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The Perspective Institute:

Centre for Changing Relations Between Man, Representation and the Measured World

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The centre would require the following

- 1) library
- 2) museum
- 3) comparative modes of expression room
- 4) total simulation room(s)
- 5) seminar room
- 6) academic teaching, technical research and administrative staff
- 7) offices

Each of these requirements will be briefly described.

1) Library

The library should aim to collect all specialized literature in the field. Including textbooks this amounts to a figure c. 5000 and including neighbouring problems such as proportions and drawing books the total is unlikely to be more than 10,000. The library should also collect films dedicated.. to perspective (c. are known to the author). Because it is extremely specialized the library would remain small in size. Regular libraries could be consulted for other literature.

2) The Museum

The museum should consist of a collection of models of the most important gnomonic and astronomical. devices, each of which would have accompanying charts on which would be explained both the projection methods they involve and the point of view they assure.

All gnomonic devices are effectively alternative means of systematically letting a plane intersect a shadow. Since some methods are as simple as putting a stick in the ground and other involve complex instruments, the history of such instruments arranged in terms of alternative projection techniques, would bring to light another strand of the projection plane experiments prior to those of linear perspective.

Similarly, the planisphere and astrolabe begin from the premise that the equator is seen as a projection by someone standing at the south pole. The growing complexity of these techniques should also help us to understand better the history of man's precise relations between viewing, point, projection plane and object beyond.

3) Comparative Modes of Expression Room

Each of us who has looked at a renaissance or baroque bird's-eye ,perspective view of a square such as the Piazza della Signoria in Florence and has also been on the spot has witnessed a tension between the experience of the perspective view and that of the actual place: the perspective view inevitably makes the square look many times larger than we "see"

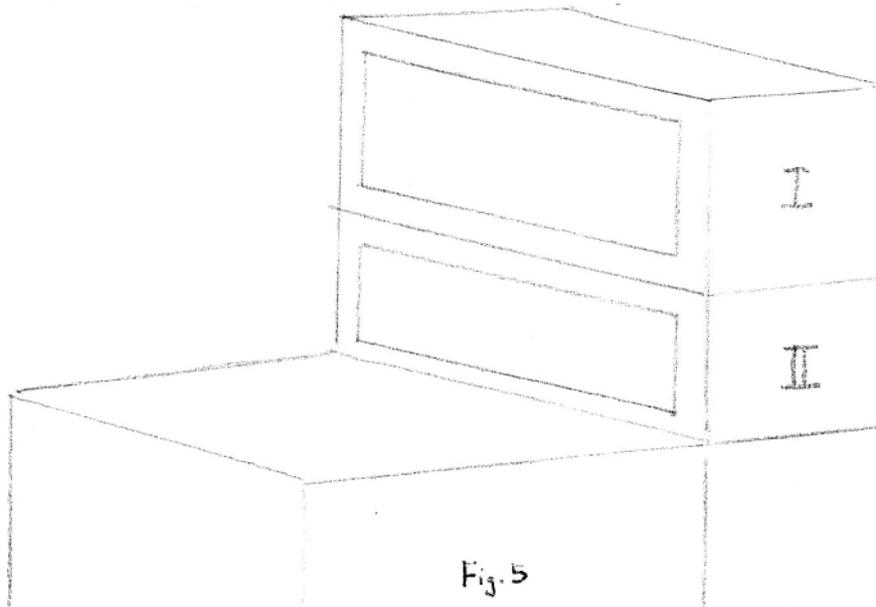


Figure 1. Table with two screens for comparing different perspectival effects between paintings and photographs of a given scene.

it when we are there. Similar tensions exist between the experience of photographs, films and the actual objects that they represent. More complex are the tensions between model and real view. More complex still are the tensions between "seeing" (or "reading") a place on the map and the place as we see it around us.

Until a means is found of measuring the parameters of these tensions between our experience of a) perspective paintings, b) photographs, c) films, d) models and e) maps, any attempt at quantitative, objective knowledge about this important dimension of discrepancies of experience will remain futile. With the aid of the latest technology such an attempt is feasible, (ri,45). Needed simply are two television like screens positioned either directly on top of, or beside, one another. One screen (I) would show a given medium, say, a perspective picture of the square in Florence.

The other screen (II) would show the same image but with one distinction: the perspective lines on screen II would be adjustable in order that the observer, with the help of a few buttons could simulate a zoom lens effect in this second perspective drawing. One would thus be free, while sitting still, to witness the effects on the perspective scene of moving closer and further back. With the aid of a computer the actual distances represented by any view to which he adjusts his screen could be calculated and recorded.

Sitting in front of screens I and II the observer would be asked to look at the square on screen I and then adjust the view on screen II until this view on II "looks right". When he has done this the computer will record the tension between how he experiences the perspective drawing on I and how he thinks he would experience it were he there. The resulting data are recorded and an alternative medium is shown on screen I: e.g.. the same square now as a photograph, and, again the observer is asked to play with the adjustable version on screen II. Now the adjusting process on II would be equivalent to a process of trying out different lens sizes on reality and judging which lens most convincingly records our experience of the

objects seen. Once the observer has decided on his adjustment of screen II then this data can again be recorded.

Implicit in this are fascinating historical questions that should be studied: what can the records of the photographic industry tell us about the sales of different kinds of lenses and how can this history of lenses used tell us about our recording habits? Do these recording habits, in addition, perhaps reflect our state of balance/imbalance with the world around us?

But to return to the two screens: following the photographs the viewer would now be confronted with film versions and again tensions between screens I and II could be recorded. Next screen I and II would be removed but the frame would remain so that the observer could look through it to see a model. Laser technology is, by now, advanced enough that one can simulate the models through holography, thus saving the fuss of making physical models consuming valuable storage space. Again tensions between the thing seen and how one believes it ought to be would be recorded.

The observer would next be presented with a map on screen I which he would then be required to correlate with an adjustable panoramic photograph on video-tape recording on screen II. This task would then be to adjust the photograph until it shows where he thinks he is on the map.

More complex variations on this theme are readily imaginable. The same experiment can be tested with different kinds of maps of the same area. Thorough study of experiences with different kinds of maps could bring us closer to defining why some maps "work" better than others, which knowledge could then be applied for the practical advantage of all future map users.

Finally, the observer would be presented with a verbal description of an object or scene on screen I and be required to reconstruct it on screen II. Texts of varying precision could be introduced and one could study which verbal instructions are most readily transformed into both pictures and action. The historical dimensions of this could also be studied in order to establish what relationships there are between precision of verbal descriptions and instructions and developments in the communication of and development in scientific knowledge.

Thus far we have mentioned only the measurement of tensions between representation in one medium and adjustment in the same medium. But more complex variations are, of course, equally possible. For example, the observer is presented with a photograph on screen I and is then asked to adjust a perspective outline picture on screen II. In exploring the quantitative boundaries of these tensions we can hope to come closer to understanding what is happening as we move through the spectrum of abstraction that ranges from our direct experience of the natural world, through photographs, paintings, line drawing, maps and ultimately words.

The particular requirements of this equipment would require for a time a resident electronics/computer person who could buy the necessary equipment and assemble it as required. Once the basic two screens were finished there would need to be a trial period during which details could be adjusted and a person trained whose task it would be to operate the machines and coordinate the projects of various world authorities who would wish to study these different tensions between different representation methods.

4a) Total Simulation Room: Phase One

Once this project was well under way the resident electronics/computer person would devote his energies to a more complex technical challenge, namely, constructing a room in which five surfaces (four walls, plus ceiling) are used as projection screens that are coordinated to give a total simulation of given spaces, Required is an extension of the principles already familiar from the modern planetarium in which multiple cameras are coordinated to simulate a simple spatial context.

This alternative using only five surfaces of the room would leave the floor surface free for a regular classroom audience or, to be precise, an audio-visience. This technique would have obvious didactic value particularly to historians of art and architecture as well, as geographers and those in the earth and natural sciences generally because one would, for example, then be able to project all the inner surfaces of a cathedral such as Notre Dame and give realistic impressions of the spatial effects. That which applies to existing buildings could be adapted with equal ease in simulating the effects of proposed buildings so that the technique could be useful for architectural planners and designers.

Moreover, that which applies to inner space applies equally to outside space so that the same technique could be used to simulate in panoramic fashion particular geographical or geological sites that were being considered either for normal study or future development schemes. While this could not replace the field trips of the earth sciences, it could add enormous dimensions to the scope of teaching within these disciplines.

4b) Total Simulation Room: Stage Two

The next stage would be to create with the help of lasers a total space such that one recreated visually all six surfaces of a room in order to give a fully three dimensional simulation of a given space. This would again have the didactic potential offered by the simpler technique with five surfaces with one proviso: a large audio-visience would interfere with the multiple projection lines, so that small seminar groups would be more suited for this type of total simulation teaching and research.

Implications of This Total Simulation Room

The implications of such a technique are so enormous that the first priority of the centre will be to explore the frontiers of applicability for such disciplines as medicine, the life sciences, natural science, mathematics, psychology, psychiatry, sociology and history. Each of these frontiers deserves a brief mention.

Medicine

At the level of popular science fiction the recent film *Fantastic Voyage* demonstrated on the traditional one surface screen the remarkable potentials of film for visualizing conditions within the blood stream. There is no reason why this could not be taken dramatically further. The effects that we have already seen on one surface could first be translated into a six surface situation to give a simulation of total space.

With the aid of computers all the information now available through the study of anatomy could be coordinated to create models exterior and interior, macroscopic and microscopic, of typical health), bodies. The proportions of the human body are predictable enough that we

can readily programme the computer to offer various alternative models of thin, fat, short, tall types etc. and, in the foreseeable future the individual patients' dimensions could be recorded and the three dimensional visual model could then simulate to the last detail the given patient. With the help of x-rays and the latest tracing devices the problem area could then be simulated and with the aid of a clear picture the physician would be in a much better position to make an accurate judgment how to restore balance in the organism.

Life Sciences

To those in the life sciences generally such total simulation techniques will extend far beyond restoring balance in unbalanced conditions: it should introduce a new dimension to the study of organic development. The growth of an organism from its beginnings as a sperm or seed to its final stages of maturity can be seen as a, slow transformation process. If one takes enough stills of each stage of this process and then combines them, the process of growth can be simulated with one important variation: the process that would normally take years or even centuries can be recapitulated as quickly as one chooses, so that the growth of a plant or a man, or even an oak tree could. potentially be recapitulated in a matter of a minutes.

At the macroscopic level this might well seem little more than a visual gag: but if our knowledge at the microscopic level is integrated into this picture, we stand to learn enormously from a method that systematically recapitulates the growth sequence and can, with the aid of focus and lens techniques, systematically eliminate the gap between macro- and micro-sopic techniques by introducing a simple continuum between far (macro) and near (micro) views. In short we shall in future have motion pictures of entire processes rather than stills of set stages in both animal and plant development.

Natural sciences

Although we now still tend to separate clearly between the organic and natural sciences in a sense they both belong to the same continuum, we know that the mineral world also develops: it too is an organic process, only in slow motion. So the same techniques could theoretically be used in recapitulating in minutes the evolution of millions of years.

Mathematics

If the life and natural sciences can profit directly from this ability to simulate the three dimensional coordinates of ordinary space, the mathematicians will find in these total simulation techniques a method of visualizing various non – Euclidean forms of space. For didactic purposes it will be useful to demonstrate what transformations are introduced when a set of objects arranged in Euclidean space is suddenly re-arranged in accordance with Riemannian, Lobachevskian or other alternative forms of space.

These methods should, however, be as interesting to these at the frontiers of research in mathematics as they are to teachers of the subject. For the mathematical thinker who has traditionally gone to the blackboard to convey to a colleague a rough sketch of the spatial display of which he is thinking, will suddenly find himself with a dramatic alternative: because he can now freely project unto the six surfaces of the room outside himself the structures he "sees" inside his mind, the projection room can theoretically simulate the space of his mind. In short the projection room will now become a display of the thinker's mind and hence the colleague will now have the privilege of an experience equivalent to being inside the mind of the thinker, The old question: do you see what I mean, will now become: do you see what I see? Needless to say this will revolutionize the accessibility of thought. For the moment it will suffice if we explore some implications for psychology and psychiatry.

Psychology and Psychiatry

If the patient is able to actually project on the walls of the room the contours balanced or unbalanced of his inner spaces, the doctor will have access to what the patient sees far beyond anything possible at present through patchy verbal descriptions from the person on the couch. Moreover, because the simulation can potentially be transformed into film, or three-dimensional laser equivalents, it is conceivable that once enough is known about a patient's inner "hangups", inhibitions, or fears, it should be possible to actually run through a painless simulation of the crucial problem or act without the trauma that shrouds the live psychodramas of today, which it could then replace. Most at the frontiers of psychiatry would have other incentives for exploring, these techniques that would allow one to turn off the lights in the room and enter into the black. box of the patient's minds.

The latest research suggests correlations between the spatial structures in the mind and the individual's mental balance, such that mental disorders are displayed as distortions within the individual's normal spatial matrices. Once the simulation techniques have been developed using the room to exteriorize the patient's inner projections, this could become a valuable tool for psychiatrists studying disruptions in the regular mental landscapes of patients. Their clinical case records would now consist not only of verbal descriptions but increasingly of visual spatial constructions and a new taxonomy would be needed to classify the various mental spaces both in their normal and their pathological states.

Sociology

While psychiatrists continue to explore the dimensions of inner space, they will need combine efforts with psychologists, sociologists and possibly anthropologists in tackling a related and more complex problem: namely, the interaction between the individual's inner sense and the space that surrounds him, a problem to which Edward Hall has drawn attention in the *Hidden Dimension*, but which still awaits quantitative study.

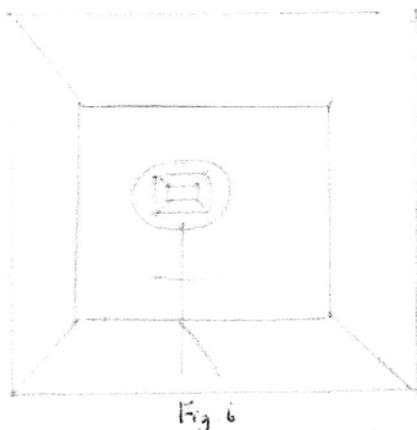


Figure 2. Comparison of person's individual perception of space with actual space and represented space.

The person who suffers from claustrophobia, for example, obviously sees a very different small room from that seen by the ordinary individual. For the claustrophobic person there is clearly not a one-to-one correspondence between exterior and interior. This problem expressed in terms of the basic ABC of perspective, is that his projection plane somehow distorts the space it seeks to record. In verbal terms we would say he has translation problems in moving from exterior to interior space.

Hence concomitant, with the psychiatrists' attempts to establish a taxonomy and catalogue the contours of inner space, there should be a combined effort to explore the exterior/interior space relations in order to arrive at a picture of the various distortions in the projection screen or the translating procedures that we now associate with mental illness.

Related to this are questions that are, in turn again far more complex. Everything that we see involves a relation between exterior object and interior record of this object that the memory can then potentially retain. And yet as we all know there are some things which we remember and many which we forget. Every process of using the screen to record information exterior to us, involves a process of screening off information outside the centre of focus. There is clearly an important nexus between initial focus of interest, attention and subsequent memory. But the subtle problems of how value systems, which may be neurologically based, play their own role in affecting, distorting, the recording screen requires further study history. If it is true that only a small amount of the great masses of stimuli at our disposal are recorded on the mental screen and stored in the memory, a far smaller fraction of these stimuli are deemed worthy to be recorded on the exterior screens such as canvas (in the case of visual images) or paper (in the case of verbal images).

What renders these phenomena the more worthy of detailed study is that the amount which a given individual remembers or records visually and verbally is by no means a static given. It varies dramatically from place to place and from one period to another. Moreover, it appears in greater amounts precisely in those places and at those times that we associate with high civilization and culture, so much so that one could define the chief condition for civilization and culture in terms of an increasing commitment to recording events (history), visual images (art), verbal images (literature), audial images (music) and numerical images (mathematics). Indeed the story of man's "progress" is ultimately a story of the progress in recording, remembering and constantly playing with the recording of these records.

Conversely the intermittent periods of decline of civilization and culture, the moments of barbarism are those in which the immediacy of the day to day present blinds persons respect for and interest in the past to the point that they believe it is possible to get on without it. Once this occurs the tedious process of recording experience dwindles, the documents of the past are neglected, the world of the spirit shrinks and life is reduced to a story of needs and wants of the flesh.

Hence the questions of what man records, how and why he records the world around him by processes of re-presentation bring into focus problems central to the mystery of why civilization progresses or declines. The centre should, therefore, explore the ways in which this total simulation can serve as starting point for a new stage in the historical documentation of all the recorded images of man both aesthetic (art, archeology) and scientific (life and natural sciences) and lead to a new universal catalogue of knowledge fundamentally superior to the mediaeval summas and speculums because it will add visual to the records of verbal information.

Once the criteria for such a programme have been established the cooperation of other research centres with great historical resources such as Wolfenbüttel will be needed which could then serve as convergence point for integrated efforts from other learned institutions throughout the world.

5) Seminar Room

To help with the establishment of criteria for these new realms of documentation, an interdisciplinary seminar is proposed that would meet 20 times a year (once a week for two terms of ten weeks). The core of the seminar participants would be 15, each being required to give a paper once a year. The remaining 5 seminars would have guest speakers.

Given the extraordinary range and experience demanded by the questions at hand it is proposed that the teacher-student ratio within the seminar should be two to one: 10 professors and 5 students.

Of these 10 professors, 5 would be connected directly with the centre. The remaining 5 would be invited to come from neighbouring universities. The criteria for choosing the 10 professors would be 1) their outstanding skills in a relevant discipline; 2) their interest in horizons beyond that of the specialist and 3) their awareness of the historical dimensions of their problems. The disciplines represented by the groups would be:

- 1) director (visual images)
- 2) linguist (verbal images)
- 3) sociologist
- 4) film director/producer
- 5) visiting academic
- 6) mathematician trained in descriptive geometry
- 7) historian
- 8) neurologist
- 9) psychiatrist
- 10) psychologist

The five students will be graduates who are preparing a doctorate and already have an interest relating to these problems. In formal academic terms the universities from which these students come will need to recognize the seminar as the equivalent of an advanced graduate seminar and credit student participants accordingly. Choice of the students will be the decision of the director who will judge on the basis of a personal interview with the most promising candidates.

6a) The Personnel at the Centre: Brief Outline of Job Descriptions

While the centre will constantly draw on academic resources of neighbouring universities, it will require a small staff of its own. The duties of each member of this staff can be briefly described.

Director (Visual Images)

The director's chief task will be to coordinate the multiple research and teaching at the centre as well as those abroad. The director's academic standing will be the equivalent of a

department head in a university While the focus of his energies will. be directed to research it is essential that he has occasion to share his experience with students through some teaching and this not only among graduates. He will therefore offer a course of 20 lectures to first year students: these lectures would combine historical survey with glimpses of the frontiers.

The number of students attending these first year lectures might readily be as many as 200. Connected with this lecture course would be tutorial type seminars. in these, a more detailed discussion of problems raised within tile lecture would ensue. Each seminar would consist of (a maximum of) 15 students. The director of the centre would supervise one of these seminars which would again consist of students within the course whom he had chosen. The tutorial would meet later on in the same day as the lecture takes place in order to assure continuity. In formal academic terms the lecture plus tutorial. would have the status of a first year humanities course. Testing would be broken down as follows:

1 st Term Exam	10%
2 nd Term Final Exam	30%
1 st Term Paper	20%
2 nd Term Paper	20%
Participation in Tutorials	20%

In addition, the director will offer a fourth year seminar in his area of specialization. This will be limited to (a maximum. of) 10 students. Here a detailed reading of a few key documents such as the works of Euclid, the perspective treatises of Alberti, Piero, Guido Ubaldo del Monte and Desargues would be used to develop sensitivity to the problems of interpretation of texts. The seminar would meet 20 times, again basically once a week for 2 terms.

Formal acadenic status of the seminar would be that of a regular fourth year humanities seminar. Testing would be as follows:

Interpretation of a set text at end of 1 st term	20%
Paper at end of 2 nd term	50%
Participation	30%

The director will also direct the research seminar. During the two 10 week terms his formal teaching load will, therefore be as follows:

First year lecture	1	hour
First year tutorial	2	hours
Fourth year seminar	2	hours
Research seminar	2	hours
Total	7	hours

The director will be free to direct personally the studies of doctoral- students. The precise number, not to exceed 5, would be a matter of his discretion. Although the activities of the centre will involve numerous disciplines, the students coming to the centre will normally come with a first or second degree in a specific discipline. In formal. Academic terms their doctoral studies could continue within that specific discipline. If this lay too far removed from the director's formal training, a professor could be found in the student's discipline Who

would be responsible for assuring that the student reached the PhD requirements for the specific discipline or subject and the director's formal role would be advisor. The practicability of such a solution has been shown by the Warburg Institute.

While the 20 weeks of term will assure that the director has a presence both at the centre and at the university, the international nature of his task will require that he maintain close contact with other great centres. He must, moreover, have time to continue his personal research.

It is therefore proposed that he retreat entirely, even from family, for a period of four weeks a year, as a research fellow within a great centre of learning such as Cambridge or Oxford.

In addition, he would spend, with family, at some other great centre, such as Wolfenbüttel, another period of 4 weeks a year. Eight further weeks of the year would be flexible during which time he would be devoted to administrative duties at the university (marking terms papers), and the centre and allow some free time for preparing occasional guest lectures. The remaining four weeks of the year would be left open for vacation. The director's month to month programme from the beginning of term in September would thus look as follows:

September	Classes at the University and Centre
October	“ “
November	“ “
December	Administration
January	Classes at the University and Centre
February	“ “
March	“ “
April	Administration
May	Retreat: Cambridge
June	Research: Wolfenfenbüttel
July	“ “
August	Vacation

Linguist (Verbal Images Person)

This person would devote his energies to exploring perspective in verbal images.

in formal academic terms he would have training in linguistics, languages and literature and have the status of professor within one of the departments. His formal academic duties would follow the patterns of the director: i.e. lie would offer one first year lecture course with tutorial; one fourth year seminar and would participate in the research seminar.

The nature of his research would require that he too would need spend part of each year in Europe.

Sociologist

In a sentence the sociologist would devote his energies to developing quantitative methods of studying the problems discussed by Edward Hall in the *Hidden Dimension*. His formal status would be a professor of sociology and his teaching duties would resemble those of his linguistic colleague.

Film Director/Producer

Until the beginning of the 19th century man's experience of rapid motion was limited to camel and horse riding. The invention of the steam locomotive made the experience of rapid motion an everyday experience. Experience of speeds beyond the sound barrier began less than 40 years ago and with the development of Concorde, this too has potentially become an everyday experience.

The systematic recording of moving pictures is less than a century old. The progress in range of possibilities from the silent movies of the last generation to the technicolour, sensurround films of today is staggering. In the past two decades the psychologist J. J. Gibson has brought the problem of our experience of rapid motion into the foreground of perception theory.

Yet it is noteworthy that the related phenomenon of how our experience of rapid motion is recorded has, by contrast, received hardly any systematic attention.

To be sure there are within the universities now scattered posts devoted to "film" but these are usually in fine arts departments where they tend to be studied either as a branch of art history in terms of their aesthetic value, or as a branch of literature, in terms of their plots etc.

What is urgently needed is a study a) of the spatial problem introduced through film making and b) of the implications of these new space rendering techniques for our perception of the world.

The processes here must be enormously complex: an average film of 90 minutes takes months and even years to prepare, so complex that only an experienced director/producer can have any idea how to go about studying the matter systematically. Hence a film director/producer of world rank is needed whose task it would be to meet with as many of the leading directors/producers as possible, especially the older ones, in order to gain as much first hand knowledge as possible about the film revolution from those who have been directly responsible for it. The resident director/producer would organize meetings, develop means of gathering and cataloguing the source materials (films, trial runs, interviews etc.) and develop criteria for the interpretation of these. His formal academic status would be professor of film within a department of fine arts or humanities. His teaching duties would centre on introducing a historical dimension into the perceptual problems surrounding both film production and the viewing of film.

Television Director/Producer

In a technical world where pastimes are becoming ever more diverse the viewing of television is by far the most regular experience shared regardless of age, race or gender. But here, with the exception of occasional special commissions concerned with the possible influence of television or violence, there has again been effectively no systematic study of the spatial problems either in the production or in the viewing of a television programme. Thus the film producer must have his equivalent from the field of television to perform a similar task in this domain.

Guest Professor

In the various disciplines there are a number of persons of outstanding ability who will be interested in the activities of the centre and yet would not wish to leave permanently their distinguished posts at leading universities in their home country. But such persons could, in many cases be persuaded to come to the centre as a guest for a year. In formal academic terms the guest professor would be appointed as guest professor at the university within the department of his specialty. His teaching load would be the same as that of the other members of the centre, small enough to still permit him to take part in the centre's activities

and allow him to continue his personal research. The academic teaching staff of the centre would therefore be six.

Once the programme was well underway the centre could benefit from the proximity of neighbouring universities by drawing on the special skills of other professors in special departments. In exceptional cases the director might even recommend to the universities the regular university appointment of an authority who would further the needs of both the university and the centre.

6b) Technical/Research Staff

In addition to those on staff committed to a combined task of research and teaching the centre will require at least four highly skilled individuals devoted to organization of itc, materials.

Electronics/Computer Person

The construction of the 2 projection screens for the comparative study of various representation methods and of the total simulation room(s) will require skills at the frontiers of electronics/computers. It is conceivable that this person would come from industry for a short term appointment of say, one or two years and, thereafter, remain in the position of a consultant who could then fly in when special technical problems arose. Besides his responsibilities of constructing the equipment, this person would be responsible for instructing an operator(s) to use the equipment and programme experiments. Some commitment to assuring that the development of new techniques in their realm is recorded for historical purposes is desirable.

Operator

The operator would himself be skilled in computer methods and be responsible for organizing systematic studies using the machines. When professors from neighbouring universities wish to use the equipment to perform specific new experiments, it will be his task to instruct them, in turn, how the equipment works. He will help supervise experiments when necessary and will be responsible for recording systematically the details of all experiments performed. both by persons from the centre and from neighbouring universities and visiting professors.

Historian of Cataloguing Information

In the introduction to this paper it was emphasized that knowledge is less a question of individual facts and more a question of how these individual facts are arranged within frameworks that introduce some sequence and system to the details. From the time of Aristotle's *Categories* and *Analytcs*, the problem of which framework is used has been a matter of interest and debate. Yet, notwithstanding some histories of the *trivium* and *quadrivium*, the question how these frameworks or pigeon holes of knowledge have changed over time has remained largely unexplored.

The classical Greek presentation of knowledge relied almost entirely on verbal images. This has changed over the ages such that we now take for granted that our presentation of knowledge will include figures, diagrams, photographs and within the past half-century a spectrum of audio-visual aids. It stands to reason that these new forms of presenting knowledge must have influenced the categories in which knowledge is pigeonholed, but to date very little systematic study has been made concerning how the introduction of visual images has transformed the classification of verbal images.

It may even be that the decision to use strictly verbal, or strictly visual, or some combination of these two kinds of images, is that which determines the classification system, that which controls the variety and sequence of pigeon holes used. The variety and sequence of the pigeon holes used is, in any case, that which determines the facility with which the individual facts can be retrieved and communicated. If a definite connection can be shown to exist between type of image (verbal, visual, numerical) used to present the facts and information; type of pigeon hole used to arrange and store the facts, and effectiveness with which the facts can be communicated we would understand at a deeper level the meaning behind McLuhan's hypothesis that the "medium is the message". To begin with it may be advisable that the researcher spend a year or two in Europe, beginning with materials already gathered at research institutes such as the Warburg and study at first hand the classification systems of the great libraries private, university and national.

Librarian

The centre will need a librarian whose first responsibility will be to catalogue the books and offprints in the library. Thereafter the librarian will be responsible for acquiring new literature as it appears and cataloguing, this. In addition the librarian will be responsible for the establishment of a project that will aim to locate all existing editions of the c. 1000 known perspective treatises. This information will be used to produce a revised edition of the standard bibliography on perspective and serve, in turn as raw material for an eventual history of perspective.

Founder/Curator of the Museum

The founder will be a person with special knowledge of the history of instruments gnomonical and astronomical. His first task will be to decide which instruments will be needed for illustrative purposes. Representative models of the required instruments will then be collected and the projection principles they entail will be set forth on charts which will then accompany them. Once the museum exists the founder will act as curator and devote himself to preparing a book that will give a survey of how these projection methods evolved. In addition he build on standard works such as Gunther's *The Astrolabe* in arriving at a systematic catalogue of former astrolabes and still existing instruments. To achieve these aims he would work in cooperation with curators of great collections such as London, Greenwich, Oxford, Leiden, Munich and Florence.

6c) Administrative and Support Staff

In addition to those already mentioned the following will also be needed.

Secretary of the Centre

This person will be responsible for liaison between the university and the centre in terms of formal academic procedures. For example, this person will arrange that the activities of professors at the centre are properly integrated to fit in with formal university requirements, that students from different faculties will be accredited by the university and that the formal procedures, pertaining to graduate students of professors at the centre will be satisfied.

Secretary to the Director

This person will help deal with the answering of the director's international correspondence and assist in the day to day administrative problems.

Bookbinder/Maintenance Person

As the library material will, in addition to books, include many offprints and even xeroxes, it will be advisable to follow the practice of the Warburg Institute and employ a person who would bind these various 'Loose articles, organize the posting of letters and serve as general maintenance person.

Receptionist/Telephonist

This person would answer all incoming calls, direct them to the appropriate person and serve as receptionist in welcoming and directing persons to the appropriate room. in the centre.

Typists

Typists will be needed for the other professors at the centre. It would be advisable to begin with a typing pool of two which could then be expanded as the amount of correspondence increased.

Part-time Cleaning Staff

Finally someone would be needed to keep the premises clean.

Appendix 1. Summary of the Centre's Staff

The complete staff of the centre will thus consist of the following:

	Academic Teaching Staff
1	Director (Visual Images)
2	Linguist (Verbal Images)
3	Sociologist
4	Film Director/Producer
5	Television Director/Producer
6	Guest Professor
	Technical Staff
7	Electronics/Computer Man
8	Operator
9	Historian of cataloguing Information
10	Librarian
11	Curator of Museum
	Administrative Staff
12	Secretary of Centre
16	Secretary to Director
17	Bookbinder/Maintenance Person
18	Typists
19	Part Time Cleaning- Staff

Offices

Offices would be required for each of the academic teaching staff, the workshop for the electronics computer man, offices for the technical and administrative staff including a small storage cupboard for the part time cleaning staff: i.e. 16 rooms in addition to the library, museum, seminar room and 3 projection rooms.