUSEUM (09:17)
30. No ideas for improving this exhibition
31. Incredible that tribute is being paid to the concepts
32. Mostly paying credit is a “nose-pointing and pinching exercise”
33. Those who lay claim to inventions are often thieves
34. The real inventor is unrecognized
35. But recognition is irrelevant
36. If you’re truly progressive and have an idea you put it out
37. You don’t always need to be rewarded
38. If you enshrine someone it will be the wrong one
39. Pay tribute to the idea – not the perspective of the newspaper
40. The idea is what matters, not the person who thought of it
41. “there is always more to what you’ve got than yourself”
42. ideas belong to everybody
43. health, for example, is your cosmic right; you can’t sell it
44. Everyone has an illness of some kind
45. Your cosmic right is to be perfectly healthy
46. It shouldn’t require drugs to stay off of it
47. The system creates problems so that heroes can solve it
48. The guy who does nothing and makes money is the one to look at
49. Look at the few who are healthy despite their behavior
50. Mostly people don’t want answers because they don’t like to change
51. Few museums in South Africa
52. It takes wealth to make an investment like this

PERSONAL HISTORY AS AN INVENTOR (15:36)
53. Interested in machines; that’s his business
54. Recognizes a machine like that from the 20’s, 30’s
55. Started with control systems for such machines
56. Loves to see the things
57. His father was “a victim of the system”
58. Grandparents had a farm and were wealthy
59. Assembled the first Model-T’s in SA
60. Would shoe horses, make wagons, or cars
61. The partner ran away with all the money
62. His father came to Johannesburg
63. Everyone robs for wars; British declared war for the mines
64. Afrikaner was discriminated against by the British
65. His father worked in the mines
66. As a boy he saw the old equipment
67. His maternal grandfather was a locomotive fitter
68. He built model trains
69. His father’s side – all musicians and academics
70. Helped by not having much schooling
71. He left before they could interfere with his thinking
72. School is for the dumb; smart people don’t need to go to school
73. To train inventors, take a pioneer country and give incentives
74. Schooling shortens the life-cycle because they lose enthusiasm
75. An exhibition on invention
76. In order to invent, you have to have a need
77. People are told they can’t invent; follow the system
78. Accept what someone else has thought out already
79. Because inventions cause discomfort
80. Working for a telecommunications company
81. Ended up with electronics despite no knowledge
82. (story of his work testing relays)
83. conceptualized it differently
84. his solution created a problem
85. transferred, fired, re-employed
86. he's a problem; bring him back
87. it undermined the management too
88. once a system is established it doesn’t want inventors
89. if you survive by your wits you know you’ll get by
90. laid-off civil servants are traumatized
91. he thinks they’re lucky; they’ve been freed
92. people don’t want to be inventors either
93. but society creates its own rebels; they always appear
94. “the best always happens. The answers will be there when you need them.”

THE PROBLEMS WE FACE TODAY (35:59)
95. The next 20 years may be difficult
96. The challenge will be surviving this
97. There are just too many of us on the planet
98. Changes will be unkind to people
99. Can you stay healthy without drugs
100. All drugs are mind-altering substances
101. The solution will be a “thinking” solution
102. Scientists try to say everything is constructed from the physical upwards
103. In fact it runs the other way around
104. If the solution isn’t simple it isn’t a solution
Notes on INV 7.29.99 AP-2

NMAH: Engines of Change (bench in front of machine shop)
Man (about 60) and son (law student) from Scotland

20:40 minutes

BACKGROUND (00:12)
1. From United Kingdom
2. Came to see American History
3. But son and he most interested in mechanical things
4. Used to be in the mobile crane business

INVENTING (00:45)
5. Wished he were an inventor
6. Imagination is key, also luck
7. Interesting what people were able to build 100 years ago
8. Not just the ideas but the sizes, castings, the time they took
9. You are born able to invent or not
10. Inventors are prolific, you have it or you don't
11. "necessity is the mother of invention"
12. although perhaps greed today is just as driving
13. need was a stronger drive in the past
14. now opportunity rather than need

INVENTORS VS. DISCOVERERS (04:17)
15. admired discoverers more than inventors
16. Benjamin Franklin is a discoverer
17. He saw something he wanted to understand
18. Something more exciting about being a discoverer
19. Son: the inventor applies the discovery to a practical problem
20. Some inventors surely just have an idea
21. The ideas just "spout" in their minds
22. Discoverer sees something that no one else ever saw
23. Inventors "make" "develop" because you need prior knowledge
24. Discovery is something that depends on "recognizing" "understanding"
25. Imagination is important for inventing
26. Engineers, designers and inventors are often one and the same
27. In other cases the inventor is the one who first plants the seed
28. Son: the engineers and designers are given problems to solve
29. Son: inventors come up with their own

MUSEUM VISITING (08:43)
31. Neither visits museums much
32. More when travelling
33. Wife is more interested in art
34. In art galleries primarily enjoys "the pleasing nature" of the art
35. Here it is more "seeing how things have evolved, or how they work"
36. A learning experience – how things work more than implications
37. Forthrow Bridge discussed in NMAH – in their hometown
38. Museums not that important personally, interesting
39. When he was a student it was more important than interesting
40. Son studying law
41. How to make interactive exhibits more than just fun
42. Best interactive experience for him was his school chemistry lab
43. Son: invention is a hard thing to show
44. Invention isn’t necessarily a thing, it can be an application or theory
45. You can ask people how to apply things

INVENTING (15:42)
46. The law is not an invention; it is an evolution
47. They respond to circumstances
48. Inventions are more by chance than law
49. U.S. Constitution also a response to situations
50. The invention of the light bulb is a “by chance” thing
51. It is the reaction to a discovery: How can I use this
52. Exhibition could show unexpected uses for things
53. The story of getting the truck under the bridge by letting air out of the tires
54. One does it, but doesn’t realize it. In that sense we are all inventors.
55. E.g., a good chef
56. In the sense that we have different views, we are also inventors
57. Existence is a series of inventions
Notes on INV 7.29.99 AP-3
NMAH: Engines of Change (bench outside machine shop)
Young couple (30's) from Texas
He has invented software (recently applied for patent), as has his father
But he didn't call himself an inventor when first asked if he was one.
They go to museums to understand within a context of objects.

16:25 minutes

1. First visit
2. Interested in history
3. Not inventors themselves
4. His father has some patents
5. Being an inventor means being a creative person
6. Depends on the job
7. Everyone has potential to be an inventor
8. She thinks everyone comes up with new solutions
9. If that's what an inventor is, everyone is an inventor
10. He has just recently submitted patent application
11. Agrees that in her terms everyone is an inventor
12. But when first mentioned he thought of recognition
13. Ability to look at something a little differently, a new approach
14. The ability to perceive a need or a solution
15. She: all invention comes out of need or curiosity
16. Necessity is the mother of invention
17. Curiosity is the father
18. She: discoverers recognize or understand a new principle
19. Inventors find new ways to apply those principles
20. He: discovery is not as concrete as invention?
21. Two different aspects to the same thing
22. He: yes, engineers and designers are inventors
23. She: invention talent is like musical talent
24. But tendency to find new solutions is innate
25. Because everyone has to go through that
26. They like to visit science and history museums
27. Experience preference: he: learning; she: objects
28. And learning: a better overall understanding of our world
29. She: natural history is a meeting ground of history and science
30. Science boils down to merger – all things are related
31. Museum visiting is enjoyable; they both like to learn
32. Intimacy of seeing artifacts in person
33. Brings you closer to the ideas and the persons who were involved
34. Also likes the atmosphere
35. Likes the unexpected – "wouldn't have thought of it that way"
36. Personally enriching – adds meaning to their lives, their point in history
37. He: life is a quest for knowledge
38. Attractive interactives in the past:
39. San Diego science museum – put together an arch
40. Could solve a problem and compare your solution to others
41. TV program on trying to understand how obelisks were raised
42. Let people try the different possible solutions using models
NMAH Engines of Change (bench outside machine shop) 
Woman, 40's with husband (elsewhere) and at least 2 children (boys) 
She was relaxing, sitting on the bench as I finished making notes on the previous interview, so I turned to her and started interviewing her.

08:53 minutes

1. "Are you an inventor?" "No" (laughs)
2. "I've never ever been that kind of person"
3. An inventor is someone interested in mechanical things
4. Finding different ways to do things
5. A combination of being born with it and being interested
6. Can't teach everyone perhaps
7. But you could teach people with the aptitude
8. Can teach inquiring mind and critical thinking skills
9. But then you can see who can jump ahead and create new knowledge
10. It is a leap past acquired knowledge
11. Requires curiosity, interest, trial and error
12. Interest is one of the biggest things
13. Not all inventions are mechanical but that's what you think of first
14. Non-mechanical inventions, e.g., hybrid plants
15. A writer is an inventor of a story; it depends on your definition
16. Seeing the whole building; husband very interested in mechanical things
17. Admired Thomas Edison as an inventor
18. He came up with so many things
19. She doesn't understand why the bulb lights up
20. Admirable that he could figure those things out
21. Einstein, Graham Bell
22. Visit art museums when they travel
23. Experience preference: art museums – seeing the art
24. History museums – imagining what it would have been like
25. Hands-on sections would be more interesting to her
26. To see how they actually put the light bulb together
27. Was listening to an NPR program on the first recordings
28. Bell (actually Edison)
29. Very interesting program – the history was so interesting
30. Even though it’s a topic she isn’t interested in
Notes on INV 8.12.99 AP-5

Interview conducted on the third floor of NMAH in the room with the printing presses (also the interactive gear model). Interviewee, a male in his late 20s or early 30s, was dressed in traditional Amish garb (round straw hat, collarless white shirt, black pants and suspenders, shaved moustache, long beard) and was first observed bent over a printing press label reading carefully.

58:15 minutes

PRINTING
1. Starting a print shop (00:12)
2. Why he's interested in printing (00:45)
3. Machinery facilitates labor or replaces it (01:52)
4. Machines that put people out of work (02:26)
5. Good side and bad side of printing (03:36)
6. Make bibles etc widely available
7. Can have major effect, e.g., Soviet Union
8. New machines reducing the number of printers
9. Ben Franklin –
10. Printing is process of democratization
11. Hence fewer printers is bad
12. Ben Franklin wanted “distasteful” social changes
13. Like divorce
14. Made a hero for his technical innovations, but he is a villain

TECHNOLOGICAL CHANGE (10:19)
15. Technological innovation has become hurtful – too much of a good thing
16. Modern technology is damaging the environment
17. Computers – supposed to be good
18. Downsides – excessive energy use
19. Americans have become so impatient, selfish
20. These are some social effects of technology
21. Computer good point – everyone can print
22. But we could also do that with small printers
23. Summarizing – technology and social change
24. Problems with airplane – tend to be bad
25. Bad for environment
26. Maybe no really good invention of the 20th century
27. In 19th century – electricity tends to be used for bad
28. Typecasting machines were good

PERSONAL EXPERIENCE OF INVENTION (22:19)
29. Personally “adaptive” more than “inventive”
30. Inventor more inclined towards something new
31. Adaptive – putting what you have to a needful use
32. E.g., Used bailing twine to fix his backpack

IMAGES OF INVENTION/ TEACHING INVENTION (24:57)
33. The handyman can keep things going
34. Ability to see a new use for a common material
35. Can teach someone to be more inventive
36. But have to do it early in life
37. You learn the basics as a child
38. Then you build on them
39. Later more rigid, less experimental, less “what if”
40. Children are more daring, less cautious
41. Later we get tunnel vision, and can’t see the broad picture

PERSONAL BACKGROUND THAT SUPPORTED INVENTION (29:38)
42. He was a very inquisitive child, always running away
43. Naturally curious, always asking questions
44. School tried to stop it, but library supported him
45. He read history, biographies, “how-to” books
46. To expand mind and create a base of knowledge
47. Between 3rd and 5th grade read all non-fiction in the library
48. As a 4th grader acted as volunteer librarian
49. Recalls as a 4-year old coloring and being asked about the colors
50. Had “an eye for things” that others didn’t have
51. These are all the building blocks for later learning

EXPERIENCE OF MUSEUMS (34:38)
52. Didn’t like not being able to touch in museums
53. Living history museums are a great advance in museums
54. Also hands-on museums
55. There should be an actual press here
56. Doing it makes it real
57. As a child he worked alongside adults with adult tools
58. Some children today would be more comfortable with toys
59. Working printers should be here in this room
60. Good experiences in museums lead to more support
61. To encourage creativity – people need to see cause and effect
62. BBC series on historical innovation
63. Step by step from Rome to space, invention by invention
64. These things are related – nothing is too insignificant
65. You have to be interested in learning and doing something with it
66. The more interactive the museum, the more it encourages learning
67. A college in Washington where everything is interdisciplinary
68. All fields of study are related in a whole
69. Summary – trying to see the big picture for everything
70. Life magazine picked Guttenberg as the man of the millennium
71. The greatest failure of the display here is that it doesn’t reflect its importance
72. Living history museum approach widens people, interactive widens people
73. You can increase attention by demonstrations
74. Room here is too dark
75. Video attracts attention because of the human connection
76. Living history museums are effective because they bring people into the picture
77. This room is very sterile
78. These machines all required people
79. Can’t the Smithsonian Institution afford to have people demonstrating?

80. INTERVIEWER RESPONSE (54:23)

Institutional Studies Office

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Smithsonian Institution
Interview took place in the electricity exhibition, near the light bulb (non-working) interactive. Interviewees were an 11-year-old boy (I.), primarily, his younger brother (A.) (age 7 or 8) and their grandfather (G.) (70s). The group also included a second older man and a younger child, neither of whom became part of the conversation. As the 11-year-old seemed most responsive I knelt to talk with him until a point when he sat down on the floor and we all sat on the floor. When a guard interrupted us we moved and sat down again, more in the corner by the interactive. The grandfather was a lighting engineer, now retired.

46:00 minutes (lost about 10 minutes at the end)

VISITING (00:25)
1. wanted to come to electricity
2. both kids had seen it before
3. A. remembered the lights

EDISON (01:01)
4. I. Knows about Edison – bulb, phonograph, DC
5. Read books about him, but he’s not especially interested in him
6. He made the light bulb with wire

I. IS AN ARTIST, NOT AN INVENTOR (01:49)
7. Not an inventor, just an artist
8. Draws really well in all styles
9. Difference between inventor and artist
10. Inventor is a job
11. Inventing isn’t really hard
12. You have to know a lot about the stuff you want to make
13. Drawing is easy for him
14. When stuck he looks for ideas
15. Draws pictures from movies or Pokemon
16. Can be taught – by example and helping
17. Whatever pops up in your head – you can do it in an unusual way
18. Needs a good imagination
19. You have to be into what you’re drawing
20. You have to want to do it
21. Perspective

I. LIKES TO READ AND TO LEARN (07:07)
22. Likes to read
23. Reads history, but not especially. Likes to learn.
24. Reads books on famous people, especially MLK
25. Likes to learn new stuff
26. Doesn’t go to museums a lot
27. Air and space is his favorite
28. Likes stuff about space and the stunt lady, whom he saw on TV
29. Been to NASM 4 times
30. Summary – likes to learn about other people

Institutional Studies Office

Smithsonian Institution
IMAGINING AN INVENTION EXHIBITION (09:24)
31. Would be interested in submitting art for the exhibition
32. Invents futuristic stuff in his drawings – cities
33. Buildings have odd shapes and are really big
34. Sometimes it is frustrating
35. Can draw houses really well
36. Wants to be an architect – really neat, people would like it
37. Summary – likes helping people a lot
38. Building toys – “Connects” or let kids draw
39. Draws to express his feelings – doesn’t draw well when he’s mad
40. Kids would use these things automatically
41. It is natural for little kids to invent

INVENTIONS (13:57)
42. Not always good to have new stuff
43. E.g., they advertise that gas is getting better but it has dangerous additives
44. E.g., they say things are better, like computers, but often they aren’t
45. Greatest invention ever is paper
46. Invented in Egypt, important documents on paper
47. No downside, esp. with recycling
48. Only problem is that it can tear

HOW TO MAKE MUSEUMS WORK FOR KIDS (17:13)
49. Likes reading and learning in museums
50. Hands-on can help, but the reading is best
51. Museums are good because they can preserve history
52. We learn what came before
53. The kids who are bored don’t want to read
54. At Baltimore science center you can learn what happens with a hands-on
55. Summary - Probably have to have some old stuff and some writing
56. Video is o.k. if a person is explaining about the inventions
57. The explainers would have to be really descriptive
58. If he was working in the exhibition he would explain what things are
59. Didn’t take tours in museum but elsewhere in Washington

KNOWING ABOUT INVENTORS WOULD HELP (22:53)
60. Inventions help people, e.g. band aid or hypodermic needle
61. We’d have to look in an encyclopedia to find out who it was
62. Then we could find out his other inventions and his life
63. Last year did a report on the guys that invented the cell
64. It explains more to know the story
65. Has been to the Hirshhorn, liked the sculptures

G.'S VIEWS ON INVENTING (27:16)
66. G. inventions starts with need
67. Edison is special because he took notes; he kept a record of where he went astray
68. worked as a lighting engineer
69. either a need or “wouldn’t it be nice if”
70. always kept notes as an engineer – things that should be
71. thinks like an inventor
72. people think of solutions but don’t notice
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Notes on INV 8.17.99 AP-9

This interview was conducted near the end of the electricity exhibition with a father (about 40) and son (age 7). The interview began with the son (J.) but moved to the father (D.). The boy wore a shirt with a reference to Jesus and D. identified himself as a pastor. We sat on the floor for the interview. At times J. was a little restless physically, but D. played with him without distracting himself from the interview. D.’s wife was elsewhere in the museum and the interview ended when he realized he was due to meet her at their assigned place.

34:52 minutes

ELECTRICITY AND INTERACTIVES (00:19)
1. third day at SI
2. J. wanted to come look at electricity
3. J. went to discovery center and learned about electricity
4. “A volt of electricity can kill a person 175 times”
5. Used an interactive about generating electricity
6. D. was helping him out
7. J. has been there 2 or 3 times, though it is only 6 blocks away
8. Also generated electricity with a bicycle display
9. J. enjoyed the boat in the maritime
10. Summary: J likes interactives especially

LEARNING (03:41)
11. J likes to read – reads on 4th grade level
12. J likes mysteries and shark books
13. J likes national geographic movies
14. Because they explain things easily and help you learn
15. His favorite thing to learn is math

INVENTING (04:58)
16. Invents things with Legos
17. Made 30-40 inch duplo planes
18. First he used the book, then made his own things
19. Also he invents with connects
20. To be an inventor, learn from books first
21. Started with duplos, then went to Legos and then connects
22. Makes things with his dad – pinewood derby
23. Anyone can invent, but they have to learn how
24. J would put Legos in an invention exhibition
25. More interested in making things than the stories about them

DAD'S VIEW: INVENTION AND TECHNOLOGICAL CHANGE (09:10)
26. D. reads biographies all the time – a history buff
27. Has read about Edison, Ford, Iacocca
28. Interested in character development, especially persistence
29. Constant tinkering, thinking through processes
30. Used to repair his car, does his own maintenance work
31. Telephone is the most important invention of 20th century
32. Made a huge transformation in culture
33. Telephone downsides – telemarketing, isolation
34. Immediacy of telephone communication causes problems
35. All inventions have downsides, but where would we be without them
36. His moral perspective on technological change
37. The telephone “invades” the family – deliberately keeps it apart
38. Sees the impact of his teenagers telephone use on the family
39. Also in his work sees people who have stopped communicating
40. Transportation and computers have had similar impacts
41. We can’t make these decisions as a culture, it must be individual
42. “Am I going to let my life be manipulated by other people’s invasions into my world?”
43. the parent is responsible for pointing out that decisions are being made
44. no video games in his house (except for the golf game)
45. No TV for the first 23 years of his marriage, just got one 5 years ago
46. Got it for the video, not the TV programs

MUSEUMS AND HISTORY (19:53)
47. Visits museums a lot, especially history museums
48. History teaches us about today
49. In the west, the understanding of the pioneers is important
50. Can imagine scenarios in a museum that cause people to think
51. E.g., communication and computers and how that has affected us
52. E.g., birth control – the options and their different implications
53. The domino effect of decisions
54. In technology how serious about alternate sources of power
55. Will we continue to depend on gasoline? What are the implications?
56. Without a TV, he felt “out of it”
57. All of us wish it was not this way, but it continues to progress
58. Some days he wishes Y2K would blow it all apart
59. It wouldn’t be so bad
60. Summary – linking historical perspective and a strong moral sense
61. Seeing the implications might help us manage these things
62. E.g., the auto changed everything, but we needed to find ways to manage it
63. E.g., telemarketing is a big management task
64. The telephone is “their only way to invade my life”
65. But “if I want a product, I’ll go out and find it”
66. All our inventions need management
67. E.g. Internet – how should it managed?
68. Summary – a process of invention, consequences, management
69. E.g., standardization of electricity
70. Americans accept change more easily and can afford them
71. That’s been key to the expansion of American industry
72. “You can’t just do history here. You have to do sociology, philosophy.”
73. History should be an accurate account of details, but it all has a spin
74. There is no pure history
75. Summary – history is some person’s way of putting the details together
76. Just visited the Holocaust Museum and wondered “who put the spin on it?”
77. “What are the agendas that are behind it?”
78. Who authored what I’m reading
79. He’s been visiting Civil War sites and likes best those with people who can be questioned
80. Maybe exhibitors should say, “here are the other approaches and why I chose this one.”
This interview took place in the electricity exhibition near the light bulb and meter interactive. Interviewees were a sister and brother from Boston, who were visiting with their father (he gave permission for them to be interviewed, but seemed somewhat unfriendly, and after providing some answers in the beginning, he never came close enough to join the conversation. After the interview was established, he wandered off elsewhere in the exhibition). The girl, H., is age 13 and the boy, L., is 10. Both were very shy and quiet. They stood unmoving throughout the interview. I knelt in front of them with my back to the light bulbs. This interview felt like work, since the kids seemed reluctant to reveal themselves. They were very suggestible (both by the interviewer and by one another) and some of their responses can’t be trusted without listening to the recording.

14:35 minutes

PERSONAL BACKGROUND (00:52)
1. Neither is an inventor, L is a collector of cards
2. Organizes them by numbers
3. H. invented a rocket thing, says L., but H. doesn’t remember
4. H knows Edison invented the record player
5. H. likes to read
6. Reads about history, e.g., WWII
7. Soldiers had so much courage
8. Also likes mysteries
9. L likes “Goosebumps,” not especially fond of history books

INVENTING (3:36)
10. H. would like to know how inventors come up with the original ideas
11. To be an inventor takes a lot of patience
12. You have to keep trying and trying until you get it right
13. L says an inventor needs courage
14. H. thinks she couldn’t be trained to be an inventor
15. “they can’t train you to think of something”
16. L thinks maybe they could teach him to be an inventor

MUSEUM VISITING (5:35)
17. They like to visit museums
18. H likes to see old stuff, e.g., spinning wheels
19. “it must have been a lot of work”
20. Life is easier now – you don’t have to use physical work
21. Not all inventions are good, e.g., guns
22. L thinks trains are not so good because they move so fast
23. H. would like to see the early attempts for inventions
24. E.g., airplanes or cars
25. L favorite inventions are ships and dinosaurs
26. They don’t play video games, but have computers
27. H likes computers because they provide information and help with schoolwork
28. But they can be bad because people can hack into other people’s computers
29. H. prefers real things to interactives
30. A voice could explain about it
31. L tries some questions for the “inventor”
32. L gives samples of the questions he asks his father in the museum
33. H says what questions her father asks her
34. Going to NMNH and NASM
35. H wants to go to NASM to see the airplanes
36. Wants to see how big they are and how they got them to work
37. They’ll also go to the castle
38. L knows there’s a restaurant here – thinks it’s McDonald’s
39. They don’t have any interest in volcanoes, earthquakes and meteors
As I was looking for someone to talk to in the electricity exhibition I saw these two kids dash past to the elevator in the corner, which I hadn’t noticed before. They were visiting with their mother, M. The older boy, C., is 12. His brother, K., is 9. The interview was conducted standing just in front of the elevator. The older boy was somewhat self-conscious and sometimes his mother answered for him. Both boys helped one another with answers.

15:15 minutes

MUSEUM VISITING (00:11)
1. visit museums in Boston, especially the science museum
2. usual M’s idea
3. they prefer hands-on things
4. first time in NMAH
5. wandered in to this section

INVENTING (01:37)
6. K calls himself an inventor
7. Likes to build with Legos
8. Thinks inventors need good imagination
9. Also they need tools, and an idea
10. Can’t teach someone else to be an inventor
11. C thinks you can be an inventor without building
12. E.g., singing, and he loves to cook
13. But “it doesn’t feel like inventing, it feels like cooking”
14. A good cook needs good taste (says K)

MUSEUM FAVORITES (05:44)
15. K’s favorite thing in a museum is a static electricity generator
16. It’s just “neat”
17. C prefers dinosaurs, because they’re big
18. Just likes looking at them

INVENTING AND LEGOS (07:16)
19. K reads more than C, prefers science fiction
20. “Clap-on lights” are a cool future invention
21. K would make towers and buildings out of Lego
22. Likes buildings because “you can live in them”
23. K dominates the Legos; C just looks

MUSEUM VISIT STYLE (10:15)
24. In the museum K speaks up first, asks, “what does it do?”

THE MALL AGENDA (10:54)
26. Going next to the Holocaust Museum
27. Went to NMNH and NASM
28. Kids liked NASM, C liked the planes
29. Ate in NMNH café yesterday, liked it “clean” “salads”
30. Would eat wherever is convenient

LEGOS AGAIN
31. K wants to go to Lego-land in California (13:27)

THE DRAW OF THE ELEVATOR (14:08)
32. They were all drawn to the elevator – just wanted to go in
33. The machine shop had a similar effect
Notes on INV 8.18.99 AP-12

This interview was conducted in the opening section of the electricity exhibition, in the Edison area. The interviewees were two boys from San Francisco – R., the 6-year-old, is very active physically and has a short attention span, S, age 10, is quiet and serious. I first noticed them when I was looking for visitors in the exhibition and heard their mother, N., reading labels. She was trying to somehow keep R interested while she served the information needs of S. She was obviously working hard – S was excited and R was bored. The boys and I ended up sitting on the floor talking, while N stood nearby. This was a fun interview. I especially enjoyed R.

Note – this file is Incomplete---

ELECTRICITY
1. S’s step-dad is an electrical engineer
2. S wanted to go in when he saw the electricity sign
3. First time in NMAH
4. S did a book report on Ben Franklin and that got him interested in electricity
5. Franklin proved that lightning was electricity
6. Franklin ran away when he was an apprentice
7. Franklin proved how the static charge collector worked

INVENTING
8. R is working with his dad to make a light thing
9. S: inventor types just come up with things
10. You need to have an inspiration

MUSEUMS
11. S. likes to read
12. R prefers mechanics and art
13. N says R likes art and interactives
14. S knows about Edison, R doesn’t
15. S wants to see the things, R too
16. N says exhibitions shouldn’t have too many words
17. S likes the words in an exhibition
18. R would rather read a book than an exhibition label
19. He likes to hear the sounds, either to himself or aloud
20. R has a hard time in the museum
21. R wants to go to the gift shop
22. If the invention show had a gift shop, R’d be happy
23. S suggests a kid’s room
24. Also flip-panels at a lower level for kids
25. R asks about a non-working interactive
26. N says the explorers hall at Nat Geo was very successful
27. R loved the T-Rex face interactive hologram
28. R describes molecule virtual reality (sounds like Microbes)
29. S likes to see old stuff, R doesn’t
30. S likes to learn about history
31. S learned about magnetism here
32. Different ways of conducting electricity and wires
33. How they discovered it
34. Summary: what each of the three wants in a museum
35. Art works for all of them
36. R studied art in kindergarten
37. S talks about East wing of NGA, afraid of the steps
38. N discusses the value of pre-visit materials
39. R’s favorite pictures were Picasso and the Water Lilies from Monet
40. S liked the rug in the lobby
41. R tells how he “made up jokes” experiencing the sculpture in NGA East Lobby
42. N says they love all art, sculpture gardens, etc.
43. They are all excited telling about it
44. S thinks the original mobile could be called an invention
45. “anything that is created by someone for the first time”
46. R says magnets were invented in 1996
47. S tells about need for lower height things, e.g., computers
48. R wants his own kids room (with dinosaurs)
49. Where you can make your own pictures
50. “Stuff that little kids like”
51. R says the cut-off between little kids and big kids is 7 years old
52. N says it’s personality, not age, that matters
Notes on INV 8.19.99 AP-13

This interview took place in front of the case of old equipment at the beginning of the electricity exhibition. The interviewees, an African-American couple in their late 30's had come to Washington from Texas with their church group for a “convocation.” The woman, W., (who is training to be a teacher) and her husband, G., both spoke freely, at times disagreeing and at other times agreeing with one another.

23:17 minutes

HISTORY (00:16)
1. W wanted to see NMAH
2. Looking for things to give back to her students
3. Likes history; she does well
4. Interested in differences between then and now
5. Computer is such a change from the typewriter

INVENTIONS (02:17)
6. Inventions are good, but we’ll go back one day
7. Today’s things don’t last
8. Y2K might drive us back to typewriters
9. Summary: need the old things for back-up
10. Advantages and disadvantages, like a balance scale
11. Asked about downsides, G suggests the side-effects of medicines
12. W mentions a drug that causes fetal deformity
13. G: drugs now don’t use natural materials
14. Dangerous because they’re man-made
15. “Anything man has to do with is faulty, is not 100%”
16. W: everyone talks about Y2K
17. They should have thought about this from the start
18. G: man has no knowledge of what God is planning for the world
19. There is too much emphasis on what “man” is doing
20. God is still in control and knows what will happen
21. G: the solution is to trust in God
22. W: these old things survived because it was meant to be
23. The things that perished were not meant to survive
24. It is not an accident
25. Because it was made better
26. We are the “microwave society” we want it quick, now
27. G: consider construction. Houses used to be built better
28. It takes less time now, but they won’t last
29. Look how well-built these things (in the case) are
30. The things now just aren’t holding up
31. W: people in the past got by
INVENTING (09:00)
32. W: not an inventor (laughs) “can invent a mess”
33. G: everyone is an inventor in some kind of way
34. Some things you come up with that others haven’t thought of
35. E.g., dressing – inventing some new style of dress
36. W: thinks it requires a special intellect – not everyone is an inventor
37. They do it because “it needs to be done”
38. G: Other people get credit for your inventions
39. The company takes it from you because you don’t have the money
40. The inventor’s life is hectic
41. Inventing a drug for sickle cell anemia and other things
42. Inventor friend’s troubles – needs money for the patent process
43. Companies take it away from you and you get no royalties or praise
44. Summary: Reason to invent: G. curiosity, W. need
45. G.: people just start doing something and come up with something
46. W: have to have a deep-down desire. It has to really matter to you.
47. G. sometimes desire or need, sometimes accident
48. He (Franklin) wasn’t out there looking for electricity
49. You see things that others invent and think “I could have done that”
50. W: teaching about invention, she would teach about the telephone
51. Americans have a desire to do better, “to be on top of the map”
52. “we have a rich heritage here”
53. how we went from point A to point B to where we are now
54. G would sum up American history and invention with the airplane
55. Amazing that someone had that idea
56. W. “that horse and carriage was getting’ old”
57. Those who perfected the airplane were thinking about time
58. G: they’re still looking for a substitute for gasoline for cars
59. They’re trying to find a way with water
60. W: water is a bad idea – we need the water. The earth will go dry.
61. Summary: consequences of invention
62. G. American inventors don’t think about consequences
63. It is the inventor who is responsible for consequences
64. W. you have to consider all the possibilities and weigh them out
65. G and W: If you can’t figure out the consequences, leave it alone
66. G: medicine is tested on animals, who are not the same as humans
Young couple. She (S) and he are (H) English, from near London.

21 minutes

WHAT ARE INVENTIONS/INVENTORS/MARKETABILITY
1. Doing first floor of NMAH, picture of Americans/America
2. Neither inventors, love gadgets
3. Inventiveness of people
4. Takes (S) imagination and (H) perseverance
5. Laziness kept him from being an inventor
6. (S) have something difficult, find need and way to do it
7. put in certain circumstances, will become inventive
8. Difference between countries, if there is a “best” way, why isn’t it universal?
9. Metro – lights at edge of platform, don’t have in London, and is good thing
10. “not invented here” syndrome
11. Marketing is a key
12. Britains have good brains, just poor at marketing things
13. Many inventions on “other side of the pond” that have been exploited
14. Is a cultural thing – American’s invested in Edison, have so many “dot com” things
15. “Unproven” inventions, until it makes money, isn’t really there
16. imagination and social conditions (Andy), and will be accepted (H)

INVENTIONS OF 20TH CENTURY/TASTES IN MUSEUMS/VISITATION
17. oil spray – great, quickly accepted by British
18. 20th century invention – telephone...invented by a Scotsman? (also 19th century)
19. Uh, computers then
20. Process of invention...not greatly interested
21. Must learn patience
22. Not possible to teach imagination
23. Live near London
24. Like (She) history or art
25. Changes in social history
26. Many different names for “museums”
27. Imagining the time, to live there, participate in the time (S)
28. Invent a time machine (S)
29. How do the ideas start? (H)
30. Often improving things
31. Early bicycle or omnibus
32. Lived through the computer age, think how it was when he was young, compared to kids today
33. More his level, more technical
34. She will like something else more
35. She is more imaginative, he is cognitive in their visitation

TO PUT IN AN INVENTION EXHIBIT/FAILURE OR SUCCESS OF INVENTIONS
36. Suggestions – send U.K. inventions that didn't work
37. Prof. Clyde Sinclair – calculator, electric car
38. Didn’t work, catch on
39. Mind to invent but lives in a house full of antiques
40. Invented things, if looked at in detail, may work, but weren’t useful.
41. Was ahead of it’s time (C5), electric
42. The way it was marketed helped it fail
43. Was a “car”, maybe should have been a “bike”
44. One of great failed inventions of the century
45. What was the need? No real need (perceived), so it failed
46. Swatch car in Europe
Notes on INV 10.15.99 AP-15

A couple, age about 60. They own and run a family business. H is the entrepreneur and manager, W is the chief designer. They make figurines for Christmas. I spoke with them inside the Made in America exhibition, just after a display on factory production. They were very serious interviewees and worked hard to answer questions fully. As visitors they are the cognitive type and their style was reflected in the thoughtfulness of their answers. They were a pleasure to talk with, and by the end I felt like I had known them for a long time. They are from Pennsylvania.

46:16 minutes

1. In town for business, stopped for day.
2. Wanted to see the machines that made America
3. Entrepreneurs put together fantastic machines
4. Help move through century
5. Were problem solvers
6. See it here in history museum
7. Edison and Ford
8. Shakers on everyday things
9. Woman invented circular saw
10. Antiques and how things work
11. Circular barn
12. Like museums
13. Collect antiques
14. Inventor is scientific
15. Designers
16. Problem solvers
17. Make Christmas decorations
18. Handcrafted product in manufacturing way
19. Similar to Ford’s idea
20. Creating new things all the time
21. Simple elements (paper, coat hanger etc)
22. Into figurines and sell over country
23. She does original and make mold
24. 185 people work for them
25. one of biggest manufacturers of ornaments
26. relate to innovators – admire these guys
27. Ford did it on huge scale
28. Got such a huge number of people to work together
29. He had a vision – could see what others couldn’t imagine
30. Great men are men of Vision
31. Little inventor – mechanically oriented, like solving problems
32. But not an engineer or scientist
33. He can make things grow – she has idea
34. Entrepreneur has inventiveness and ability to make things grow
35. To be successful – need a talent to work with people,
36. have empathy for people
37. They are a family business – keen interest in employees
38. Country is no longer like that
39. Leaders of past have that Human Resource touch

Institutional Studies Office

Smithsonian Institution
to have people follow them
Fascinating period of time to be living
Change in cars, stove, microwave, telegraph, radio, TV
Impact on humans and lives will take time to see
Is life better today than yesterday?
Was simple, less stressful, more appreciation for God and things
We may be paying a price for incredible change and advances
Are value issues
Technology lets us be more impersonal, will continue
Will create walls between the intelligent and the worker
done well, have a responsibility for those at the bottom
Government has done a rotten job of it
Social problem, need to take care of others
Creativity of men is necessary to solve problem – isn’t there right now
Most see invention as mechanical or technical, system
As Entrepreneurs have lost two business before present one
Know the feeling of having nothing
Serve Salvation Army – learn basic needs of people
Eye-opening education
From business and religious affiliation
Father died at 8 years old
Afraid of being an orphan – read Dickens became afraid
Led to faith
She – from PA Dutch hard working environment as youth
Museums are wonderful educational tools
SI was good child education tool
Visit museums for vacation
Helped found Museum in Doylestown
artifacts
Exercising respect for the past
Have dumbed down things in contemporary museums
NMAH has dumbed down
displays and presentation makes people move through quickly
may not go back
limited space, covering too many subjects
missed the depth, versus graphics
want to see old things in their context
catering to bulk of people in visual appeal
compare clothes from different time periods
furnishing from time period
tie all elements of time together
TEACHING INVENTION
To be better problem solvers
Too much memorizing facts
Like puzzles, chess – is problem solving
Their work is like chess – see objective and how to get there
People don’t see big picture
Rather, they micromanage what is in front of them
Enhance in school, but have natural tendency
People are born with it, school could enhance
89. Show there is a amount of satisfaction in problem solving
90. Start young
91. lives will be more satisfying in learn not to run away, face it
92. Even in relationships
93. Show they can thing for selves
94. Booker T. Washington – famous inventor
95. Try things that Scientist Didn’t say would work
96. Success – lots of inventors didn’t get it at first
97. Hershey, Wright bro.’s
98. Have a direction and go with it
99. Teach that there is something wrong with failure
100. She - What is failure?
101. It is a good thing
102. Teach what NOT to do
103. Do it different next time
104. Learning
105. teach empathy
106. you have learned, and tried, had idea and put effort on line
107. young people have idea but won’t give effort, and try
108. may make enormous contribution to society
109. Instead settle for “what if?”
110. Define success – everyone isn’t entrepreneur
111. Ex: teacher
112. Success? – happiness, personally feel good for job
113. is doing good for society and human kind
114. Inventor – isn’t content with just going along
115. Yes, entrepreneurs are different
116. “get out of the box”
117. we look like mundane people, not risk takers, are conservative
118. Ex: won’t wear way-out clothes
119. Can afford the best, but don’t want the Rolls Royce
120. Best don’t want to be millionaires
121. Do what they want, enjoy
122. Give great service, will have line of customers, fulfill the need
123. Process of thinking – why their here

MUSEUM/EXHIBITION PREFERENCE
124. Visitor center for company
125. 25,000 collectors for their product
126. made in America type of figurines
127. but had typical factory
128. built place to add perceived value to product
129. quality employees
130. asset to community
131. during recession – build dream
132. add jobs, help neighbors
133. 86 acres, $, very appealing factory
134. with visitor center, shop
135. visit museums to get ideas for improvement
136. all age groups and interests
137. interactive
can’t expect to interest everyone
but specific things for individuals
Invention creates personal satisfaction and impact on society
Think creatively – the more the better the society
Man has ability through inventions, to help mankind
EX: microchip to detect cancer
Yet, other invention could be to destroy in battle
Will help one contrite, but terrible for mankind
Don’t fund, if it’s not good for mankind
Good life is that toward helping others
Moral and social responsibility to humankind

Interview cuts off here, seems to be pretty well finished.
An African-American couple, age about 60. I spoke with them in the historic automobile section. They were the first African Americans I had seen in the museum. H is seriously interested in invention and plans to work on inventions when he retires. They are from Ohio, where H works for a tire company. H was the respondent. His wife mostly just added assent. She listened, but looked away the whole time of the interview, and she signaled the ending.

26:36 minutes

1. spoke about being lost in museum
2. remember NASM, Natural History from visit
3. NASM planes, Apollo, science of air and space
4. Here as youth, 9 year old, now 59
5. Had a tour of plant
6. Got to see a car from start to finish
7. Was a thrill
8. Been talking for 20 years about museum
9. Afro-Amer. Contributions
10. Something for everyone
11. Interesting and educational
12. Seeing process of making car
13. Evolution of car industry from kid
14. See how people work together
15. Everyone works together, complete process
16. Even if only tightening screws, part of big picture
17. Museum makes impression on kids
18. Also saw Quaker Oats factory
19. Sees self as inventor
20. Planted seed for a lot of things
21. Tire plant employee
22. Other man got credit for his idea - $25
23. People stealing ideas
24. Toys today are like he made as a kid
25. His era was more into invention than now
26. Kids have so much now
27. everything true to life, games, Nintendo
28. S-brother made twine cars
29. Inventors are talented, God-given gift
30. G.W. Carver, Ford – thought they were crazy
31. Ford would be overwhelmed by his invention
32. Considers self unusual
33. Everyone is unique
34. Find own uniqueness to be happy with self
35. Improved self
36. Instill in children, take them to museums etc
37. Place life in Big Box, not reserve to little
38. Children liked SI – NASM
39. Individual bored at museum, own fault
40. Saw car from childhood
41. Has inventions in head, won't talk about
42. Problem today is to get it marketed
43. Unlike old days, now have to pay them
44. Retire and work on some things
45. Harder to be an inventor today
46. Can invent, but can't get profit
47. Need of people for invention
48. Invented little except computer
49. Have improved on inventions
50. Have moved ahead
51. Improve automobile more
52. Changes are inhibited by individuals, like gas people
53. Need electric or other source, not gas
54. Long time to go still
55. Air bag may be bad invention
56. More horsepower is bad
57. Cars work best faster
58. Then dangerous going so fast
59. Process: See problem, do better
60. "Do this so this will work"
61. To perform certain task
62. Happens in mind - middle of night
63. Invention is action
64. Thoughts into actions, come up with something
65. Doesn't do much good to invent in head
66. S - everyone can't invent
67. Grew up on farm
68. Made toys - cars, engines, twine
69. Have no control over inventive thoughts
70. Brother pushes him to make it
71. Thought of Jiffy Lube, before they came...
72. Get inventors in action
73. Avid Interneter
74. On line 3-4 months a week
Our lunchtime table in the historic tavern included three elementary school teachers – two of them retired from local schools, and one still teaching art (her father was also there). They talked about invention and children. The still active teacher was also very experienced (in her late 40’s) and was from Tallahassee. The Tallahassee teacher mentioned “invention conventions” where kids are asked to determine a personal need and design something to solve it. It was a little stressful to try to interview and eat at the same time.

11 minutes

1. can tell at young age, even Kindergarten
2. some would be creative, others normal
3. born with it
4. Father was inventor
5. Thought he was kind of strange
6. Made WW2 sub
7. Worked on in early and very late
8. Worked for GM
9. didn’t want them to steal invention
10. couldn’t resist urge
11. She writes poetry, similar
12. Can’t stop it – get quiet, get in mood
13. Father took naps during day
14. Mundane stuff of the day is out of the way
15. Poetry is therapeutic
16. Lose track of time
17. Walk in woods and write
18. Just comes, rarely rewrites
19. Wouldn’t have patience to invent
20. 2 – 3rd/4th grade – not so good kids
21. they were working with hands
22. can free up minds, not taught
23. “not so good” at the academics
24. get neglected in traditional Education
25. inventor doesn’t fit mould
26. 1- father wasn’t macho, was loner
27. 2 – Edison was poor student..."retarded"
28. intelligence not tested in standard
29. inventor types get lost
30. don’t sketch what they imagine
31. 3 – art teacher – always fighting for resources
32. Exceptional students (handicapped)
33. They are creative
34. 2 – is the gate to academic learning
35. get in the back door
36. love art/music want to learn about person
37. 3 – uses found objects to invent things
38. Men in Black theme for art classes
39. Forces them to be creative
40. In different manor than normal
41. 2-Kids must be able to handle things
42. 3-Gears, gadgets, Visual
43. Daughter figures out before looking at label
44. Wow Factor, amazes them
45. Magic of seeing how things work
I was looking for some children to interview and saw a little girl and her mother in the hands-on area. The girl was playing with a gear-wheel game and the mother was reading a brochure and looking bored. So I approached them. The little girl immediately went away, out of listening range but close enough to see her mother. The mother was waiting for her husband who was meeting with a curator to measure parts for his antique airplane. She was a dedicated interviewee and really wanted to be helpful. Neither of us could get her daughter to participate, however. It later turned out that Abby also tried to get the little girl to talk and she couldn't do it either. They are from out of state.

31:00 minutes

1. J-1: 1920's airplane – why her family is here
2. Husband wants to get plane measurements
3. He is rebuilding the airplane
4. She isn’t but her children/husband are inventors
5. Husband invents ovens
6. To dry Gypsum better – family business
7. Always been inventive
8. Father never gave him things completed
9. Wanted to instill it in him
10. It is teachable
11. Kids will come up with new ways to do things
12. Girls make things for Barbie dolls
13. Tired of cleaning them up, husband made closet for them
14. Velcro dolls in closet
15. Create things to make play easier
16. Other kids aren’t as inventive – TV
17. Not helping them all the time
18. Let them figure out things to do
19. Daughter – age 9- likes planes, invents paper planes
20. Likes to visit airforce museum, into planes
21. Likes the hands-on aspect
22. Liked climbing into the train in museum
23. CPR is one of most important thing
24. likes airplanes too, get to sister
25. CPR is important, though not visible
26. Telephone might be good, but then everyone calls
27. Got husband put phone in hanger, then he didn’t like it, people called him
28. Can be good and bad
29. A lot of inventions since TV
30. Even though lots are sitting in front of it, doing nothing
31. Makes her children go outside, play, are more inventive
32. Need to put limits on computer, TV, etc
33. Uses it for e-mail, encyclopedia, homework
34. Technology lets her stay in touch with twin
35. Anything that keeps them communicating they use
36. Ready for Video-phone, see her and kids
37. See someone you can’t see
38. Technology is good, keeps them thinking
39. Finding new and better ways to do things
40. Evolved into what we have to day (ex: car)
41. Likes change
42. Some things can keep the same
43. But people change
44. Need to keep up with the times
45. She and kids accept change
46. Already have a number of museums for kids
47. Kids need to play and experiment
48. They can’t do it at home anymore
49. Place with lots of hands on
50. Children are the future, need to center on them
51. Show children old game – “skittles”, didn’t like
52. Was good game, and so are present
53. Children are creative, - Legos, clay, draw
54. Have to be, will take over business
55. Daughter – likes to draw horses
56. Exhibition – look to playgrounds
57. Have sand and water, beach scene
58. Room full of Legos
59. 2nd Daughter – whale watching led to desire for career
60. Husband is a problem solver
61. Chapel Hill research science museum
62. Technology, science, butterflies
63. Enjoyed pillars that formed tornado with 4 people
64. Bubble making place for kids
65. Space ship model interactive
66. Had to think, skill building
67. Caterpillar to butterfly process
68. Like animals – live on farm
69. Every child is different
Notes on INV 10.15.99 AP-19

This group of four males represented three generations: grandfather (about 60) [1], father (40) [2], and two sons (17 and 15) [3 and 4]. They were interviewed among the classic autos. The older men dominated the conversation. I tried to involve the older boy, but the younger boy wouldn’t participate at all. All but the younger boy said that they are inventors, and the father was especially willing to identify himself that way. The boys sat for the interview, the older men stood. I both sat and stood. The interview went o.k. but I had a hard time finding a personal connection, perhaps because there were so many of them. They live locally.

22:30 minutes

PERSONAL INVENTIONS
1. Tire hose holder – out of old tires
2. Use used tires, recycle
3. Opened magazine and there it was, in plastic
4. Portable sink – wash veggies outside
5. Always tinkering with something
6. Making something new out of old
7. (1) – single row of light across car front
8. (3) – car run on magnets in road
9. (1) - vehicle automatically avoid road and other cars
10. very thoughtful and in-depth ideas
11. Indian man – so many cars, should have mono-rail
12. Americans are selfish, want own vehicle
13. Sons invented car exhibit across street

INVENTOR CHARACTERISTICS, PROCESS
14. Invention takes creativity, risk, practicality, insight, imagination
15. (1) – inventors are out of the status quo
16. Most stay in comfort zone
17. Move from idea to object to acceptance
18. tire thing so simple, inexpensive, but is new
19. (3) not teachable
20. (2) – have to have drive, desire to create new, haven’t thought of
21. (1) – both ways
22. (1) - smart people- academics- plus someone who fiddles with things
23. Education is necessary to get things together
24. Over education kills things
25. (3) tried his magnetic car idea

EXHIBITION IDEAS
26. Tell kids that think “I can do that”, “You can do that!”
27. (2) – seeing everyday people creating together helped stimulate
28. Made him feel “yeah, I can do that”
29. Hands-on
30. (1/3) Materials with many colors that match design
31. After that, let kid use own imagination to create
32. Use materials that are there to let you use imagination
33. (1)Mold material to fit your feeling/imagination
HISTORY AND PROGRESS/FUTURE
34. (2) everything started somewhere
35. see things that were build upon previous
36. ex: oldest auto, and then corvette
37. through process of invention
38. (2) – all inventions are not good
39. (1) – simplest inventions – button and zipper
40. inventions that help society change
41. bring community together again
42. Atomic bomb not good
43. Then saw good for short time, long term not good
44. How to use atomic power for good
45. Both physical environment and attitudes
46. Possessive, selfish current ideals
47. Edison invented for people, not himself
48. Invention served society, made life easier
49. Now we have everything, now bring people back together
50. (2) – age of communication divides people
51. computers isolate people, can reach too far
52. before, it was Telephone, now can contact complete strangers
53. (1) – so much technology, info, life is chaotic
54. create simplicity of life, but appreciate beauty of technology
55. bring people back together to recognize
56. (4) – don’t feel world is a mess
57. (4) - computer is favorite invention
58. use it for games, homework, learn
59. (3) get on and see places, things never seen before
60. like being in a new big place, without dangers
61. (1) – generational gap, more distant as older
62. Knows Teens that feel isolated, left out,
63. Not connecting with real people
64. Like it, but it needs to be tamed
65. Middle generation that is taking it everywhere
This interview also took place in the classic auto section. I spotted the girl and decided to approach the family. She was eager to participate and sat with me on the bench while her father waited off to the side. Her mother and younger sister went off elsewhere in the museum (to the hands-on area) and did not participate at all. After the interview started I noticed that her father’s shirt said “Bob Jones University.” The little girl (age 11) wore glasses, and was extremely engaging and bright. When I finished with her, she went off to find her mother and I interviewed her father. He too was very cooperative. They are from Pennsylvania.

57:33 minutes

INVENTORS, CHARACTERISTICS OF
1. Talked about great grandfather who knew May who invented Slinky
2. From Dunkinsville PA
3. Cousin might grow up to be an inventor
4. Is always building
5. Inventing in practice of medicine
6. Invents Kool-Aid pops
7. Inventors don’t have to be special
8. It just is in the way they think
9. Have to go to college
10. Learn chemistry, physics
11. Wants to be a MD, or Vet
12. Good medicine is shot for chicken pox
13. Gets 100%’s in science
14. Dad knows everything
15. Is home schooled

MUSEUMS, EXHIBITION
16. This is first big museum visit
17. Has seen Carnegie Science Center, Williamsburg
18. Not really a museum, is hands on
19. Shows how things are done
20. Museums have to have lots of interesting things
21. Describe interactive at Carnegie
22. Likes mystery and dog books, historical novels
23. Is learning about ancient civilizations
24. Already knew about Israelites from church

INVENTIONS
25. Great invention – car
26. Can get you places faster
27. “Nonsense” inventions – bike with 10 seats
28. Invention is good if fun to use or useful
29. Such as Nintendo
30. Computer is good, depends on what it is
31. Liked concept car, black canon bike
32. Likes VWs camper (Westphalia), new bug – its style
33. Learned about Ford, Wright Bro.’s, Edison, inventors in school
34. Inventions – silly putt, super balls – “mistakes”
35. They came out of accident while trying something else
36. Invention failures – Ford Stanley Steamer car
37. Were cars made like trains – steel wheels
38. History chapter on Inventors
39. They invented at different times, things change

FUTURE AND CHANGE, EXHIBITION
40. Now we don’t need much more
41. Hard to think of things we need
42. Came up with idea cause wanted to
43. Inventing today – medicine
44. Exhibition – inventing games, play things
45. Play dough, putty, bouncy stuff
46. Create play dough that would bouncy
47. Change color to make individual
48. Wire, wheel, steering wheel
49. Create weight lift
50. Make new things out of things that were invented
51. Makes castles out of Lego’s, Duplo blocks
52. Little cousin into robots, automatic things

PERSONAL EXPERIENCES
53. Her dog is 14 years old, she’s 11
54. Has always liked animals
55. Just not big birds – geese, ducks
56. Recall experiences with wild birds
57. Create for world-a bible in every single language
58. So everyone would have one
59. Would like Dalmatian dog that is always nice
60. Could mix breeds – Dalmatian and Chihuahua
61. Transfer brains
62. Cross between collie and Dalmatians
63. Long haired Dalmatian with brown spots

TITLES
64. Titles – Be an inventor
65. Invention Adventure
66. NOT – Build a Better Mouse Trap
67. Invention Roadshow
68. Inventing is Fun
69. Not – You Too Can be an Inventor
70. “Kids are Inventors Too”
71. have things easy to make but interesting
72. Two storied car

SWITCH TO FATHER – HISTORY OF MUSEUM VISITATION, MEMORABLES
73. To dad
74. Restores instruments – organs
75. Knows how they work, not musician
76. Mom is musician

Institutional Studies Office
Smithsonian Institution
77. Rather work with hands
78. Made dresser
79. Not inventor – not his job
80. He could have been renaissance man
81. Loved childhood museum visit
82. To all museums in Pittsburgh
83. To living history house, places
84. Bule Planetarium – theory of atom
85. Technological interactive, ancient history
86. Parents gave the opportunity, read books
87. Met John Glenn, Allen Sheppard
88. Models of rockets, Star Trek “freak”
89. Was 11 when they landed on moon

HIS EDUCATION, EXPERIENCE INVENTING, INVENTOR CHARACTERISTICS
90. Was going to be engineer, but then biblical studies
91. Works at university
92. Fascinated by ancient studies, collects books
93. Go to antiques stores and used books
94. (her) Likes Little House on the Prairie
95. Parents visit museums, sights etc
96. Have always had appreciation for past
97. Parents always restoring things
98. Built first car, no money, had to fix things
99. Can’t throw anything out
100. If you can visualize, see it, can do it
101. People that create are artists
102. Technology of era would highlight inventions
103. What made person make the leap to make new thing
104. How they stumble upon it
105. Process of invention – science
106. Can be inventor by setting goals...but
107. Problem in society drives someone’s passion
108. And deal with aesthetics
109. All part of it, become obsessed with problem
110. Tinker on the side cause of need to survive, Love
111. Inventors often are not well off
112. Takes much trial and error
113. Like an explorer, have to take risks
114. Can’t fear unknown, have skills
115. Be well read – see different angles
116. Get past society’s taboos – government, peers

FUTURE OF INVENTION/INVENTORS
117. Future – inventions on micro level – medicine
118. Invent device, process to understand genetics
119. Engineer who manipulates cells, etc
120. Exhibition – medicinal elements
121. Realize there are non-regulated labs that work
122. Can’t invent in garage, at home anymore
123. Have to learn the rules of play today
124. Bad inventions – not inherently evil
125. Some have risk factor – wrong people
126. Nuclear science – cancer, energy, mechanics
127. But also bombs
128. Any device/ process can go bad with wrong person
129. Have moral issues with fetal tissue research
130. Forget his moral standards would be ok
131. Society would be chaotic without standards
132. Application of inventions is where goes bad
133. $$ desire is wrong, but Future will be ok

**AFFECT OF TECHNOLOGY ON SOCIETY/KIDS**
134. Technology doesn’t breed corruption
135. Don’t have Nintendo – get addicted
136. But uses technology, is building computer
137. Technology can change behavior
138. Children are driven to be entertained
139. Instead of wanting to learn
140. Law of diminishing returns in kids games
141. Technological games – themes out of culture, negative
142. Games that create evil civilizations leads wrong
143. Doesn’t teach helping others
144. Game is bad, not the technology
145. Created for money
146. TV in his era – double beds – subliminal message
147. Having no TV from 6th to 10th grade was good
148. Lived on farm, lots to do
149. Technology won’t run out of control
150. Inventors aren’t usually popular
151. Corporate and government encourage creativity – allow open door
152. Saw book “What Was Invented in Garages”
Notes on INV 10.16.99 AP-21

This interview with father and daughter didn't go very far. The father is a local 4th grade teacher, just starting his first year of teaching. His daughter is also in fourth grade and he was making a pre-visit to the museum before bringing his class. He was reluctant to talk at all, since he was trying to do this quickly. We talked standing up, on the steps to a large piece of industrial machinery that they had been examining. His daughter was not very informative, nor was he.

4:01 minutes

1. 4th grade teacher – lesson on inventions/inventors
2. Inventor has to come up with an idea for things to work better
3. Can give someone a problem
4. What would you do to improve it?
5. Dad suggests robot invention
6. 7th grade may be more hands-on, want to try new things
7. 4th grade is inquisitive, not obnoxious, or too young to understand
8. 5th and 6th grade – ready to “do this or try that”
Notes on INV 10.16.99 AP-22

I saw this family (father, mother, daughter) near the large photo-text panel about Henry Ford as the mother asked the daughter (age 12 or 13) to read it to them. The father seemed to be African American and the mother Jewish. The father was skeptical and very reluctant to participate, and the interview only could take place because the mother supported it. But, unfortunately, the girl wouldn't say very much. They are from out of state.

16:54 minutes

ORIGIN OF INVENTIONS
1. Girl – Inventors Ford, Edison
2. Family saw Edison’s birth house
3. Mom – we are not scientific or electronic
4. Dad – everyday life invent things to get from here to there
5. Doesn’t have to be world shaping
6. Be creative, take new approaches to things
7. Haven’t made things to patent or sell
8. Mom – invention comes out of need
9. If you’re creative anything is possible
10. Create in own life, but does it go beyond you?
11. Has more applicability than in your personal life
12. Girl – phone and car, AOL, TV
13. Cars give off CFC’s
14. Nothing bad about other inventions

MUSEUM VISIT PREFERENCES
15. Visit museums once a year
16. Dad wanted to come to Ford Museum
17. Was from Detroit
18. Is spectacular, full of interesting things
19. Girl – read about Helen Keller
20. Keller was inventor of sorts
21. Mom – seeing historical kitchens
22. How far we’ve come since then
23. Girl – like Holocaust Museum
24. Felt sad, learned about details
25. Mom – is interior designer
26. Likes to imagine and see how need has created styles
27. Dad – see things
28. Girl – see things also

EXHIBITION AND TITLES
29. Exhibition – how clothes and fashion has changed
30. Mom – experiential things
31. Titles – Invention Roadshow, Invention Exhibition
32. You too can be an Inventor
33. Invention is For Everyone
34. Kids too can Invent – good
35. Dad – Life before the Internet
36. Prior to computers, etc
37. “Inventions from the last Century”

FUTURE OF INVENTION
38. dad - invent something to prolong life
39. Medical breakthroughs in Exhibition
40. Mom - long way on info retrieval
41. But not far on saving lives, overcoming illness
42. Have misused invention, not gone too far
43. Mom - morality of misuse
44. Inventions are only as good as people who use them
Notes on INV 10.16.99 AP-23

This was my most frustrating attempt to talk to a kid. The boy, age 8, I spotted because he was enthusiastically and very verbally interacting with his dad around the large locomotive. But as soon as I started talking to them he clammed up and never said another word until after I’d left. He would only nod or shake his head and kept looking at the tape recorder. Fortunately his father was willing to be interviewed and it was not too bad in the end. The father did not seem to have a high level of education and he was definitely there for the sake of his son. They live locally.

14:57 minutes

BEING INVENTIVE
1. Was time to visit museum, has been to Village
2. Is a little creative, more artistic
3. Always been a handy man
4. Try to fix something but don’t have a piece
5. Go out to garage, bend and shape things to make something that works
6. Son likes to be out and doing things
7. “911” calls when playing with cars
8. Think of Edison, G.W. Carver
9. Take information as it comes

CHILD MUSEUM VISIT, 20TH CENTURY INVENTION AND FUTURE
10. Son liked science museum, play with things
11. Static electricity exhibit interactive
12. 20th century invention – computer
13. People take it for granted
14. But computer has improved life
15. People now have access to things that mislead
16. Car – pollution, get you around
17. Yet people have gone nowhere quick
18. More complication, more inventions
19. Ex: tin can, then special tool to open
20. Cheap throw away things
21. Inventions create more waste
22. People think they need more and more
23. Bad invention – Dust Busters
24. Waste of resources
25. Care about earth, keep pure for children
26. Necessity is the mother of invention

PROCESS OF INVENTION
27. Something comes naturally, get enthusiasm
28. Want to figure it out, can’t stop yourself
29. Enthusiasm, Creative mind
30. Figure out if worthwhile to do
31. Can discourage self
32. Got to be in you, keep going no matter what
33. What outcome, doesn’t matter how got there
34. Opportunity is key
35. If something is there, use it
36. Have time to do it, have materials handy
37. Comes automatically
38. Failure – have 999 failures, one works
39. Keep trying, never give up, try new things
40. Invention – help pollution in mass production
41. Machine to make tailored clothes automatically
I had noticed that there were very few teenagers in this museum and as soon as I saw this girl (age 16) (D) with her mother (Mom) and younger sister, I approached them in the section with old furniture. The girl was not especially interested in being interviewed but I was able to work with her more cooperative mother and gradually get the girl involved. This left out the younger girl, who never said anything and mostly wandered around the area. They sat on the edge of the display railing and I interviewed them while standing. In the end they were quite friendly and seemed to enjoy talking. They show a preference for decorative art that is reflected in where I found them. They are from out of state.

30:56 minutes

INVENTOR, MUSEUM VISITATION
1. Mom- dad invented anti-collision devices
2. Has patents with federal government
3. She designs buildings
4. Father was work-a-holic, always tinkering
5. Worked on go-cart engines as child
6. Visited Ford and traveled to museums
7. Usually art, history, National Park museums
8. Is bringing children back to Ford, Village
9. See living history, realizing how easy it is now
10. Tries to bring children often
11. D- mom takes them to museums
12. So that they can learn and explore world
13. Likes to see old cars, air force academy
14. Being exposed to variety of things
15. To see how things used to be, versus now
16. We have it easy now
17. Can’t pick just one invention
18. Mom – cooking, cleaning are easier
19. D – things that make life luxurious

20TH CENTURY INVENTIONS
20. Invent way not to go to school
21. Mom- work at home through computer
22. People are still tinkering, inventing
23. Scratch surface of computer things
24. Draw by hand, but can now do it on computer
25. D – just likes internet, can go anywhere
27. 20th century invention – computer chip

AFFECT OF INVENTIONS
28. bad invention – manor they are used, people think they should be used
29. D – no bad inventions
30. Everything that is put out will affect us
31. Mom – original intent isn’t bad, application
32. Microwave, refrigerator, dishwasher ease work
33. Make life more interesting, WWW
34. Expose kids to things mom can’t give them herself

VISITOR TYPES
35. D – likes to see things, think of them
36. Seeing something can spur idea, invent something
37. She does art, anything can inspire
38. Liked diner and wiener mobile
39. Never know how seeing things will affect you
40. Mom- amazed people had ability to create things
41. What people were driven to, to invent
42. Industrial Revolution – explosion of things
43. Understand where things come from
44. D – reads sci-fi

TYPES OF INVENTORS, CHARACTERISTICS
45. Mom – everyone is an inventor
46. Even if just making own life easier - adapting
47. Ex: stay at home mom – to help her life with kids
48. D – never patented anything, so not inventor
49. But does invent daily – like art project
50. Even inventing thought process, affecting others
51. Mom- have a need, problem, break it down
52. D – just hits you, don’t know how
53. Might have seen something in past

TITLES, EXHIBITION, CONTEMPORARY INVENTION/ORS
54. Titles – invention
55. You too can be an inventor – good
56. D – immediately involves people
57. Sure, I’ll be an inventor
58. Mom – story from invention’s viewpoint
59. D–wrote story from objects view, won award
60. Ice cube story
61. Mom–need time to think of invention as a concept
62. Medical inventions, so fast
63. Invent vaccines, combinations-like Edison
64. Bio-Genetics
65. Don’t hear about these people, but Bill Gates
66. Due to Public Relations
67. They were looking for man who did Measles Vaccine
68. D-Didn’t mention one person, give credit to anyone
69. Need to recognize Big Inventors, but see other people
70. Mom–how to determine what is significant now, and will be in future?

AFFECTS OF MUSEUMS
71. Museum peaks curiosity
72. How hard their life was
73. D-Learn of person’s life, back in the day
74. Mom – Frank Lloyd was nuts, Picasso, Van Gogh
75. Peculiar people, yet great inventors, yet could be not so nice
76. Never been to SI
77. D-wants to see Louvre
78. Have to be exposed to things
79. Make life more interesting
80. See how other cultures live
81. Mom-SI interest – furniture
82. D-doesn’t matter where, just go
83. Likes to absorb as much as possible
84. Mom – talk about future museum visits
85. Frank Lloyd Wright buildings
86. Personal “hero” – architecture
87. Fallingwater is favorite – 6 times
88. Sheer genius in building
Notes on INV 10.16.99 AP-25

This interview is with a 6-year old boy who grew up in the SEEC program at the Smithsonian. Since I know him personally he was very relaxed and willing to talk at length about what he thinks and feels about invention and museums. He was very serious about the interview and although he was conscious of the tape recorder (and pleased to be doing an "official" interview), he was very frank. His mother was not present until near the end of the interview, and he was thinking very hard (most of the time he was looking off to the right). He lives in Arlington.

39:23 minutes

PERSONAL INVENTION
1. He invents food and crazy pictures
2. Makes tarts of fruit and dough
3. Wanted to make dessert for family
4. Wanted to make something but didn’t know how
5. So just thought something up
6. Put it in the microwave but didn’t work
7. Didn’t have the right ingredients
8. Dad helped fix it
9. Draws lines that never end
10. Crazy pictures – squiggly, wiggly
11. Put name on so people know it’s his
12. Important so they know history of picture
13. There is lots of history – is important
14. Wouldn’t know what people did long time ago

PROCESS OF INVENTION
15. Need to know how people avoided problems in past
16. Feels important and funny to be inventor
17. Don’t know what your gonna do
18. Then realize, “What was I thinking, I know what to do.”
19. The solution comes to you
20. Was hard to understand before
21. Surprises can be bad
22. Can help, but also mess things up

SIDES OF INVENTIONS – GOOD AND BAD
23. Make car, then be too big for road
24. Would block people from parking and road
25. Too high to see traffic lights, crash
26. Crayons are good invention
27. Don’t mess things up
28. Living is the best invention
29. God invented life
30. Money is not good invention, but not bad
31. Can help people
32. When don’t have things to trade, use money
33. Isn’t good...
34. Some people think money is most important – greedy
35. Everybody is inventor
36. Do things that are a little different
37. Teach people to be inventive, but don’t force them

MUSEUM PREFERENCES
38. Wants to be doctor or vet
39. Would help people
40. Favorite museum A and I
41. Museum has old facts, is old
42. Paint had poison in it
43. Exhibition on bento boxes
44. Interesting woodwork
45. NMAI wolf pup
46. Had play with Indian Dances
47. Likes reading and to touch stuff
48. Touched dried Dino poop
49. Likes dinosaurs – were cool

FUTURE
50. Likes nature – without, won’t have balance
51. Without animal, world is uneven
52. Tiger and deer story
53. Interested in facts in Museum
54. Gets mad when watching nature shows
55. Don’t want world to get unbalanced
56. Leads to losing animals, we’re last
57. God would have to create world again
58. Wouldn’t be same people and wouldn’t be happy
59. God might not remember everyone’s name
60. 2000 – will be 6 billion, million people
61. Makes connections to newer and old things
62. Likes signs that identify and read labels
63. See actual real thing, not plastic
64. And likes to touch them
65. Shouldn’t touch if not allowed
66. Get fingerprints, rub, scratch

EXHIBITION AND IDEAS, EXPERIENCES
67. Einstein
68. Typewriter, light bulb – inventions
69. Exhibition – sand art, silly pictures
70. Baltimore Discovery – liked finding things
71. Made musical instrument – fell apart
72. Failing feels frustrating
73. Couldn’t “see” what it did, would do
74. Instrument didn’t work
75. Because he didn’t know how to make notes
76. Failure is good, you learn from your mistakes
77. His mistake – bad cookies
78. Title – Amazing Inventions of History and of Modern
79. Telephone, light bulbs that do and don’t work
80. Typewriter, computer, chairs, glasses,
81. Toys – Legos, Wizbits
82. Robot with light bulb eyes and red nose
83. Cardboard ears, and talk and shake
84. And clean up room
85. Invention to save animals
86. Shrink dog, so can pick up again
87. Art activity in exhibition
88. Dragon out of cooking stuff, robots
89. Have wood and tools
90. Play dough, clay, markers and paper
91. Need to do plans for creation
92. Need to think ahead in invention
These two brothers, Adam (5) and Ryan (6) were interviewed in a section of the museum that dealt with electricity. Ryan identifies himself as an inventor, Adam is not. Their mother helps with the conversation.

17:42 minutes

**DESCRIBES INVENTIONS, TOOLS**
1. young boy (A, age 5) and mother aren’t inventors
2. says his brother is an inventor (R, age 6) – cars
3. builds cars big enough to get in
4. his brother wants him to find things for him
5. draws pictures to invent things
6. likes mechanical interactives
7. brother (R) – uses a lot of tools to invent
8. invented a “go-go-gadget” mobile
9. after watching a movie
10. used wood and metal to create something new
11. enjoys young brother helping him invent
12. types outlines and directions on computer
13. backpack invention – cardboard, tinfoil, flag
14. inventions are good and bad
15. wants to make a bowl with clay
16. mom – gives them things to work with – water, glue
17. see what they come up with
18. (R) remembering his creation from “youth”
19. would want “Mr. Rich” (cub scout leader) to help him invent
20. gave him idea for paper propeller
21. mom – difference in age = difference in boys
22. also personality, R’s room is full of his inventions
23. he likes to see how things attach/work
24. R – made a camera, but didn’t work
25. Thinks of “another one” (invention)
26. Inventions are “pretty” and work well
27. Having stuff you need to make it is important
28. Gives invention away if don’t have right stuff to make what he wants
29. Sold invention to mom for 5 cents
Notes on INV 11.11.99 AP-27

This couple from Virginia with their seven-year-old son were interviewed near the end of the music exhibition. They came to Baltimore for "good science museum." I first saw the father by himself and started talking with him. The interview then switched to his wife. He is a software engineer who refused to call himself an inventor. She is a designer, and is very anxious about the pressure to get a cell phone.

18:42 minutes

IMAGE OF INVENTORS
1. Not an inventor in the classic sense of Edison
2. Market things, use science, what's best
3. More a craftsman, software programs
4. Writes programs, but not invention
5. Thinks of Invention in historic sense, people, things

DIFFERENCE IN HIS JOB
6. His job is more creative, more an art
7. He builds book cases also
8. Engineers Micro-codes for the machine
9. Come up with better way for image to display
10. Edison is in a different league than him

ELEMENTS OF INVENTION
11. To be an inventor you don't need recognition
12. Invention comes from experience,
13. How you use it, what you do to create
14. Bell didn't just invent phone, there were things before it
15. Education, training, experience
16. The creative mind puts it all together
17. New uses of old things

SELF CHARACTERISTICS
18. As a child, could "see things others would never see in a million years."
19. Was always imaginative
20. Son – invented house for beanie babies, Legos
21. Got idea for house from magazine
22. Makes things at cub scouts too
23. When only one person is doing it, don't need name
24. When there are others around, need to put name on
25. Edison is famous, light bulb
26. Takes thinking, creativity
27. Mom – designs hotel buildings
28. Architects are inventors, creative
29. Trial and error, "stick to it-ness," be
30. Be motivated open to trying new things

TEACHING INVENTION, PERSONALITY DIFFERENCES
31. There is more than one road
32. There is a seed in children
33. Teach them there is more than one way
34. There is no right or wrong
35. Art is anything you express
36. Some kids have set thoughts, memorize
37. Others are more open don’t want to be told
38. Narrow creativity by telling them one way
39. “Staying within the lines” is harmful to the creative mind
40. inventors were diagnosed as retarded
41. He was “Learning Disabled”
42. Teachers can stifle or encourage
43. “Computer” has many forms; good and bad
44. Scratch plow in Egypt made plenty of food
45. Others could go off and be creative
46. Have two different children, creative and fact minded
47. Let the second use computer to be creative
48. Can use tools to be creative

GOOD/BAD INVENTION
49. TV is great – get information
50. TV is bad – entertainment, mindless
51. Children’s minds go to mush, stifle creativity
52. Car is good - get there faster
53. Car is bad – smog, congestion
54. Balance invention
55. Kids watch educational TV, limit other
56. Video games on the computer – question value
57. “build” race tracks – is creative

TECHNOLOGICAL STRESS
58. invention is manageable in family and if balanced
59. Don’t have control out of the house
60. Creating stress cause we expect more of ourselves
61. Cellular phone – can’t be away from the phone at all
62. Mom – don’t see need for phone
63. Where she is because that’s where she wants to be
64. Won’t answer phone when she’s teaching, away from desk
65. Now she’s putting others out cause she doesn’t have a phone
66. Is not there to answer phone, doesn’t want to talk
67. “How inventions have screwed up our lives” –dad’s title
Notes on AP-28 11.11.99

This interview was lost due to interviewer error (I forgot to turn over the tape!). The interviewee is a school teacher and musician (30s), and the interview was quite long. I first spotted him wandering alone up the staircase and interviewed him in the math exhibition. I soon realized that he was in the museum with his school class as kids came up to him periodically throughout the interview.

He is very environmentally conscious. He feels that invention is not so good because of how inventions are used. For example, he would choose electricity as the most significant invention, but points out that it makes air conditioning possible. As a result of air conditioning, people lose their connection to the outdoors. More and more inventions make us more and more stressed and we take less and less time, as a result, to "smell the roses." For example, he recently decided not to get a garbage disposal – not because of the cost but because it meant more wiring, possible breakdown, possible damage to silverware that he might drop into it, and garbage would no longer be available for his garden compost. So he said no.

He grew up inventive and creative – a budding engineer. But his mother’s friends were professional musicians and his grandmother was a musician and that was the direction he took. His father was a butcher and he grew up on a farm in Oklahoma. He became allergic to the additives in meat and now he’s a vegetarian.

He works to instill inventiveness in his students and all of them end up being able to do it – some immediately and some more slowly. He also tries to work in other subjects in his music classes, so they talk about history, etc., and he manages to share his views on history and the environment.

When counseling kids individually – if one is especially inventive he would encourage him to think about the consequences of his idea, e.g., how will it be used.

We intercepted one of his ten-year-old charges and asked what needs to be invented, and he said "a food machine – so that homeless people could eat." The school is in a poor district in southeast Maryland.
Notes on INV 11.11.99 AP-29

This man in his 40’s was spotted standing alone, leaning against the railing outside the math show and looking outside the glass wall at the harbor. He seemed to have no interest in the museum. He is a well driller who was visiting with his wife and children. Eventually, despite his efforts to continue the interview, they pulled him away. He feels that technology is a big problem and that medical invention in particular, are good.

10:42 minutes

ELEMENTS OF INVENTION
1. Tries to make improvements in job
2. Always looking for easier way
3. As a child, taking things apart
4. Problem was getting them back together

AFFECT OF INVENTION AND TECHNOLOGY - FUTURE OF
5. New inventions, space working is good
6. Can only go so far with global communication
7. Going to be a stopping point
8. Will then have to just be better people to each other
9. U.S. economy will reach a limit – can’t survive on exports
10. Takes a lot of money to finance invention
11. Space program-federal money-
12. public doesn’t realize value
13. cellular phones are beginning of space movement
14. We are losing our “roots”
15. Are losing their personalities
16. The more difficult the technology gets…
17. The less human we are
18. Satellite TV – kids watch TV, lose touch
19. While parents are out trying to afford the satellite

GOOD AND BAD INVENTION – TECHNOLOGICAL STRESS - MORALS
20. People are worrying about their health (and technology)
21. Are watching their parents grow old
22. Genetics and body part development
23. Genetics is more an invention of a technique
24. These are positive advances
25. Advance of medical tech. – meant to live a little longer
26. Just isn’t enough time in life span for humans
27. Generation needs a place to go
28. People think, “computers are taking over.”
29. College educated people are out of jobs
30. Tell kids to go to college?
31. But life is better today
32. Things are determined by profit
33. Let’s just hope benefit to humanity and profit go together
34. Goal behind medicine is to save lives, not profit
Notes on INV 11.11.99 AP-30

Enjoys art and science museums. This woman (30’s), a young mother and her daughters (8 and 3), was interviewed in the space link room at the Maryland Science Center where she was standing patiently while her young daughter surfed the internet. They are from New Jersey.

18:23 minutes

IMAGE OF INVENTION
1. Don’t know inventors
2. Would have to invent “something”
3. Something useful
4. New product, helpful
5. Like a nanny robot

IMAGE OF INVENTORS
6. People are born inventors
7. Those good with their hands
8. But given the right setting can teach
9. Start in school, make kids think in different ways
10. Trying to figure out way to teach daughter math
11. Without light bulb couldn’t have anything in Museum
12. Thinks of Edison and Bell, from school
13. All inventions are good, but can’t figure out computer

PROCESS OF INVENTION – ART AS INVENTION
14. Process – idea, how can it work, make it work
15. Try this, doesn’t work, try that
16. Ideas come, making it work is hard
17. Art and invention are equal
18. Come up with idea, different medium
19. All is getting idea into reality

MUSEUM PREFERENCES - GENDER
20. Enjoys art museums
21. Daughter likes science museums and art
22. D (8) – likes to draw people
23. Puts name on cause sister draws too
24. Enjoys computers in museum
25. Get to be artistic
26. The Bed is good invention
27. Mechanically oriented vs. nature oriented
28. Difference between girls and boys
29. Point out boys working with equipment
30. D - Likes puzzles
31. Would like a talking dog
Notes on INV 11.11.99 AP-31

This woman (about 40) is a teacher and her father was an inventor-type. I intercepted her as she was wandering near the end of the music exhibition trying to locate her son. She has two children, ages 12 (boy) and 16 (girl).

17:00 minutes

IMAGE OF INVENTORS
1. Father was inventor-minded
2. Coming up with ways to solve problem
3. Worked for lab, designs for experimentation
4. Sister and she didn’t get the “bug”
5. Father is carpenter by trade
6. Is a thinker/reader
7. Some things make it easier, less thinking

AFFECT OF TECHNOLOGY ON TEACHING INVENTION/CREATIVITY
8. Teaches third grade
9. Kids used to be deeper thinkers
10. Kids didn’t have instant answer from computer
11. Now computer gives answers
12. Quicker and motor skills are better
13. Kids with parents that encourage are deeper thinkers
14. Unless kids take own interest, don’t have thinking skills
15. Parent came it to demonstrate science, encourage reasoning
16. “Invent America” – kids keep log of invention
17. Log of how and why they are doing it
18. Can teach to be thinkers
19. Break down the process
20. What are you doing?, why?, what are you using?
21. A lot of inventions were stumbled upon
22. And inventors think how it can be used
23. Someone who is curious and realize other use

INVENTION IN YOUNG CHILDREN
24. Kids did it a lot – had original plan but realize new use
25. Some were enthusiastic, others just did assignment
26. Have something to make cooking easier

TECHNOLOGY AND THE FAMILY
27. Microwave made things quicker, lost without
28. When working full time, allows more time with kids
29. Separation in family is true
30. Taken away family games – video, computer
31. Have to make time – take active role
32. Dad was always like this
33. Never worried if something broke
34. Dad could fix it, make it even better
35. Dad is German – very quiet
MUSEUM VISITATION/VISITOR TYPE
36. Remembers childhood trips well
37. Took children to museums
38. Put questions in their mind as you go
39. Give them sense of history and geography
40. Son is cognitive type, Mom is object type
41. He is factual thinker, versus deep