May 26, 1982

Dear Alan:

Following are several lists of questions, broken down into rather loose fitting categories. The lists are not intended to be either definitive or exhaustive. They are just to get us started. As you will see, I've aimed for breadth rather than depth. Even so, I've certainly not gone as wide as we need to. Given that this is potentially one of the most ambitious (and exciting) intellectual undertakings of all time, I've undoubtedly neglected large areas of concern. Besides the ones I've missed there are many more which will show themselves as the work unfolds.

During these early stages we are going to have to operate on at least two levels - deciding what we want and deciding what to propose to EB. In general the second should be generated from the first - although the first is obviously an ongoing task which will extend well beyond the initial proposal we make to EB.

Nature of Product - Long Range

A. Content (purpose, point of view, audience etc. as opposed to form which has largely to do with technology, recognizing that in many areas the boundaries overlap)

1. Analysis of existing encyclopedias
   - how are they used, by whom and how successfully; by what criterion should we judge this?
   - what are the good and bad features of each of several major encyclopedias as seen by various types of users, librarians, teachers, etc. - implications for us?
   - understanding of any of the above won't necessarily provide any direct answers in terms of what we want to do, but it seems reasonable that one part of understanding what an electronic encyclopedia could be all about is to understand print encyclopedias as well as possible. Clearly we are not trying to recreate these in an electronic form, but we don't want to ignore any key functions they perform, nor do we want to miss the opportunity of identifying + solving ~~to solve~~ certain problems that these encyclopedias have not been able to solve in their current form (eg. a suitable mechanism for indicating the numerous interconnections between different subjects or finding a way to function as a medium for both fact reference and learning, without giving short shrift to either).

Nature of Product - Long Range

Content cont.

2. Audience - who are we aiming at primarily?
   - children? adults? what educational level?
   - if both children and adults, does that mean there is a subset of the whole specifically for children and a subset for adults (eg. one product which comprises both "Atari-EB" and "Junior Atari-EB") such that the user can consciously choose which mode they want?
   - how do needs and requirements differ between children and adults and between adults (and children) with different experiences and education? how to deal with these differences? [cultural and sex differences?]

3. Purpose of an electronic encyclopedia
   - mainly for learning or mainly for reference? can one product answer both needs?
     - what are the different reference functions an electronic encyclopedia could serve? fact reference, research, etc.?
     - what are the various types of learning that might be considered? eg. learning 'about' a subject, which is rather casual, as opposed to learning something well enough to be able to use that knowledge and apply it elsewhere.
     - textbooks are usually very sharply aimed at a given age/experience group and very explicit assumptions are made about the goals of a

Nature of Product - Long Range

Content cont.

given course. How does this differ from an encyclopedia which attracts a relatively diverse bunch of people with different abilities and goals? Can we develop a sufficiently flexible or soft "curriculum" which can tailor itself to diverse needs and prior experience levels?

- to what extent can an electronic encyclopedia be "intelligent"? encyclopedia as active guide, helping user find his way through the domain, making connections and inferences based on user's input? encyclopedia as tutor? diagnosing problems user may have with particular subject matter and prescribing remedies or next steps? other aspects of "intelligence"?

- synthesis
  - with the partial exception of EB3, English language encyclopedias have ignored the task of synthesizing knowlege to any appreciable extent; they tend to be more dictionaries of info and knowledge. why is synthesis important? what are the key elements in tackling such a task?
  - conversely, how far can we go in atomizing the content so as to maximize flexibility without losing basic coherency? are there articles in an electronic encyclopedia on given subjects or is each 'article' constructed on an ad hoc basis from smaller parts for each user on the basis of his description of his needs?

Nature of Product - Long Range

Content cont.

- could the degree of synthesis be variable, according to user needs?

4. Basic Description of the scope of an electronic encyclopedia; how far beyond current conception of what an encyclopedia is supposed to be are we going to go? encyclopedia as basic library?

- components are 1.
  2.
  3.
  . dictionary, thesaurus, atlas
  n:

- extent of 'database' and relationship to other databases
  - how much detail in electronic encyclopedia?
    - assuming that the electronic encyclopedia is basically an entry way (or first level) into the entire domain of knowledge, how to define this first level and the inevitable sub-levels?
    - how to handle current events? not only daily news but events which are sufficiently recent (from a month to a year) and sufficiently complex such that there has not been enough time to properly summarize them and integrate them into the encyclopedia itself? what is the difference between the way subjects are treated in news media as opposed to encyclopedias? what happens to these distinctions when the capability of an electronic encyclopedia exists?
    - should the encyclopedia provide a gateway to deeper levels of detail- bibliographies, full text of periodicals and books, other databases (NYT Information Bank, Dialog etc.)? what sort of gateway?

Nature of Product - Long Range

Content cont.

5. How do people go about getting information and knowledge?
   - is it possible to classify the various directions people come from - ie. the types of questions and the pattern of inquiry?
   - how do people follow search trails; distinction between goal-oriented searching and browsing? how to accomodate both approaches in same system?

6. How to represent the structure of knowledge so that knowldege of the structure becomes an important component of the encyclopedia itself?
   - how to include the concept that knowledge is not static but "in process"?
   - value of the "travel" metaphor; advantages and disadvantages
   - how to provide for both overview and detail relative to any given subject? ie. how to provide user with both microscope or telescope at any given time?

7. Problems in learning theory and instructional design
   - "what if" learning; how it is motivated and encouraged? the role of simulations?
   - socratic method and discovery learning; what is its value? how is it implemented via computer?
   - interactivity - let's define this buzzword; people seem to use the same word to mean different things? what is the range of meanings?
   - media selection; guidelines for what works best in which cases, for whom? when to use still pictures, text, full motion video, animation or real-life? do we need photographs and motion pictures? hi fidelity SOUND?

Nature of Product - Long Range

content cont.

8. What do we mean when we say that using an electronic encyclopedia should be "entertaining and fun"? why is this necessary? what are the different fantasies that people associate with learning, information retrieval etc? how to accomodate these and in so doing make the encyclopedia a more effective (and popular) tool?

9. World outlook, point of view?

   - it is inevitable that an encyclopedia reflect a basic philosophy (for example, how you deal with evolution with regards to crap like creationism will certainly reflect a philosophical outlook). with a project as massive and complex as an encyclopedia how do you determine this philosophy and make it explicit so that it can help guide the work and make the whole a coherent piece? who should be called on to help set the standards?

10. Do we want user-user communication on system so that for example, six people studying the same question could "work together", sharing notes, insights etc.?

Nature of Product - Long Range

B. Technology (Basic technological decisions. In general these questions should be answered in the context of the answers given to the content issues raised above. Also, it probably makes sense to come up with two sets of answers to a lot of these questions - both an ideal solution and also a range of possibilities off of the ideal taking into account various realities like costs, market factors, timing etc.

1. Delivery

- Are there any viable alternatives to having the heart of the system on-line? what are the advantages and disadvantages of at least a partially on-line system? some issues to examine - flexibility, size of database, updating, sophistication of operating system, level of 'intelligence,' access to other databases?
  - what are the basic configurations that should be considered? eg. on-line + videodisc in the home; all on-line; etc.?
- Assuming at least a partially on-line system what is the method of on-line delivery?
  - how much bandwidth do we need?
    - are we sending analog and digital data or just digital
    - broadband, baseband, narrowband
    - role of video and audio compression
    - cable vs. phone? present and future characteristics of both? technologoical, economic, legal(regulatory)

Nature of Product - Long Range

Technology cont.

market etc.? potential role of optical fiber?

2. Hardware (recognizing arbitrary distinction between hardware and software). Given what we want electronic encyclopedia to be, what are the various hardware configurations that would give us what we want?

- what are the various components which would make up the hardware end of the system? which are the key elements? which need to be developed first? how much of the developmental work would be done by Atari?
  - what kind of a processor in the home? (again this might include both a sense of the ideal and the ideal as it is tempered by reality. how much power do you need in the home processor to do what we want to do?
  - what kind of display? importance of high resolution display? potential impact of high definition TV? possibility of working with Pioneer or Sony in this area?
  - pointing devices, speech, sound and music?
  - basic decision - will access to the system be limited to very specific hardware configurations or to a broad range of configurations with ~~some~~ ~~set~~ minimum standards?

Nature of Product - Long Range

Technology cont.

3. Beyond text - (assuming an important role for full motion video)
   - videodisc; capabilities of different formats? are there viable alternatives to videodisc?
     - difficulties inherent in placing videodisc at user's end and integrating material on disc into encyclopedia via on-line software instructions?
     - possibility of using videodisc at head end to supply still frames to user on-line via frame grabber (a la "NewsPeek")? possibility of using videodisc at head-end to distribute motion pictures?
     - development of still-frame-with-audio videodisc capability?
     - transitional nature of videodisc: what replaces it? when? what is necessary at user's end to receive full motion digital video? when, at what cost ?

4. Integration of electronic encyclopedia with other computing applications, particularly word processing?

5. Question of personalizing database; ie. entering your own notes (in "margin") and saving for later either in system itself or at user's end? can system maintain record of user's last search?

6. What kind of a programming language or languages do we need to implement this system? do we adapt an existing language or develop something new?

7. Of all the things we say we want to do in the 'content' section, what are the most difficult from a computer science point of view? when is it likely that solutions

Nature of Product - Long Range

Technology cont.

will be found? where should we be looking for the solutions? are certain questions key such that coming up with a solution is a sine qua non or such that finding solutions to them will greatly facilitate finding answers to other questions?

8. Nature of the interface?
   - how to make interface function effectively with people coming to system with diverse cognitive styles and approaches to information seeking and learning?
   - how to facilitate browsing throughout the domain?
   - nature of query language? how close to natural can it be, need it be?
   - physical attributes? role of keyboard? importance of quality of display? touch screen? mice? joysticks? voice, music, etc.
   - a metaphor to represent the system to the user? cartoon character? other?

9. User Communication and Feedback?
   - how to provide for user feedback to system? types of feedback wanted? user ideas on how to improve operation of system? user ideas on how to improve content?
   - how to provide user to user communication (if we want it)?

10. Time - how long before everything comes together - technology, market, development of actual content? Are we talking about 10 years, 15 years, more? How long just to assemble content? How long to develop technology?

11. Budget - how much will it all cost (develop technology, produce content, projections for maintenance costs, updating etc.)

Short Range, Medium Range ... Getting from Here to There

Past discussions have assumed that we would put out a short range product rather than wait the 10 years or more before the long range product is "ready." Is this viable? What sort of short range product or products? Whatever the answers to these questions, the principal factor in deciding on the short range product should be how it will contribute to the long range goal (as opposed to immediate market conditions, etc.)

1. Constitutional Strategy
   - It has been suggested that an on-line short range product could be designed so that any part of the system could be changed without affecting other parts, allowing for the evolution of the system from primitive short range to advanced long range without seriously disrupting service. How realistic is this?
   - how "good" does the short range product have to be to indicate (or at least not contradict) a sense of how exciting the long range product will be?
   - how soon could we put something on the market which is sophisticated enough to evolve into the long range product? If the time period is too long (how long is too long?) do we need to start thinking in terms of short range products which would stand alone (and not evolve directly into the long range product) and a medium range product (perhaps 3-5 years from now which would be sophisticated enough to base a constitutional strategy on?

Short Range, Medium Range ...

2. Reasons for short range product and associated questions
   - way to earn and learn at the same time; create minimal system which generates revenues and provides rich environment for learning much that needs to be learned in development of long range product. market considerations?
   - establish market position; is there something going on in the marketplace (eg. other electronic encyclopedia's) which would necessitate getting a particular type of product on the market by a certain time?
   - morale booster
   - material from short range product may be suitable for use as part of long range product - eg learning modules on specific subjects or footage from videodisc programs
   - are these reasons valid? are there others? implications for type of product?

3. What is the range of viable short (and medium) range products

   1.
   2. what would each contribute?
   3.
   etc.

4. (assuming partnership with EB) - how suitable are existing EB products (particularly EB3 and Compton's) for adaptation to on-line system or some other electronic form? What criteria do we judge this on? (This is not a technical question, rather an attempt to get a feel for what the products would "look like" if we just adapted what's available from EB

Short Range, Medium Range ...

5. If the short range product is at least in part an on-line system, how to handle illustrations? all computer? printed matter? feasability of frame grabber at user's end to grab still pictures from videodisc at head end?

6. Would we need to conduct tests of an on-line system before we put it on the market, even if it is seen as a short range product?
   - what would we need to learn from test?
   - what content and technology would we use?
   - where would test be conducted?(participation of WASEC?)

Market / What Business Are We In? Who Are We In It With?
(assuming some form of on-line service)

1. Publishing (two aspects - creation of product and distribution - various possibilities)
   - does the product we are selling have both hardware and software components?
     - database which can be accessed by any terminal
     - database which can be accessed only by Atari HW
     - database which can be accessed by any terminal, but not with full bells and whistles (eg. not with full graphics, sound, display quality etc.); full bells and whistles come only with Atari HW
     - what are the tradeoffs here in terms of market size and the quality of the product?
   - who distributes?
     - Atari-EB direct to user
     - Atari-EB to WASEC(?) to user or WASEC to cable companies to user
     - Atari-EB to all distributors of electronic databases capable of distributing the system
     - market and technological implications of above?
2. How broad is the market?
   - besides homes, schools and libraries is there a market for the type of service we are considering to business? (what level of business?) which aspects of the service in particular might be applicable? implications for content and technology?
   - international considerations; is there a market for this outside the US - implications for content and technology? Tie-ins to Paris World Center project and research ?

Market/ What Business Are We In ...

3. Relationship of electronic encyclopedia to other products, services, etc. planned by Atari, WCI, and WASEC? long or short range? Implications for content and technology?
   - can parts of the electronic encyclopedia be packaged and sold separately? conversely can materials developed by WCI or WASEC operations be used in electronic encyclopedia?

4. Revenues
   - are people going to pay per use, by subscription, combination of the two? pros and cons?
   - how do people pay for information, non-electronic and electronic?

5. Relationship to whole field of teletext and videotex?
   - very complex field; given tremendous range of predictions and assortment of plans somebody out there must be wrong. is anyone on right track?
   - range of existing and proposed services; rationale behind various planned offerings and how the electronic encyclopedia might relate to them?
   - how have consumers reacted to initial offerings?
     - Prestel, Source, Compuserve? how do people use these services? what do they like, dislike? growth rates?
     - same questions for Dialog, Nexis/Lexis?
   - which among existing and proposed services are likely to succeed? which won't and why? how do these services relate potentially to electronic encyclopedia? implications for content and technology?

Market / What Business Are We In? Who Are We In It With?

Partners

- assuming EB is interested, are there other partners that might be considered:
  - Lucasfilm?
  - WASEC?
  - a partner or partners who held one or more of the following attributes:
    - technical expertise
    - $$$$$$$$
    - intellectual breadth
    - daily and current news
    -
    -
- given the potential for international distribution, do we want international partners from the beginning? which ones? on what basis? is the service to be delivered "as is" to other countries or reconfigured and "personalized" (actually "nationalized") - eg. a Canadian edition etc.?

Alternatives to EB

- supposing EB decides not to participate, who would other suitable partners be? how to make up for EB name, especially in terms of giving project immediate and recognizeable intellectual weight in order to secure broad participation from scientific and scholarly community?
- are there other suitable encyclopedias?
- what about an Atari-Harvard Encyclopedia or an Atari-Smithsonian encyclopedia?

Market / What Business Are We In? Who Are We In It With?

Alternatives to EB cont.

- having raised the question of what we would do if EB decided not to participate, perhaps we should ask ourselves real clearly right now if EB is our first choice among all possibilities? what do they bring that no one else could? what else do they bring to the project? what are the disadvantages of working with EB?

Particular questions to be addressed in Proposal to EB should we get to that point

- relation to ongoing EB products and business? what kind of safeguards do they want? can we provide them?
    - relation to future EB products (ie. besides the electronic encyclopedia?
- role of EB sales force in new venture, if any?
- nature of EB's contribution to project - besides the original database? are they going to contribute any personnel? what else?
- structure of the new venture?
    - joint venture?
    - $ formula? who puts up what, gets what on what schedule?
    - board of directors, how many from where?

How to Organize Work of Creating the Electronic Encyclopedia

1. Divide work up into basic areas
    1. development of content
    2. development of software that runs system
    3. development of hardware that system runs on - at user's end and at head end
    4. development of marketing capability

    are these categories correct? decide how the parts interrelate? what needs to be done in what order?

2. Staffing requirements
    - what are the attributes of an electronic encyclopedist?
    - what categories of people are needed? in what numbers? where do we get them from? start compiling lists of potential people

3. Geographical considerations
    - given tasks at hand, where should project be located? what city or cities? how centralized or decentralized?

4. given complexity and diversity of task, how to maximize intellectual energy and input at least cost? possibility of locating project on university campus ("Atari-EB Institute for .....)? what would be the advantages and disadvantages of this? likely universities?

5. how to design formative research into project right from the beginning?

Getting Started

At this point we need a relatively small group of people who can consider the project as a whole, perhaps dividing up areas of investigation, but bringing it back to the group in a consistent way for analysis and synthesis.

- who should be in such a group?
- what stage should it bring us to, by when?

- other projects to look at, experimental and commercial?
- journals to review?
- conferences to go to?

Miscellaneous questions?

- what other projects are going on at Atari that might relate to this work? Is there an Atari-Qube expt.
- how to avail ourselves of the experience and research accumulated by WASEC
- ten outrageous and radical ideas:

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.