Cambridge Laboratory Experimentation Review Board, meetings
August - October 1976

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ReDNA

CITY OF CAMBRIDGE
DEPARTMENT OF HEALTH, HOSPITAL AND WELFARE
1493 CAMBRIDGE STREET CAMBRIDGE, MASSACHUSETTS 02139
Telephone 354-2020

August 26, 1976

MINUTES OF CAMBRIDGE EXPERIMENTATION REVIEW BOARD

The first meeting of The Cambridge Experimentation Review Board was convened at 5:00 p.m. in the Board Room at The Cambridge Hospital by Dr. Comunale, Chairperson. Others present: Mr. Hayes, Dr. Krimsky, Dr. Brusch, Mrs. Nicoloro and Mrs. Hughes.

A second packet of material was distributed.

Reference was made to the letter the City Manager wrote to the City Council outlining the tasks of the Board. It was the opinion of some that the tone of the letter implied a fait accompli re: the building of the labs in Cambridge. It was decided that the City Manager be asked to attend a future meeting. It is the understanding of the Board that its purpose is to advise the City Manager through the Chairperson.

Attention was then focused on the tasks as seen by members of the Board and the following issues were raised.

1. In the event the labs are constructed, can true safeguards be constituted?

2. Can we be sure there is no risk beyond reasonable doubt at the lowest level?

3. What are the infective properties of recombinant DNA if organisms escape?

All agreed that the NIH guidelines are vague, not specific, and do little to settle conflict among disagreeing scientists.

Other questions generated:

1. Is it possible to use another vector than E coli?
2. Should P3 experimentations be conducted under P4 conditions?
3. Does recombinant DNA take place in our environment naturally?
4. What is the validity of risk? (Should we invite experts on risk?)
5. If emperical data is not available, how can we obtain probability of risk?
6. Will the same guidelines be applicable to industry?

Discussion followed regarding open or closed meetings with the public. At this time it was decided to keep the meetings closed. Efforts will be made to invite proponents and opponents to our meetings for the purpose of educating the Board members. The members will not get involved with the media but will refer them to the Chairperson.

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MINUTES
cont'd

The advisability of obtaining an extension to the 90 day moratorium (October 6) was agreed upon. Plans were set up to meet twice weekly on Tuesdays and Thursdays, with the possibility of a third meeting on Saturday mornings, if necessary.

The next meeting will be September 2nd at 4:30 at The Cambridge Hospital. Dr. Comunale will invite the Chairmen of the Biohazard Committee of Harvard and MIT.

C. Hughes

TO: The Cambridge Experimentation Review Board

FROM: Sheldon Krimsky

DATE: September 2, 1976

SUBJECT:

I wish to share with the members of the Board some thoughts I have about the Board's direction and objectives in the limited time period at its disposal.

It seems senseless to proceed without a clear direction and more concrete objectives related to what the Board is looking for in terms of input or without any sense of protocol on how consensus is reached. The question of paramount importance is how the Board views itself, which, of course, should be related to what charges were given to it by the City Manager. I see the Board as citizen-jury comprising a cross-section of the Cambridge community. Its function is to hear testamony and read arguments from people who, by virtue of their training or position, have a special expertise in some area related to the Recombinant DNA controversy. This may include biologists, experts in the field of the measurement and assignment of risks, lab technicians, communicable disease experts, geneticists and even those who have a special understanding of the social context in which science is carried on. I don't believe it should be the function of the Board to review "hard" or "soft" scientific data. The Board should rather be looking at the data as interpreted by experts. In this manner the Board as citizen-jury should be assessing the controversy within the scientific community on the issue in question. The function of this review should be, therefore, to try to understand where the locus of disagreement lies, whether on an issue of scientific merit or on a value laden issue, such as in the balance of the known risks with the potentional contributions such research could offer.

Once the metaphor of a citizen-jury is accepted for this Advisory Board then it becomes comprehensible to have lay people (to one degree or another) serve as jurors over an issue of a highly technical nature. To draw upon the legal analogy, I suggest we focus on the term "reasonable doubt." In a court of law, a person is innocent if there is reasonable doubt in the minds of the jurors that the evidence against the person is credible. After relevant testamony and review of the arguments the Experimentation Review Board should decide whether in its collective mind there is any reasonable doubt that the health and safety of the citizens of Cambridge is being compromised by the proposed Recombinant DNA research under the NIH guidelines. Because the controversy is of such a serious nature, the justification lies on the shoulders of those who propose the research. The Board should be looking at the risks as they are interpreted by professionals and should arrive at some conclusion about the assessments.

In particular, before the Board moves mindlessly into a morass of testamony and "hard sell" I recommend the following:

1. The Board establish a protocol which includes how decisions are made, whether meetings be open to the public or to the media, whether Board members should communicate to the media, the taping of sessions and what is to become of the tapes.

2. The Board establish a plan of operation including what it intends to examin, choice of representatives of the opposing positions, a time table, the need for technical and legal advisors.

I also recommend that the Board's purview include:

(i) an assessment of whether present NIH guidelines for Recombinant DNA research carry any risk to the workers in those facilities and the residents in Cambridge.
(ii) if such risk exists in the minds of the Board members such risks can be mitigated by the additional regulations superimposed on to the NIH guidelines by the universities proposing the research.
(iii) modifications or recommendations of the NIH guidelines as it applies to such research in Cambridge.
(iv) recommendations to appropriate state and federal congressional leaders requesting state or national initiative in setting up guidelines for monitoring or restricting such research.
(v) an assessment of the EIS statement to be issued on Recombinant DNA research by the NIH.

Respectfully,

Sheldon Krimsky
Member, Cambridge Experimentation Review Board

MINUTES - CAMBRIDGE EXPERIMENTAL REVIEW BOARD

Tuesday September 14, 1976

Members present: D. Hayes, S. Krimsky, C. Wheeler, C. Hughes, W. LeMessurier, Sister L. Banach and Dr. Comunale

The Board members were informed that Dan Hayes is now the Chairman of the Board because of the ambiguity of Dr. Comunale being the Chairman, and also the one to whom the Board should advise.

DECISION: A letter should be sent from Dr. Comunale as the Commissioner of Health and Hospitals of Cambridge to Robert Sinsheimer, Director of Biology of California Institute of Technology asking him if he still feels that what he stated in his letter of February 5, 1976 is still relevant. His letter is being referred to by the opponents of recombinant DNA genetic research, and it would be helpful if we knew whether or not he still has the same views now as then.

DECISION: Open Meetings - A press release will go out stating that the Thursday meetings would be public and anyone interested in contributing to this issue should contact Daniel Hayes, Jr.

DECISION: All statements to the press should not come ONLY from the Chairman of the Board, but instead, each member could make comments to the press, using sensible individual discretion.

DECISION: Dr. Comunale should ask MIT and Harvard to extend the moratorium for three more months because the Board feels the October 6 deadline doesn't give them enough time to make a fair decision.

DECISION: When a major issue has to be voted on, it should have the vote of ALL the members, even if it means postponing the vote until all members had been polled and their view on the issue heard.

The members of the Board were informed that Dr. John Beckwith will be at Thursday's meeting (Sept. 16) at 5:00 p.m.

There being no further business, the meeting adjourned at 7:00 p.m.

MEMORANDUM

TO: CAMBRIDGE EXPERIMENTATION REVIEW BOARD

FROM: SHELDON KRIMSKY, BOARD MEMBER

DATE: SEPTEMBER 16, 1976

In line with my previous recommendation that the Board cluster its invited speakers around specific areas related to the recombinant DNA controversy I am submitting a draft statement on what I perceive to be the typology of conflicts related to P-3 level experimentation. There are some areas the Board may deem out of its purview for investigation. My aim in this statement is to offer a complete list of the key controversial areas and allow the Board to make the selection from among these on the basis of the charges given the Board by the City Manager. Each section can be broken down further into subcategories as the areas of controversy become more specific.

Typology of Conflicts: Recombinant DNA Experimentation (P3)

1.0 Philosophical & Ethical Issues

Whether experiements of this type should be done in Cambridge or elsewhere; whether they represent an unethical intervention into natural evolutionary processes and a disruption of natural biological barriers, whether humankind has reached a level of responsibility and has attained a moral sense to insure that research into genetic engineering could not be used to promote baneful social policies or transgress certain fundamental human rights.

2.0 Process of Establishing the NIH Guidelines

On whether the process undertaken to establish the NIH guidelines (released June 23, 1976) was fair and adequate; on whether the representation of the NIH Recombinant DNA Molecule Program Advisory Committee was sufficiently diverse, sufficiently bereft of vested interests.

3.0 Containment for P-3 Experiments

3.1 Physical Containment

Whether the NIH guidelines for physical containment are adequate for all classes of research to be carried out in P1 -P3 facilities; on whether the discretionary powers of the Biohazards Committees on refining or reviewing the physical containment guidelines are too narrow or too broad.

3.2 Biological Containment

Whether the host organism or class of organisms (the receptor of the transplanted genes) is safe to use under P-3 conditions.

Whether the class of vectors which will be providing DNA to the host are safe to use under P-3 conditions.

3.3 Classification System Established by Guidelines

Whether the classes of allowable experiments are in the correct "containment space", i.e. the physical and biological barriers are adequate.

Whether some experiments which are permitted under NIH guidelines should be prohibited under all levels of containment.

4.0 Review of Proposed Research

Whether the Biohazards Committee of the University hosting the research both in composition and in process is adequate.

5.0 Research in Practice

Whether the research protocol as carried out is likely to deviate significantly from standards set by NIH or University Biohazards Committees.

Whether there are sufficient safeguards to insure the competency of the personnel carrying out the research, i.e. lab technicians, graduate students, etc., and whether there are sufficient safeguards to preclude human error and carlessness.

6.0 Monitoring Standards

Whether provisions for monitoring the actual research practices are adequate.

7.0 Emergency Follow-Up Plan

Whether there are adequate measures for dealing with emergencies.

8.0 Experiments Carried on Outside the University or Not Covered by NIH Guidelines

Whether there are sufficient safeguards or legal provisions to insure that P-3 "basement experiments" are not carried out; that whether there is sufficient regulation of possible non-university recombinant DNA research.

MEMORANDUM

TO: Cambridge Experimentation Review Board

FROM: Sheldon Krimsky, Board Member

DATE: September 21, 1976

SUBJECT: Dr. Sherwood Gorbach's Testamony, September 9, 1976
Dr. Gorbach is Chief of Infectious Disease Service
New England Medical Center, 171 Harrison Avenue, Boston 02111

Dr. Gorbach spoke about the alleged dangers of using Ecoli K12 as a host organism for recombinant DNA experiments. The following is a summary of his remarks as interpreted from my notes:

There are no known infections carried by Ecoli K12 that we are aware of. EK 12 lacks a cell wall and is therefore a poor bacterium. Experiments which have tried to implant foreign DNA into EK 12 have succeeded in one sense but have still not enabled K12 to colonize. Other literature also supports the view the EK 12 in native state doesn't colonize in the human gut.

There have been attemps to produce a hybrid Ecoli K12. A wall is actually implanted from elements of dangerous virus material. The Ecoli K12 accepts the wall but still fails to colonize. It can't be dangerous unless it can colonize. There is something else missing from the inner parts of the Ecoli K12 which prevents colonization. In that sense the virus fails to be implanted. An attempt was made to implant typhoid baccillus on Ecoli K12; it gave it a cell wall; it looks like any other Ecoli with a formed wall but EK 12 won't colonize.

There are many other forms of Ecoli which will take to implanted viruses and will therefore colonize. There is a form of diarrhea caused by an Ecoli strain that is referred to as Traveller's Diarrhea. The Ecoli gives off a toxin. The toxin and the genetic material with which it is associated has been isolated. For a strain of Ecoli to be pathogenic it must be capable of making a toxin and must be able to colonize.

All experiments to date which have tried to get EK 12 to colonize in humans have been unsuccessful. Similar experiments have been tried on calves and pigs with similar outcomes.

EK 12 is a specially bred class of Ecoli that is enfeebled. Stanley Falcow isolated the genetic material that is responsible in the Ecoli that is diarrhea causing; that material has been transplanted into EK 12. Still the EK 12 did not become pathogenic. For Ecoli to be pathogenic it must have a cell wall; an ability to colonize; possess a special pathogenic factor. EK 2 is a variety of EK 12 that possesses further safeguards on colonization outside the laboratory.

EK 3 is another variety of EK 12 which hasn't been developed at this time, but if it is developed it would offer greater safeguards than EK 2. (EK 3 is cited in the NIH guidelines).

The NIH guidelines require EK 12 for all P-3 experiments. The only means by which Ecoli of any type could infect people would be if taken through the mouth. It must pass through the stomach and into the intestinal track. Stomach acids tend to kill off Ecoli. At least 10^6 (one million) are required for disease. Other kinds of Ecoli besides K-12 could release a virus to humans.

Dr. Gorbach expressed his views on the NIH guidelines presently in effect. The guidelines take a fairly conservative viewpoint. There are some weaknesses in areas that deal with monitoring, surveillance, follow-up on lab workers. There is also some debate on whether EK 2 adds safeguards on to EK 12 that it is alleged to.

(What about the buildup of the EK 12 with the new spliced gene. Can it build up in numbers to be hazardous). If the EK 12 doesn't colonize it will not be hazardous.

Safety procedures in labs are often poor, but in spite of that there has been surprisingly few cases of infected technicians. Secondary infections are almost unheard of.

(What about the transferability of the implanted DNA from EK 12 to other organisms. If we swallow the EK 12, can't it transfer that DNA to another type of Ecoli in my gut. Isn't it possible for that transfer to produce a pathogenic strain of Ecoli?)

Gorbach agrees transfer can occur. That's why P-3 experiments are restricted to those vectors which have no known pathogenicity to humans.

According to Gorbach, many of the tests done to try making EK 12 pathogenic were accomplished by overlapping large segments of chromosomes onto EK 12. Genes would then transfer to EK 12. There have also been experiments with greater specificity of transplantation.

(Since the results on the non-colonizability of EK 12 are to a large extent based upon these special non-specific transfers, is there a greater likelihood of risk from specific transfers?)

No, if anything, the non-specific cases should show the pathogenicity much more readily than the specific transplants.

TUFTS UNIVERSITY

MEMO

TO: Dr. Francis Conunali

FROM: Sheldon Krimsky

DATE: September 23, 1976

SUBJECT:

Dear Frank:

The article I have enclosed may be of interest to the other members of the Board and I have also enclosed an abstract of Dr. Gorbach's testamony from my notes.

[copy 2]

To; Cambridge Experimentation Review Board

From: Sheldon Krimsky

Subject: Planning for Recombinant DNA Debate

Date: October 18, 1976

The idea of CERB holding a debate on recombinant DNA is in my view a creative and worthwhile undertaking. It will draw attention to the care and responsibility in which the Board is attempting to arrive at a reasoned decision. It also fits in well with the concept of the Board as "citizen jury".

By this time we are all beginning to understand the importance of this Board as a model of public participation in science. For that reason and because of the value that such a debate can have in bringing into focus a controversy of such impact and breadth I believe we should embark on this debate with a fair degree of forethought and planning. Putting together a two hour debate on this issue in our usual meeting time is simply inadequate. A repeat of the Wald-Messelson debate would not make a significant contribution. That debate was of some value but within a narrow range of issues and personalities.

My first recommendation to the Board is that we devote one of our meetings (or more) toward planning this event. There are several well established planning strategies that can be used to insure that each Board member has a full opportunity to provide input, express the areas they feel should be covered in the debate, and offer suggestions for participants.

Secondly, I propose that we view the debate as a kind of courtroom experience. That is, the information and discussions should be primarily designed to help the Board carry out its deliberations.

Thirdly, I propose that we grant the Cambridge citizenry the opportunity to witness the debate. I think the public should be aware of the kind of evidence the Board is using to arrive at its decision.

This is an unusual opportunity and we should take the greatest advantage of it. Whatever CERB's final decision it will at least be respected for undertaking some imaginative efforts in grappling with the controversy.

A carefully planned debate will highlight the months of testamony and help each of us to make our final decision.

The citizen-jury metaphor while useful only has limited application. We have a much more difficult task than that of deciding whether or on which counts a defendent is guilty.

In the second half of this memorandum I shall make some specific recommendations for the structure of the debate which I hope will be reviewed with other suggestions during a planning session.

1. The debate should be a one day affair, possibly all day Saturday in late November or early December.
2. CERB should plan the agenda and the issues it wishes covered.
3. Consideration should be made to invite speakers from outside as well as inside the city and state, including representatives from NIH.
4. A neutral party should serve as moderator -keeping the debate organized according to the pre-arranged schedule.

A cross examing committee made up of two proponents and two opponents will serve as surrogate questioners for the Board.

An example of what the day-long debate schedule might look like is as follows:

Morning Session:

10-11 General statements from opponents and proponents with cross examination
11-12 Topic A

12-12:30 Summation
Lunch 12:30-2:00

2-3 Topic B
3-4 Topic C
4-4:30 Summation by examining teams.

The Board can either ask questions directly or else pre-filter their questions to the cross examining committee.

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TO: Cambridge Experimental Review Board

SUBJECT: October 26, 1976 Meeting

An informal meeting was held with no speaker present in order that the Board might recap previous meetings and lay the ground-work for future speakers.

The possibility of sending one or two members of the Board to meet with Dr. Frederickson of the NIH was brought up for discussion. Some of the issues that might be raised at such a meeting include the following:

1. Whether sufficient time was actually allotted to speakers for the opposition in the drawing up of the guidelines. If not, as Jonathan King has charged, what is the rationalization for this.

2. What kind of participation will be involved in the drawing up of the second draft of the Environmental Impact Statement?

3. To what extent are the guidelines meant for work to be carried out in an urban setting?

4. What kind of input was received from industrial concerns and how can constraints be placed upon them.

5. How exactly was the recombinant DNA committee selected?

6. What kind of basis is used for the determination of the "purity" of segments of DNA to be used in experiments?

Decision as to whether such a meeting would be worthwhile will be put off until after the Board has heard from Dr. Goldstein, (Nov. 4) who is meeting with Dr. Frederickson this week.

Both Harvard and MIT have been asked to submit written documents stating why they feel the work should be done in a university setting.

The next issue discussed was that of the forthcoming "debates". It was decided that "cross examination by peers" would be a more accurate definition of the meeting.

1. Invited participants will be Drs. King, Goldstein, and Beckwith for the opposition and Drs. Baltimore and Ptashne for the defense.

2. The meeting will be open. If it is to be held on a Tuesday, this will be announced to the public at a Thursday meeting. The actual date will be either November 20 or 23 depending upon a poll of the Board members. As not all were present, the date will be given at the next meeting. The place will be either in the hospital auditorium or the old nurse's house.

3. Planning sessions for the "debate" will be conducted under a think-tank type format and will be held tentatively on Nov.9, 11, 16, 18 as no speakers have been lined up for those nights.

4. The "debate" will be scheduled at 4-5 hours in length with an approximate time (about 15 min) to be suggested for discussion of each issue.

Forthcoming speakers were announced. They are as follows:

October 28	Dr. Alberti, Dean of School of Sciences, MIT
November 2	Dean Hyatt of the Harvard School of Public health
November 4	Dr. Goldstein, Harvard Medical School

B. Franks

TO: Cambridge Experimentation Review Board

DATE October 28, 1976

SUBJECT: Statement of Dean Alberty,
School of Sciences, MIT

Dean Alberty, a chemist by training, is administratively responsible for the School of Sciences at MIT. This includes the Biology and Nutrition Departments. His testimony is given as an administrator, rather than from a scientific point of view. Following is a summary of his statement.

Recombinant DNA techniques are an important new tool for learning about how cells operate, how information in them is coded, how that information is exchanged and how characteristics are propagated. Some of the potential benefits include: correction of genetic defects, production of biological substances in bulk, and other applications relating to industry. MIT scientists have been pioneers in this field - both in the theory and in the laying down of ground rules for the carrying out of the theory. It must be stressed that the importance ofgoing on with this work lies in the fact that these experiments are the core of a new theory, not just of peripheral interest to it.

In carrying out recombinant work at the P1 and P2 levels, MIT workers have seen no untoward effects . MIT is very concerned with the safety of its workers and of the community and has stayed well within the NIH guidelines. There are a total of (7) safety committees at MIT. These groups represent the interests of all the people in all of the schools there. The NIH-required Biohazard Committee is one of these and is already very active. There is also a central safety committee which functions as a check on all the other committees, making certain that there are no gaps in policy and that no issue is passed over. On a higher level, all experimentation at MIT is subject to monitoring by government agencies such as OSHA.

Dean Alberty's feeling on the question of whether the proposed experiments might be better done elsewhere was that this is not necessary. Isolation of experiments might be proposed for hazardous P4 level work. He feels that overly strict operating procedure is already required for the DNA recombination experiments. Also, if this work were merely a peripheral offshoot of the subject area it could easily be

put elsewhere. However, as it is the core of biology at the present time and will be the work of many people, it must be carried on in a place that is accessible to the experimenters. They are also necessarily involved in other educational activities such as teaching and other functions which require them to be near campus. Further, supervision of the research worker is facilitated by having him in direct proximity to the university department. A remote facility would be far too expensive for comparable monitoring to be instaled.
If a group of scientists were to isolate themselves, they would also be away from any intellectual criticism or political control. At the university labs, people will be alert to any problem arising even more quickly than under isolated conditions, and if anyone is to get sick it would be the worker himself.

Committees and communities are alert to the hazards of all research that is going on, and it is realized that after some point nothing is completely risk free. Very careful monitoring systems are being set up. For example, blood samples will be taken periodically and stored just in case some kind of abnormality crops up that can then be tested for. If, by chance, any disturbing results are obtained, a crisis issue would be raised immediately with the university and with NIH. Controls would be tightened immediately. It is clear that the guidelines are subject to change at any time need should arise. So far, though, more care has been put into this project than any other - the only criticism might be as to the amount of involvement allowed the public.

Dean Alberty attempted to give an overview on how a proposal passes through departmental advisors to department head to special committee to watchdog committee to himself. He stressed that each and every propsal is review very carefully at some point.(He also pointed out that Maury Fox is no longer chairman of the Biohazards Committee, as he is on sabbatical)

When asked about the feasibilty of MIT and Harvard sharing a facility, Alberty replied that this would not significantly lower risks - in fact, less protection would be assured with people carrying things back and forth.

Some of the scenarios of disaster were reviewed, in particular that of the possibility of the host bacterium acquiring an antibiotic resistance gene as a result of an experiment, and possible safeguards were discussed.

RECOMMENDED: That intensive screening of host organism be carried out after the experiment to determine exact effects on the phenotype.

TO: Cambridge Experimental Review Board

DATE: October 29, 1976

SUBJECT: Telephone Conversation with Dr. E. Chargaff
Columbia University, New York

Dr. Chargaff, who in the early 1950's made a key discovery in the attempt to define the structure of DNA, has taken a stand in opposition to the proposed Recombinant DNA experiments. He was interviewed over the telephone by Mr. Hayes and Dr. Krimsky. A summary of his statement follows.

Dr. Chargaff fears the unknown factors which make the evaluation of risk impossible in these experiments. He feels that it is an ill-chosen plan that NIH has to allow the spread of laboratories for these experiments over the entire country before any control data is in. If the work is to be done, it should be done in centralized labs under maximum containment conditions until precedents are established through experiment. A university is by no means the place for DNA recombination experiments at this time.

As far as the use of E. coli as a host in the experiments, Dr. Chargaff does not consider it a good choice, the only rationalization for using it being that much is known about it. Thus far, there have been no experiments measuring the consequences of the escape of huge amounts of the E.coli on animals or humans. Most of all dangerous is the creation of new genetic information where broken ends of nucleotide sequences join up in the organism. We know that the organism will not be the same after the experiment is finished, but we simply do not know what kind of change will take place in it. It is unfortunate that the bacteria about which the most is known is part of the human flora. It would require 5-10 years of intensive research to attain the same level of knowledge about another, nonhuman dwelling bacteria or one that will not grow except under extreme temperatures. Since this is the case, control experiments should be done.

Chargaff considers the NIH Guidelines to be lacking in several respects:

1. Monitoring
2. Allowance for formulation of public policy
3. Epidemiological studies

They are neutral guidelines which prevent excesses by scientists and do at this time a better job than anything else.

Dr. Chargaff attended the New york State hearings held by Attorney General Lefkowitz and made a short statement there. Among the proponents were:

1. J.D. Watson , who is against having any guidelines at all, he feels the work is that safe.

2. D. Baltimore, who approves of the guidelines although he feels they are a bit to strict.

3. Darnell of Rockefeller University, who took the same stand as Baltimore.

Opponents included:

1. George Wald
2. Jonathan King, who mentioned the difficuties of monitoring
3. Chargaff, who enumerated the unknown dangers
4. Francine Simring

All the opponents agreed that the University setting is the worst possible place to do work that requires policing.

A representative of a pharmaceutical manufacturers organization said that industry would be willing to follow the NIH guidelines except where they apply to volumes of organisms.

No cross examination was allowed. All questions came from the officials whom Chargaff felt did a fine job.

Dr. Chargaff also attended the International Congress of Biochemistry in Hamburg recently. His feeling is that each country will have one central laboratory and all will follow NIH guidelines. The English are formulating their own guidelines, which are probably patterned after NIH.
Chargaff will visit the Biocenter at Basel, Switzerland later this month and will be happy to talk with the Board upon his return.

Several other conferences will be held on DNA Recombination within the next few months. The largest will be a symposium at the University of Miami January 10-12, 1977. Participants will be exclusively proponents.

It seems to be Chargaff's view that the whole issue is being put down as a fait accompli - the offensive being so strongly mounted by the proponents that it is almost useless to oppose an issue that has passed the point of being open for opposition. It is also difficult to argue where there is very little back up from molecular biologists.

In closing, Chargaff mentioned that he sees no real parallel to this issue - even in nuclear research as monitoring of radiation is easy. Biology, he says, has never really impinged on the public before.

SEPTEMBER 1976

PHILLIPS BROOKS CALENDAR SO CALLED BECAUSE THIS WAS THE STYLE USED BY HIM. SAMUEL WARD MANUFACTURING INC., BOSTON, MASS. 02210

CALENDAR 1976

	SUN	MON	TUE	WED	THU	FRI	SAT
JAN					1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31
FEB	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29						
MAR		1	2	3	4	5	6
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† Book of Common Prayer
* Services for Trial Use

	Sunday, 5th † 12th Sunday after Trinity * 13th Sunday after Pentecost	**Sunday, 12th** † 13th Sunday after Trinity * 14th Sunday after Pentecost	**Sunday, 19th** † 14th Sunday after Trinity * 15th Sunday after Pentecost	**Sunday, 26th** † 15th Sunday after Trinity * 16th Sunday after Pentecost Go[illegible]
	Monday, 6th	**Monday, 13th**	**Monday, 20th**	**Monday, 27th**
	Delia **Tuesday, 7th**	**Tuesday, 14th** * Holy Cross Day 5-9 DNA	**Tuesday, 21st** † * St. Matthew 5-7 DNA Caucus	**Tuesday, 28th** ~~DNA~~
Wednesday, 1st	**Wednesday, 8th**	**Wednesday, 15th** † * Ember Day 5 Walt[illegible]	**Wednesday, 22nd** Dump 4- Men Church. 5-6.30 Halvorsen MIT Teaching DNA	**Wednesday, 29th** † * St. Michaels and All Angels Ex [illegible] 11.30 Ha[illegible] DNA Forum.
Thursday, 2nd	**Thursday, 9th**	**Thursday, 16th** 430-7 DNA 5 R-9 Church	**Thursday, 23rd** 12.30 - Pap- Faculty Club DNA. 4.30-6.00 DNA	**Thursday, 30th** 10 Betty U.F. Dorothy G[illegible] DNA 430
Friday, 3rd	**Friday, 10th** 6.30 Wolcott	**Friday, 17th** † * Ember Day G.P. + 4	**Friday, 24th**	
Saturday, 4th	**Saturday, 11th**	**Saturday, 18th** † * Ember Day York	**Saturday, 25th** 4-7 Phister CBC	

[Calendar of Cornelia Wheeler]

OCTOBER 1976

PHILLIPS BROOKS CALENDAR SO CALLED BECAUSE THIS WAS THE STYLE USED BY HIM.

SAMUEL WARD MANUFACTURING INC., BOSTON, MASS. 02210

CALENDAR 1976

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JAN	--	--	--	--	1	2	3
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† Book of Common Prayer
* Services for Trial Use

	Sunday, 3rd † 16th Sunday after Trinity * 17th Sunday after Pentecost	**Sunday, 10th** † 17th Sunday after Trinity * 18th Sunday after Pentecost	**Sunday, 17th** † 18th Sunday after Trinity * 19th Sunday after Pentecost	**Sun., 24th** † 19th Sunday after Trinity * 20th Sunday after Pentecost **Sun., 31st** † 20th Sunday after Trinity * 21st Sunday after Pentecost
	Monday, 4th Drive [illegible] on Tues	**Monday, 11th**	**Monday, 18th** † * St. Luke Mothers Club Sally [illegible] 4. E Clarkhare - DNA Repub Club. 8 –	**Monday, 25th** 5-7 Chem Party
	Tuesday, 5th DNA - 5-7	**Tuesday, 12th** DNA.	**Tuesday, 19th** ~~2.30 [illegible]~~ - 2.40 DNA - 5 Biology Lab	**Tuesday, 26th** DNA 5 St Botolph - [illegible] 8
	Wednesday, 6th 10.15 Ex 12 - [illegible] B School, 2.30 Mt A. Aux [illegible] 7.[illegible]	**Wednesday, 13th** 10.15 Ex 12 - [illegible] 4 - Caffy tea - Tour Paine Fund here	**Wednesday, 20th** 10.15 Ex Walker 5 Forum	**Wednesday, 27th** 10.15 Ex Forum - 2.30
	Thursday, 7th DNA - 4.30	**Thursday, 14th** Wilson - Stoned Swooning 5-7 DNA - 4.30 - Transp? –	**Thursday, 21st** - 9.30 - Spanish DNA - 4.30	**Thursday, 28th** † * St. Simon and St. Jude 9.30 - Spanish, Flu shots 4-7 DNA Friends of CH - 8 -
Friday, 1st 1[illegible] - [illegible] Flemen. - Sym - [illegible] - 7	**Friday, 8th** Sym.	**Friday, 15th** (DNA Clark Sym - St. Botolph [illegible] 12.30 LW.	**Friday, 22nd**	**Friday, 29th** Brownes - [illegible]
Saturday, 2nd [illegible] 3A - 15 Anniversary [illegible] 50th	**Saturday, 9th**	**Saturday, 16th**	**Saturday, 23rd** * St. James of Jerusalem	**Saturday, 30th**

NOVEMBER 1976

PHILLIPS BROOKS CALENDAR SO CALLED BECAUSE THIS WAS THE STYLE USED BY HIM.

SAMUEL WARD MANUFACTURING INC., BOSTON, MASS. 02210

† Book of Common Prayer * Services for Trial Use	**Sunday, 7th** † 21st Sunday after Trinity * 22nd Sunday after Pentecost	**Sunday, 14th** † 22nd Sunday after Trinity * 23rd Sunday after Pentecost	**Sunday, 21st** † Sunday before Advent * Last Sunday after Pentecost 5. Here CR.	**Sunday, 28th** † 1st Sunday in Advent * 1st Sunday of Advent
Monday, 1st †* All Saints' Day 12.15 Punky to eyes. Winsor Concert cocktails 6	**Monday, 8th**	**Monday, 15th** Teddy Moth... ~~Aunt~~ 12.30	**Monday, 22nd** -9.30-13 ... -14- Spanish	**Monday, 29th**
Tuesday, 2nd – 9.30-12 – pass cards Lowell 5-7 DNA – Mod ~~dinner~~	**Tuesday, 9th** -2 Gib Pearle. 5-7 DNA. LW - St. B.	**Tuesday, 16th** 5-7 DNA.	**Tuesday, 23rd** 10.45 - Hair 1-3.30, UNICEF 4.30 DNA thru evening	**Tuesday, 30th** †* St. Andrew Bermuda 1-3.30 UNICEF – Mtg 5 DNA
Wednesday, 3rd Ex 10.15	**Wednesday, 10th** Ex. 10.15 LW. Palme -	**Wednesday, 17th** Ex 10.15 Pl Curt R Walker 5 ~~... St. B. 6 ...~~ ~~Forum - 8~~	**Wednesday, 24th** Ex 10.15 ~~Dan Steinenfine~~ 5 Bermuda -	
Thursday, 4th Spanish 9.30 12.45 Hair 4.30 DNA CCA - here - 8	**Thursday, 11th** Chocorua	**Thursday, 18th** Spanish 9.30 1- Bettys. Winsor '27 4.30 DNA	8.45 **Thursday, 25th** Thanksgiving Day	
Friday, 5th Teggy - children here St...dph Restaurant - 12. Sym - LW. Winsor	**Friday, 12th** Sym.	**Friday, 19th** 8-11 Sonata - K □	**Friday, 26th** Sym	
Saturday, 6th	**Saturday, 13th** R Markus - 3 + Barbara H.H Game -	**Saturday, 20th**	**Saturday, 27th**	

CALENDAR 1976

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	SUN	MON	TUE	WED	THU	FRI	SAT
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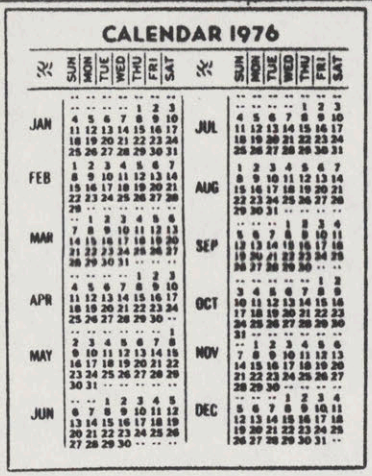
DECEMBER 1976

PHILLIPS BROOKS CALENDAR SO CALLED BECAUSE THIS WAS THE STYLE USED BY HIM. SAMUEL WARD MANUFACTURING INC., BOSTON, MASS. 02210



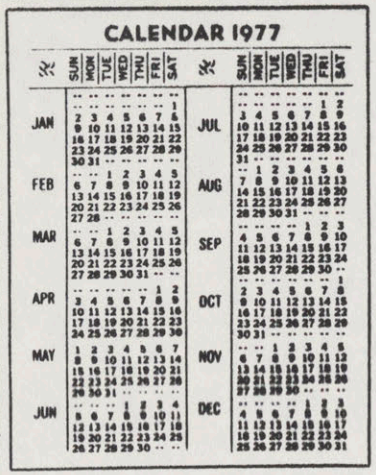
† Book of Common Prayer
* Services for Trial Use

Sunday, 5th † 2nd Sunday in Advent * 2nd Sunday of Advent LW Meeting 3	**Sunday, 12th** † 3rd Sunday in Advent * 3rd Sunday of Advent	**Sunday, 19th** † 4th Sunday in Advent * 4th Sunday of Advent Buehler 4-7	**Sunday, 26th** † St. Stephen * 1st Sunday after Christmas	
Monday, 6th LWV - Dorm 12? 3.30 Winsor Comp.	**Monday, 13th** LW - Sanger for T	**Monday, 20th** Dyer rDan 3.30	**Monday, 27th** † St. John Evangelist * St. Stephen	
Tuesday, 7th 1-3.30 UNICEF 5. DNA.	**Tuesday, 14th** 12 Coffy Service 1-3.30 UNICEF 5 - DNA 6 - Family Soc. party LW - Curtis - N. 10 here -	**Tuesday, 21st** DNA - 5	**Tuesday, 28th** † Holy Innocents * St. John Evangelist	
Wednesday, 1st 10-6 Peabody Luncheon Ex 10.15 TI for P; 12 Ha Soc game 6.45	**Wednesday, 8th** -Fam-3.30-	**Wednesday, 15th** † * Ember Day TI for P - Monacelli 12 - LW Paine Fund	**Wednesday, 22nd** - C Service -	**Wednesday, 29th** * Holy Innocents
Thursday, 2nd 9 Spanish. DNA	**Thursday, 9th** 9 Spanish 12.30 Dan D - lunch. for Blacksmith House 4.30 Dept. LW. (Bent) Rapids 7.30	**Thursday, 16th** 9 Spanish. 12 Hair. 4. Dowiak-tea-Cathy St Botolph.	**Thursday, 23rd** Polly supper	**Thursday, 30th**
Friday, 3rd Fam visit 11 Winsor lunch. 12. Symn LW. LW - Rehearse	**Friday, 10th** Chocorua.	**Friday, 17th** Bath † * Ember Day Symn G.P+H party	**Friday, 24th**	**Friday, 31st**
Saturday, 4th LW - Meeting 3.30	**Saturday, 11th**	**Saturday, 18th** † * Ember Day	**Saturday, 25th** † * Christmas Day	

JANUARY 1977

PHILLIPS BROOKS CALENDAR SO CALLED BECAUSE THIS WAS THE STYLE USED BY HIM

SAMUEL WARD COMPANY, BOSTON, MASSACHUSETTS 02215



† Book of Common Prayer
* Services for Trial Use

	Sunday, 2nd † * 2nd Sunday after Christmas	**Sunday, 9th** † * 1st Sunday after Epiphany (The Baptism of Christ)	**Sunday, 16th** † * 2nd Sunday after Epiphany	**Sun., 23rd** † * 3rd Sunday after Epiphany	**Sun., 30th** † * 4th Sunday after Epiphany
	Monday, 3rd	**Monday, 10th**	**Monday, 17th** 12.30 Mother Chb-Cook	**Mon., 24th**	**Mon., 31st**
	Tuesday, 4th DNA 5	**Tuesday, 11th** CASCAT DNA Party here 6.30	**Tuesday, 18th** * Confession of St. Peter	**Tuesday, 25th**	
	Wednesday, 5th Hair 12.15 DNA hearing 6.30	**Wednesday, 12th** Ex 10.15 PI for P 3.30 M' A Corp.	**Wednesday, 19th** 5->	**Wednesday, 26th** † * Conversion of St. Paul Ex 10.15 PI for P.	
	Thursday, 6th † * The Epiphany Mt A leading 10.30	**Thursday, 13th** Mt A 10.30	**Thursday, 20th** Mt A 10.30	**Thursday, 27th** Mt A 10. 5 DNA Walnut	
	Friday, 7th Sym Andy	**Friday, 14th** 10.30-	**Friday, 21st** St. Bart 12 - Winsor	**Friday, 28th**	
Saturday, 1st † Circumcision of Our Lord * Holy Name	**Saturday, 8th** Walker Auct.	**Saturday, 15th**	**Saturday, 22nd** Chorus	**Saturday, 29th**	