ANIMATION AS A MEDIUM FOR COMMUNICATING ABSTRACT CONCEPTS: THE CASE OF MEASLES

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D E C L A R A T I O N

I hereby declare that this project has been composed by myself and that it is a record of my own research work. It has not been accepted in any previous application for a higher degree. I have fully acknowledged all information derived from materials both published and unpublished by others.

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July, 1985.

CERTIFICATION

This thesis entitled Animation As:
A Method for Communicating Abstract Concept by
Joel 'Lade Adeyanju meets the regulations governing the award of the degree of Masters of Arts (Industrial Design) of Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

To

'Teju, Jimi and 'Niran.

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ABSTRACT

ANIMATION AS; A MEDIUM FOR COMMUNICATING ABSTRACT CONCEPTS

The purpose of this study was to explore the use of animation art as a medium for communicating abstract concepts so that such concepts could be easily understood by a wide range of audience. An understanding of the internal process of the disease measles was used as an example of abstract concepts.

Two procedures were used in collecting the required information for this project. First, lectures were attended with the microbiology students to grasp the knowledge about measles pathogenesis. Lectures were also attended to understand how to communicate with illustrations with special reference to animation art. Information were gathered from the 'NETC[1] Kaduna where the machine for preparing animation was avaiable.

Pictures of the development of measles in their various stages were shot in hospitals and in the local areas where measles patients were being attended to. The literature review on processes of meales replication was later translated to drawings by hand by the researcher to illustrate the measles particle in its various stages of development, and they were converted into slides later on.

It was postulated that if this type of sequence helped to simplify the concept of measles, these

illustrations could be effectively used for enlightening various groups of people about measles. That would be communicating through animation.

The study has revealed many aspects of the measles disease such as its cause and severity; its endemic nature throughout the world and the unfounded **superstition** about it in Nigeria. The study has also shown that the internal processes could be illustrated and this could lead to a better understanding of the disease if animation art could be employed. But, the scarcity of equipment and materials and the cost of animation now in Nigeria are such that it has not been possible for the researcher to actually complete the process and field test the product Although evidence seems to lead to a belief that animation art would be an effective way of helping people to understand abstract concepts the chances of employing this medium for non commercial purpose in Nigeria are at the moment remote.

In the developed countries, animation has been accepted as an effective instructional media for communicating concepts, especially abstract ones and are used in various institutions. This is not the case in Nigeria, and the use of illustrations and slides in the process of animation can very easily be incorporated into the learning processes of various institutions in Nigeria, with the exception of the institutions of the blind people.

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Chapter 1

INTRODUCTION

1. THE RATIONALE FOR THE STUDY

The Federal government in its effort to eradicate illiteracy in the country had to spent a lot of money on the education of the illiterate, adults and the youths. In 1981 a sum of ten million naira (₦10. million) was set aside for a five year programme to execute the mass literacy campaign. (NAVA programme of activities p. 7, 1981). In support of the Federal Government's intention to improve on Nigerian education system, the Nigerian Audiovisual Association (NAVA) organised series of lectures on 'audio visual approach to mass literacy' at their National Convention in Calabar, Cross River State and also made recommendations to the Federal Government on the use of professional - 'mediated instructional strategies' in order to reduce illiteracy in Nigeria (NAVA, 1981).

Perhaps, the recent formula of the 6,3,3,4, system of the Nigerian Educational Policy would augment literacy among the Nigerian youths. Since good education is essential for the welfare of the individual and the society, the Federal Government education planners have designed the achievement of the basic skills necessary for the child to be literate in reading, writing and in using numbers during the first six years of education

in the primary school. The next three years was programmed for the child's education in the Junior Secondary School, while the next three years in the Senior Secondary School prepare the child for future vocational or academic education. In the past, a lot of emphasis was laid upon teaching or reading, writing and arithmetic in Nigeria. The problem of educating the masses is compounded when there is no one common adequate medium of communication. Language difficulties form a particular major barrier to a quick way of disseminating knowledge. A large number of Nigerians did master the rudiments of the '3' Rs, which took about two to six years of the elementary school during the colonial period. Today, the nurseries and reception classes make this accomplishment possible within two to three years of the primary school.

Nigeria, with the population of approximately 80 million, really has the problem of communication, especially when one considers the different spoken languages and dialects and a very high rate of illiteracy. Efficient flow of communication is just not there.

There are, in Nigeria, different ethnic groups with their different historical, socio-economic cultural and political differences and problems. While the most widely spoken language in a locality differs from one area to the other, the English language which has become

a common language is not easy to grasp by others who have not heard conventional school experiences. Even when there is a widely spoken common language like Yoruba, Hausa and Igbo, there are dialects which are sufficiently different as to bring about misunderstanding. In addition, a language identified with one ethnic group cannot be imposed on the other for such would give the impression of superiority of that ethnic group over others. All these rivalry are caused by political awareness, and the unfortunate incidence of the eighteen months of Nigerian civil war perhaps has a lot to do with the differently spoken languages and problems of communication.

The non-existence of a commonly spoken language in Nigeria can easily be broken conveniently if educational materials would be converted to iconics. If this could be done, the numerous illiterates would benefit from it, since they may never have the opportunity to learn to read and write in schools formally.

In some Third World countries, where about 80% of the people are illiterates, printed educational materials such as pamphlets are of little or no value to the masses. Animated film, if used, should break through language barrier conveniently.

The art of animation involves the use of visuals. It speaks for itself. Most of the time the ability to portray movement makes the art of animation to be one of

the most interesting and stimulating medium of communicating facts about what goes on both externally and internally in the human and animal organisms.

Animation, though difficult and laborious to set in motion, can be used effectively in educating people about viruses.

It is suggested that one of the most effective ways of educating the masses on the causes and prevention of some of the diseases rampant in their areas would be the use of film animation. The use of an animated film for the teaching of health education could be of great value to Nigerians, since the number of people getting sick carelessly could be drastically reduced. The Nigerian Tribune of 16th April, 1985 under this heading discussed the importance of having a healthy nation. According to the daily paper, health comes first. It further stated that "we need to re-order our priority if we are to find a lasting solution to our problems". Health is wealth as it is often said, and it is believed that a sound mind lives in a sound body. Therefore, it is the healthy people of Nigeria that will execute the objectives and programmes of the Nation. The Guardian News Paper of Tuesday April 23, 1985, under the title stated that the World Health Organisation (WHO) target recommendation to the third world countries was one doctor to 10,000 people, this is impossible to meet up in Nigeria in forseable future. However, in the light of

austerity, most of the government owned hospitals have suddenly become mere consulting clinics. The impact of austerity has made Nigerians, to seek help from quacks and road side drug sellers. Rather than allow this trend to continue, health problems can be minimised through education and art animation medium has great potential in achieving this goal. Considering the case of malaria parasite, in Nigeria, an animation of the virus causing people to be sick of malaria could be portrayed This could be shown several times to enlighten patients in hospitals, the nursing school students could benefit from it as well. Parents. who are literate in the interpretation of visuals would also find an animated film of malaria virus very interesting to watch. The knowledge being disseminated would therefore form a basis for people to protect themselves from mosquito bites. Since the actual internal process of what takes place in the patients' blood stream could be explained and made understandable to patients by the science students, doctors and nurses, through the medium of animation art, the same art could serve very well for communicating the activities of viruses.

In addition, to the effectiveness of animation art for explaining facts, the process is dynamic since it can move and it is this quality that makes it possible for the technique to stand out as one of the medium of instruction which one could rely on. Wittich and

Schuller (1979) regarded it as ..... "excellent for a detailed study or review of visual information". In order to make communication clear and understandable, the message has to be repeated often. And when a communication programme is recorded, using the animation art technique, it is possible to show the same programme several times until the learners or viewers have the grasp of the intended knowledge.

WHAT COMMUNICATION IS

Communication could be described as a structure of thought brought into action. According to Field (1970) "..... a great deal of communication takes place which is not couched in formal language. Hence, communication may be verbal or non-verbal." Art, according to Field, communicates; which means that it is possible to communicate without using words. Communication can be expressed in many ways; by sight, through gestures and by assuming varied postures. Sounds offer other avenues for communication as well. This can be observed through action, for example, when watching a person playing a piano, or the sound could be heard when sounds emit from musical instrument, or from a commentary, or lip synchronization or from mouth sound or from found sound, etc., etc.

Communication according to Morgan and King (1956) is "signals made by one organism that have meaning for

other organisms and thus affecting their behaviour". Communication involves the act of imparting news or information which is expected to give a positive or a negative feed back. Therefore, to communicate effectively, the channels of communication has to be clear.

Fine art is a form of non-verbal expression which can be used as a form of communication such that all categories of people can relate to: the literates, non-literates, children and adult. In the fine art, communication is expressed in forms of lines, colours, tone and shape, mass, etc. Whereas in the sciences, communication involves the use of most or all the senses, the eyes, the nose, the body surfaces, etc. Because art is visual, it has been effectively used to back up scientific findings and explorations such as the exploration of the moon in the 1970s by the American astronauts. Visual art has the aesthetic and functional value and it has been used to make the presentation of scientific findings more refined such that the communication of results have been made a lot easier. Hegel (1920) expressed the view that art gives joyous animation to gloomy and dry notion thus bringing its abstraction into reconciliation with its details.

In Nigeria where a high percentage of the population is illiterate the use of fine art as a form of communication may be exploited for its numerous potentials for educational purposes. The wide gap of illiteracy in Nigeria may be

reduced if the real function of art which is to "express feelings and to transmit understanding" to the people is employed, according to Reed (1931).

It is believed that most people in Nigeria still do not know how an infection begins or spreads. The science students, especially the microbiologist who are charged with the duty of enlightening others about infectious diseases, most of the time, have no resources for their research experiments, other than what they gain from reading text books, and from oral lectures. Also, where a few equipment are available the population of the science students for the use of equipment in the laboratory may not allow for a very effective experiment. Although the lecture method is widely used in most of the Nigerian Institutions of higher learning, the fact remains that efficient communication may be very lacking.

A better way of gaining the attention of the students might be allowing them to view the subject matter on the screen. The use of a synchronised sound track can equally instruct as they watch the film on a subject they are about to experiment on practically. According to Ely and Gerlach (1980) motion picture aids fast learning and it also aids in the processes of memory retention. They explain that this is so because, what is seen on the screen is more concrete. As a result, abstract thoughts

are replaced by concrete and visual occurrence. It is believed that science students would gain a lot more of the experiences they would need after viewing a subject matter on the screen. The experiences thus acquired will help the students in carrying out a successful experiment on how the infection of a viral disease begins since they all have watched the processes of the experiment on the screen.

1.2 Statement of the Problem

The problem of the study is how to communicate concepts that cannot be easily understood or seen by utilizing illustrations in slides, through the art of animation. Viruses are impossible to see with the naked eyes or photograph directly even with the use of a microscope. Measles is one of the common diseases that Nigerians need to understand. It is caused by a virus. To show the process of the development of measles virus and its effects on human victims, the only available channel to be used for the time being, is art animation procedure.

1.3 Purpose of Study

The purpose of the study was to investigate, using the measles, the possibilities of the art of animation as a communication tool, such that it would be used in hospitals for instructing nursing students, doctors, and paramedical staff who eventually may have to explain the causes of certain ailments to patients.

The study seek to provide a simple and clear illustration of measles virus particle, the pathogenesis of its infection, measles virus interaction with the hosts cell, and its replication process in man. The background of information thus provided would be useful to students and lecturers of microbiology as an introductory encounter with the disease.

Eventually, when the illustrations on measles are animated, the product automatically becomes a stimulus for students and non-microbiologists entering the field for the first time. In due course this idea of animating measles virus disease might bring about other novel approaches to solving some of the related intricate problems of students. Such problems as those relating to reproduction, the space logistics and theorems that cannot be visually handled and equally difficult to handle.

One of the objectives of this project is to find a way of communicating the facts of measles to the people so that they would avoid measles epidemic. Specifically the study is attempting to answer the following questions:

1. What agent is responsible for causing measles diseases?
2. How do you communicate the facts of measles when the electron microscope that could see them are not accessible?

3. Can the use of motion pictures to illustrate the possible causes of ailments help to eradicate superstitious beliefs about measles virus infection?

1.4 Target Audience

The communication of measles virus disease to the science students will be appropriate since they will readily conceptualize and interprete the illustrations thus provided for this project. The art students may find it difficult to interprete because of the existing communication gap and moreso, this project seeks to discuss an internal process.

1.5 The Scope of the Study

Although the interest is a general one, this research has made use of measles disease as a case study. The research is concerned with communicating the facts of measles including the process of measles replication and its effects on victims to students of measles i.e. medical students, nurses etc.

1.6 Limitations

The original purpose was to put this project on animation, but circumstances prevailing have forced the research student to illustrate the programme, hoping to undertake the animation aspect in future. The problems of materials, the films, the cell paints, problems of facilities and the equipment and problems of time have

been limiting factors. For example, there was an instance when all drawings and illustrations already prepared in colours, had to be put to black and white because it was difficult to get 'Ektachrome X films and there was also financial constraints.

This research was a case study. The necessary experiments and interview carried out for the study were limited to the following institutions and groups of people:

a) Specialist Doctors and Nurses at the A.B.U. Teaching Hospital, Zaria.

b) Lecturers in Microbiology, A.B.U., Zaria and University of Ife, the physics and Industrial Design Department of Ahmadu Bello University, Zaria.

1.7 Significance of the Study

It is true that students read and digest what they have read in order that they might understand such concepts and utilize the knowledge later on. However in some fields of knowledge, such as the sciences, some facts are difficult to understand when information are not easily conveyed to students by the teachers. Often good static illustrations would help but sometimes some of the facts are lost. However, when such facts are animated and projected in motion picture forms and the students see the facts being translated in concrete forms right in front of them/they would understand better and they are also able to retain these facts longer than when

they merely read from books. It is believed that we retain 75% of what we see and only 25% of what we hear or read, after three days. (Balogun, 1982) lectures unpublished. Audio visual is an aid to quicker learning, better understanding and longer retention. It is hoped that information from the results and findings of this study will be useful to the following categories of people:

1. Practising teachers at all levels of education who need to tap other avenues to ease the teaching-learning process.

Moreover, not all teachers are gifted in the art of drawing. A good many of them are capable of writing up good notes but are handicapped by the inability to supplement such notes with appropriate illustrations to better explain abstract terms. Animated film is one adequate media that teachers can use in such situations.

2. Patients undergoing treatments in hospitals who need to be better informed about the real causes of their ailments. For it is not unusual in a developing nation like Nigeria for sick people to blame the causes of their ill health, especially the internal ailments, on witches and the handiwork of malicious neighbours.

The Nigerian News Papers every week have carried stories about the severity of measles as it kills the innocent children (Guardian News Paper of 8th July, 1984).

Our traditional doctors have been working on a possible solution to arrest measles and in case one is found, it is expected that they send such finding to the World Health Organization for clearance before it can be accepted.

Meanwhile it is not enough looking for a curative measure for an ailment whose impact have affected the developing Nations for so long a time (Peer, 1966). Perhaps, the best solution to the problems of measles in Nigeria is to get people to be aware of the facts about it. This can be done by making the masses see the illustrated film on the causes, prevention and cure of the viral disease.

Viruses are known to be the smallest organised infectious agents found responsible for high death rate of children of the tropics. Measles is one of the most serious diseases of children caused by viruses.

The severity of measles has affected the history of some parts of the World like Fiji (1875) and Faroe Island (1846). The outbreak of measles diseases in the Fiji led to a phenomenal mortality within three months because they had not had any previous experience of measles. In the Faroe Island measles mortality rate was as high as 25% it was reported that only the people above 60 years escaped it. Before vaccine was introduced in the U.S.A. 500,000 cases of measles occurred yearly

but with mass immunization campaign in 1966 to 1967 only 62,705 cases were reported. Measles now occur sporadically in the developed countries even though the third world is yet to find an adequate solution to theirs.

Morley, et al. (1963) claimed that measles experience in Nigeria is severe because of poor nutritions and that the fatality rate was estimated to be 5 percent approximately. Measles is common among children of pre-school and school age children all over the world. Death from measles are frequent between the age of 6 and 18 months and often 10% of children get killed because of development of complications like phneumonia as a result of measles attack.

The infection rate of measles is lower in scattered settlement than in crowded communities. Morley (1969) states that .... 65% of children of age 1 to 5 years were affected by measles in Northern Nigeria while 21.5% was recorded in the Eastern Nigeria.

Table 1: The Mortality due to measles in Tropical Africa (1962 - 1967)- Born and Javetz.

	Author	Place	Class of Patient	Case Mortality Percent
1962	Morley	Nigeria	Hospitalized	22
1964	McGregor	Gambia	Village Domestic	14.01 15.22
1967	Savage	Zambia	Hospital Admission	30% at Peak age 6-18 months
1967	Morley	East Africa	In patient	5.7%

The Guardian newspaper editorial of July 8, 1984 discussed measles on the decline in Nigeria. It stated that loss to the Nation in five years was 6,485 children aged 9 months to five years. The killer disease attacked 776,757 children in Nigeria between 1978 and 1982.

An understanding of the causes, development, consequences, cure, and prevention of measles by the common people will reduce the incidence of measles to the minimum and also make it less fatal.

Table 1.2 The List of Nigerians Vaccinated against Measles: 1980, 1981, 1982
Population Estimate: 84, 731, 000

Year	Estimated Population measles risk	Number Vaccinated	% Vaccinated
1980	4,236,580	2,588,023	61.19%
1981	4,344,850	2,408,403	58.43%
1982	4,485,875	1,854,453	41.59%

(The Guardian July 8, 1984 Table 3)

Table1.3 (1978-1982) Measles records of Deaths in Hospital

Year	No. of Attacks	No. of Death	% Death
1978	188,727	938	0.50%
1979	176,468	2,348	1.33%
1980	142,106	1,212	0.90%
1981	129,671	1,002	0.77%
1982	139,785	985	0.70%

(The Guardian July 8, 1984, Table 4)

Table 1.4 1982 Monthly Record of Cases of Measles in Nigerian Hospitals

Month	No. of Cases	No. of Deaths	% of Deaths
January	16,374	141	0.4%
February	15,030	118	0.79%
March	19,669	119	0.61%
April	18,933	115	0.61%
May	16,394	160	0.98%
June	12,870	113	0.88%
July	9,801	44	0.45%
August	8,261	56	0.68%
September	5,488	29	0.53%
October	8,760	29	0.33%
November	8,733	42	0.48%
December	5,772	19	0.33%

(The Guardian, July, 8, 1984, Table 4)

Table 1.5 The 19 States Account in 1982

STATE	NO. OF ATTACK	NO. OF DEATH CASES IN HOSPITAL	% of deaths
Anambra	2,160	1	0.046%
Bauchi	8,635	61	0.71%
Bendel	5,422	5	0.092%
Benue	4,275	4	0.094%
Borno	3,762	56	1.49%
Gongola	20,342	118	0.92%
Imo	4,620	14	0.30%
Kaduna	8,688	92	1.06%
Kano	21,736	1,567	7.21%
Kwara	1,551	13	1.19%
Lagos	5,973	2	0.03%
Niger	8,659	156	1.80%
Ogun	6,829	46	0.67%
Ondo	8,747	1	0.011%
Oyo	2,578	6	0.23%
Plateau	13,156	154	1.171%
Rivers	1,289	1	0.078%
Sokoto	5,898	97	1.64%

Table 1.6 1983 No. of Immunized Nigerian Citizen in Lagos state for Ten months.

January	2,425
February	3,615
March	7,784
April	7,172
May	2,788
June	3,091
July	2,809
August	5,886
September	2,274
October	6,709

(The Guardian July, 8, 1984, Table 5&6)

DEFINITION OF TERMS

Art - An attempt to create pleasing forms through expression.

Animation - The bringing to apparent life and movement of inanimate objects set before the camera by employing the joint capacity of film and eye to fuse disparate images into an apparently continuous flow. (Spottiswoode, 1951).

Animation cycle - Is a series of drawings or cells which can be photographed over and over to give the illusion of a continuous repeatitive action.

Animators - The artists who are concerned with the lay-out of the sequence of action and draw the key movements in an animated film.

Aperture lens - Is the orifice through which light is admitted to a lens. The diameter of the aperture lens in relation to the focal length and transmission of the lens determines its effective speed. (Spottiswoode, 1951).

Breaking down - The idea of reducing a series of draw movements into its key positions.

Cartoon - Cinema film made by photographing a set of drawings, so that they seem to move.

Cell - One of the transparent pieces of celluloid used in cell animation. It contains three holes or slots which mount on pins under the animation camera to secure perfect registration. Animation art work is normally traced and painted on cells.

Cells - A very tiny part of human, animal or plant bodies.

Colour - Is referred to as mental sensation resulting from the stimulation of the retina of the eye by electromagnetic radiations called light, which lie within the wave length range of approximately 400 - 700 millimicrons (Spottiswoode, 1964).

Cut outs -

A method of animating where by cut - out images, drawings or shapes are moved on a background to a pre-arranged plan. The filming of cut-outs are done frame by frame in slightly different positions. Depth of field - Area of acceptably sharp focus in front of and beyond the plane of primary focus. The focal length of the lens (f - stop) determines the dept of field and the position of the primary focus.

Documentary - This is a type of film which is interpretative and more realistic than the conventional commercial pictures: most of the time, the background of real life and spoken narration are included.

Dope sheet - This refers to a camera instruction sheet.

Emulsion - This refers to a light sensitive material supported on a permanent base such as film.

Fast motion - When motion of the film through the camera is slower than the standard rate, the result is that actions appears faster than normal when the film is projected at the standard rate.

Field size - The area actually photographed.

Film Motion Picture - This is a thin flexible ribbon of transparent material having perforations along one or both edges and bearing a sensitized layer or other coating capable of producing photographic images. Films may be exposed or unexposed, they may also be processed or unprocessed. (Spottiswoode, 1964).

Frame - Individual picture on a piece of motion picture film.

In-Between - The preparation of drawings to cover the action between key animation positions.

Illustration - This refers to hand-drawn images produced in sequence and prepared for future animation documentary.

Jump - When a sharp contrast appears in the movement of animation cycle, an unpleasantly visible jump will be noticed.

Light Box - A tilted box with light in it, the design is like that of an art board easel. The top has a heavy glass through which light emits. The animator can trace through several layers of paper and keep his drawing in register.

Motion film - Is the movement of film, which contain the reproduction of series of discrete images that have been recorded at regular intervals, the movement is apparently intermittent.

'NAVA' - Nigerian Audio Visual Association.

Noise - Such noises that can be tape-recorded and synchronized in a documentary motion picture e.g. the noise of rain, thunder or the noise of a barking dog or a croacing frog, etc.

'N.E.T.C.' - The National Educational Technology Centre.

Optical effect - The production of shorts which involve conventional photography and animation art procedures like, fades, superimpositions etc.

Peg bar - A metal strip with three pins used for registering animation artwork; the middle pin is usually round and the other two are flat, one on each side of the middle pin.

Projector - A device by which films are viewed when such devices throw images on the screen. Projectors are either with a sound or without along with the picture image.

Puncher - This is a machine used for punching registration holes in animation cells and other artwork.

Registration - The precise positioning of an object. Films and cells depends for their effect on the exact repetition of positions.

Slow motion - Refers to motion of film in the camera which is faster than the standard rate, which therefore results in action appearing slower than normal when the film is projected at standard rate.

Sound - This is sensation produced through the ear due to an alteration in pressure or a displaced particle etc.

Sound track - A sound track is a narrow band along one side of the sound film, which carries the sound recorded.

Static - Non-moving drawn object on animation cells

Story-board - This comprises a series of sketches which indicates the key-incidents in the action which are arranged in order on a board called a story-board in preparation for shots or series of shots.

Synchronise - The action of fussing picture and sound film together such that when pictures are seen, the sound are heard correspondingly.

Timing - This is the allocation of time to animation cycle, this exercise is a check on the correct pace of movement before shooting begins.

Visuals - The picture images of which a film is composed, or other visuals like posters and flash cards etc, used to aid in communication.

Zoom or Zooming - This is the movement of the camera towards or away from the subject ebing photographed inorder to achieve a zooming effect on an animation stand.

Chapter 2

REVIEW OF RELEVANT LITERATURE

2.1 The Motion Picture

The history of motion film began with Thomas Edison in 1894. It was his invention that brought a new dimension to communication of information simplified for graphic documentation, educational and for entertainment purposes. The first films were silent but were later improved upon in the 20th century.

Edison discovered that the human eye can persistently interprete as correct any image (mental impression) for a small fraction of a second even after the actual source has disappeared. (Wittich and Schuller 1979).

Clarke (1974) also described persistence of vision as the Physiological function of the Retina of the eye 'storing' the image of an object for a fraction of a second after the object has disappeared. He emphasised that motion picture capitalizes on this function by rapidly replacing the picture projected from one frame by a series if slightly different pictures on successive frames. He also stated that ....

....."

> "If frame changes are made shorter period than that of the persistence of vision, a viewer experiences the impression of movement."

Based on this fact, Edison invented a mechanical device that took a succession of pictures very quickly at a

speed of 16 mm per second, and another device for projecting same images on the screen at the same speed.

In 1895, in France, the LUMIERE brothers invented the cinematograph through which they successfully projected their films. Initially, they showed their films in Fair grounds and they also featured in variety shows until Cinema houses were built for the showing of films only. Their films were nicknamed 'Flicks' because the process of projection was by flickers on the screen at only 16 frames per second. (Ely and Gerlach, 1980).

The first motion pictures were miniature cartoon entertainment films lasting for only about two seconds. The illustrations were hand-drawn simple coloured clowns juggling, concubines, dogs and hoops were made to move. The pictures of birds were seen flying, children were seen skipping and tumblers were made tumbling. Some of the early motion pictures made use of devices like the phenakistoscope which was made in 1832, the Zoetrope 1860, and the Kinetograph which was made in 1868. The Kinetograph was a camera that made use of celluloid film.

The Praxinoscrope was an improvement on the Zoetrope. This motion picture device worked with mirrors set at an angle in order to separate the frames instead of silts. There was a public presentation of the 'theatre Optique' which was based on the use of the Praxinoscrope,

but the show was not successful because the viewers concentrated only on the coloured cartooned photograph and image instead of the movement.

Education through motion picture began shortly after Thomas Edoson's production of "the housefly and the frog" on a 35 millimitre wide silent film strip. (Wittich and Schuller, 1979). George Eastman Kodak company in 1920 designed and developed the 16 millimetre silent projector, that was an improvement on early silent film projector. It also made a non-explosive "Safety" film and since then experiments were made on sound and sound effects.

It was in 1926 that the effect of sound and music synchronization on motion picture became successful. In 1927 one of such films, the 'Jazz Singer' with AI Jolson was shown. The film was then called "Talkies". More experiments were made on sound films. This raised the level of production of high quality motion picture programme. The first all talking picture named 'Lights of New York' was shown in 1928 and from that time cinema developed rapidly. (Harris and Levey, 1975).

2.2 Motion Pictures in the United States, Europe and Japan

Experiments in photographing movements had been conducted in both the United States and in Europe as far back as in the early 19th century, but no one recognised the technical and its commercial potentials.

In 1867, in California, Eadward Muybridge and J.D. Isaacs set up a row of electrically operated shutters to produce photographs of racing horses in motion.

Thomas Edison and his staff, in 1889, developed the Kinetograph camera. They used rolls of coated celluloid film. Kinetoscope was a device that was used for the peep show viewing. It became very popular because it was available for sale by 1893. (Harris and Levey,1975)

In 1895, after the Luniere brothers created the cinematograph, there was a rapid development of motion pictures and the importance the scientists gave to its improvement led to the development in United States, of projection machines, especially the Pantopticon and the Vitascope. They were used in York City in 1896. Although the screenings formed part of vaudeville shows and arcades at first, by 1902 'Movie Houses' sprang up. Three years later the first Movie Theatre was built in Pittsburgh. The patronizers paid a nickel for admission, and the theatre was called nickelodion.

The use of a camera in the course of the development of motion pictures cannot be over looked. Although at first the camera was used to film everyday contemporary attitudes, fashions and events, the camera was later panned from side to side and moved close and a way from

subjects. This was another development in the course of the history of the motion picture. The camera used to be in a stationary position.

George Melies was the first to create Cinematographic film trick effects. He incorporated a plot line, and artificially arranged his scenes to tell his stories. Two of his innovative accomplishments were "Cinderelia" (1900) and A "Trip to the Moon" (1902).

Edwin S. Porter developed the principles of editing films and created dramatic contrast in his films. His "Great Train Robbery" of (1903) was real to life. Hence motion picture business increased, production demand increased as well as competititon which led to rivalry among new film industries.

The American movie Directors produced about two films (pictures) every week. This steered up some form of competition among the directors. But in 1908, there was the development of 'guilds' among actors, cinematographers, writers, editors and film laboratory technicians. They worked on their own under the director. Motion pictures during the second World War expanded into education and propaganda.

In 1932, Technicolour, a three colour process, was developed and seen for the first time in La Cucaracha. Although the sudden boom in the development of television

set reduced the efforts of the film makers for sometimes, the 1950s experiment with wide screen process - such as cinemascope and cinerama; stereophonic sound system 3-D (three dimensional cinematography) created much interest for film watching.

In 1909, many unlicenced film makers moved out into Los Angeles close to the Mexican boarder for fear of injunction from the Picture Patent Company. And in 1913, Holywood, California, became the American Movie Capital. The famous film stars of this period in America were Charlie Chaplin, Buster Keston, Mary Pickford, Dougles Faubarks, Marie Dressler, Lillian Gish, Williams S, Hart, Creta Garbo, Rudoph Valentinia, Will Rogers, etc.

In the 1880s, E.J. Marey, a French Physician, produced the first motion pictures using single lens camera.

British Film

Britain is reknown for the illustrious talents she has produced in the history of film making. Some of their films were known to be "literate and often suspensful". (Harris W.H. and Levey J.S., 1975). It brought international fame to actors like Lawrence Olivier, Ralph Richardson, John Mills, Paul Scoffield, Meree Oberon and Michael Redgrave by 1929. The producers like J. Authur Rank, and Directors like Alfred Hitchcock, Carol Reed, David Lean and Alexander Korda (a Hungarian born) brought

to fame some of the British films. (Harris W.H. and Levey J.S., 1975).

Japanese Film

The Japanese produced action packed films after the World War II. They were especially noted for their "imaginative use of camera and colour technique." The Japanese, due to importation of culture, have definite elements of the West in their films. In addition, it is possible to find some aspects of the culture of Kabinci and Samurai tradition in those of Akira Kuroswa, Rashomon, Seven Samurai and Yojimbo. (Harris W.H. and Levey J.S., 1975).

So much for the development of the regular motion pictures. It is pertinent now to take a look at the development and features of animation films.

2.3 ANIMATION FILMS

So far, history refers to animation as the art of drawn cartoons with the basic intention of projecting them to cause the series of cartoons to move. Pioneers, like Walt Disney and his peer produced animated films solitarily in their studios. Some other individuals who were artists and producers have managed to combine their style of work with big business organisations for promotional purposes and sponsorship.

The animated film which is a branch of Cinematography was developed at about the same time when the Lumierre Brothers opened their Boulevard des capucines cinema in Paris. Since then animation art has been seen as a convenient method of simulating on film processes those events and activities that are found difficult to photograph as they occur.

Animation art can therefore be regarded as a step in the production of motion picture because it has been successfully put in use, for instance, where impressions could not be shot locally for the use of the cinema.

Animated films have a recorded history and the phase of it historically explains the gradual development and the struggle for its improvement. There are four main phases of the animated film. John Halas and Roger Manvell (p. 13) explain:.

> ".... (1) the initial period of trick work and magic,
> (2) the period of establishment of cartoon as a side line to commercial entertainment (mainly during the 19th century).
> (3) the period of technical experiment and of the development of animation in form of full length feature entertainment (during the 1930s and 1940s), and
> (4) the contemporary period during which there appeared to be an explosion of animated film into every kind of use - from television commercial to the highly specialized instructional film.

2.3.1 Periods of Trick Work Magic and Commercial Entertainment

The first two periods i.e. Trick work, Magic and Cartoon as side line to Commercial entertainment can be taken together.

There are a number of ambitious contributors to the development of film animation. As early as 1908 in France, Emile Cohl made white little match-sticksfigures to possess life, the match sticks were seen by observers to jump about against the black background. Four years later, the period between 1913 to 1917 cartoons were introduced into the American theatrical programme. It was about this period that Winsor McCay produced Gertie the Trained Dinosaur: John R. Bray produced Colonel Aelzatiar. Ben Harrison and Manny Goulds produced Krazy Kat Films. Pat Sullivans produced Felix the Cat and Max Fleisher used animation to produce Out of the inkwell series in 1917, he also made a contribution by producing Kobo the Clown. He combined cartoon drawings with actual photography.

These periods featured mainly the use of animals as the major film stars. During these periods, rudimentary dialogue was stuck to the lips of the characters in floating baloon shape.

2.3.2 The Period of Technical Experiment

Walt Disney produced and animated "Alice in Wonderland" in 1923. His first sound cartoon about the steam-boat was made in 1928. Disney was the first to introduce colour (Technique-Colour) and sound track. He found a studio in 1923. Some of his other contributions are Little Red Riding Hood, the Micky Mouse, with sounds already suncronized to the characters. He released Snow White and Seven Dwarfs. The animated film was both colourful and musical, it was regarded as the first commercial cartoon.

The introduction of colours and music in the cartoon films was applauded because it raised the level of maturity when the historical development of films animation and theatre entertainment is considered. Walt Disney's animators were remarkable in their unique way of creating imaginative carricature for naturalism of style and movement in their human characters (Godfrey and Jackson, 1974). The other contributors to the development of animation are the United Productions of America (UPA) an organisation founded in 1943. Their various experiments released to the world a simpler form of animation which eventually set a pattern of stylization for other animators of post-world war.

Oscar Fischinger made abstract mobile patterns to music in 1931 and this experiment was followed by colour abstract films which Len Lye initiated later in 1933.

in Britain. Some other experiments were carried out on animated cut-out figures from woodcuts between head shadow film. The brains behind this development were: Berthold Bartosch, the producer of L'Idee - Alex Alexieff and Claire Parker made the film "Night on a Bare Mountain". It had music syncronized to it. Their achievement was an initiation to the animators of the more advanced form of graphic style of animation.

In 1934, puppet films were developed, the pioneers behind the success of this technique are Ptushk, he made The New Gulliver and Starevitch who made The Mascot in France. George Pal, a Hungarian, started to advertise his puppet films about the same time in Holland.

Generally speaking, the experiments that were carried out for the purpose of developing animation survived for about thirty years. While the approach to it"differed sharply" most of them derived their strength from the various contemporary styles in modern Arts. (John Halas and Roger Manvell, 1951).

As film animation became more popular with the audience who enjoyed the fun and entertainment it produced, the state begun to sponsor films and its production at subsidized rates. This encouraged its spread rapidly in Russia, Czechslovakia and China. Their film subjects centred around the old tales and legends in graphic form. They were traditional and representational in character.

2.3.3 The Contemporary Period

The contemporary films initially had problems in that films were restricted to ages above 16 years (Harris W.H. and Levey J.S. 1975) said that parents had to accompany children to watch some films. This idea made films to boom. Some of the films of the 60s and 70s according to Harris and Levey include: Renata Alder, A year in the dark (1970); David Shipman; The great movie stars: The golden years (1970) Paul Trent, the Image makers; sixty years of Hollywood Glamour (1972); Penelope Gilliat, Unholy Fools (1973) etc.

In Nigeria, Ogunde featured his films "Aiye and Jayesini" and Ade Love "Iyaniwura" and "Ija Ominira" etc. The contemporary period also featured the children programme of the sesame streets which is a combination of music arts and drama. The children's television workshop is yet another current development in film animation. This workshop comprises of advisers of the most outstanding authorities on education, psychology and other disciplines associated with learning in the United States. (Clarke, 1974). The workshop has reputation from Nigerian viewers of the Sesame Street programme, these films are seen to be very educative and useful for the children aged 3 - 8 years old. The programme, Sesame Street, was originally designed to help poor children in Urban and Rural areas of United States and it incorporates entertainment variety and fast pace programmes found appealing to young children.

The educational curriculum was designed to provide the basic skills for youngsters before they enter schools. These skills involve the use of imaginative and mental abilities for reasoning and solving problems; preparation for learning and reading the English alphabeth, preparation for reading numbers from one to ten, learning about shapes and objects and also it tends to make the youngsters to develop awareness of self and their environment.

The Nigerian television Authority Lagos has also, through animation, produced some advertisement programmes. A packet of Elephant detergent was animated to turn and change direction in space. An elephant was made to project its trunk from the parket of detergent to create impact on the viewers etc.

There also is a recently developed animation advert on Milo in which a basket ball player was seen to make a basket with a ball and consequently the ball transformed into a tin of Milo descending through the basket ball ring, this is perhaps a novel idea in Nigerian advert.

2.4 THE NATURE OF ANIMATION

Every artist is believed to have one time or another attempted to create the characteristic of movement in his drawings, sculpture and painting. The craftsmen who weave, often infuse in their crafts the essential characteristic of life in most of their

creation. "The human nature has the tendency to act and to react emotionally to creatures and things that move." (Halas and Manvel, 1951).

Around 30,00 B.C. the bush men's paintings on rocks of Altamira in Spain and at Lascaux, in France gave the impression of motion. This evidence of movement of the animals being attacked by the hunters is one of the indications of man's early effort to animate. A close look at the painted vison inside the cave cavern, shows that old painted animals and figures have been superimposed thereby making some animals to possess up to eight legs shown in different positions which evidently suggest that the objects were in motion.

Another look at the Greeks work of art, suggest the perfected balance and life they forcefully brought out of their paintings and sculpture.

It is also possible to suggest that the imagination of Bosch when he painted the grotesque demons, was an attempt to fuse life into his painting. There are artists like Delacroix, Picasso and EL-Greco whose paintings reflect on movement in one way or the other.

"The essential qualities of animation start at the point where live-action film making stops". (John Halas and Roger Manvel, 1951).

Animation, being a separate art within the art, can be regarded as further extension of the main principle of film making in short, but limited to the world of graphic arts.

With animation, the artist intends most of the time to make each independent drawing to give up itself as a separate image and form a link to the main sequence of continuously moving image. In other words, each successive drawing is part of a pictorial sequence, a revloving series of objects drawn, which has a beginning and an end.

All forms of animation operate on these dimensions: Firstly, the idea of the movement which an object is supposed to make. Secondly, the sketching and drawing of a finished picture that makes the idea concrete and visible. Thirdly, the consideration of the width, depth and the perspective of the drawn movement. And lastly, the timing of the movement.

2.5 THE BASIC TECHNIQUES OF ANIMATION

Clarke, Gorlach and Ely, Roger and Manvell, Spottiswoode, Wittich and Schuller all discuss at varying lengths the issue of animation. The following summary come from these authors.

One of the techniques of animation is the puppet film which were first developed in Czechoslovakia by

Jiri Trinka. Another technique is the Silhouette film based on the old shadow play which has been used by Lotte Reiniger by means of tin cut-outs placed upon a horizontal translucent screen and photographed from above. Another technique of animation is animated captions. It is sometimes used in educational television and may be considered very important. The following are the primitive technical Phases:

(1) The photographing of the outline drawings in series on successive sheets of white paper.

(2) The reverse of the above, using the negative for projection and thus producing white figures against a black background.

(3) The cut-out figures placed against a plain white background - simple silhouette film

(4) The background emphasis drawn on the same sheet of paper for each frame of film.

(5) The silhouette film technique reduces considerably the number of drawing that is required by using a constant background, executed on a separate sheet of paper.

(6) A greater economy was the introduction of phase animation. The technique involved was the superimposition of the sketches one on top of the other to reduce the repeated drawing of background for each different phase in the movement of the background figure was made visible, when the trimmed sheets were placed successively over them during the process of photography.

(7) The Cel Animation Techniques - Here, the background of the film is constant, it is an independent drawing on white paper. The figures for the successive animation phases for the foreground were traced on thin transparent celluloid and superimposed at the photographic stage. The people involved in the improvement of animation on Cel were Earl Hord, an American film-maker, Raoul Baire and Bill Nolan, who introduced the moving panorammic background.

The primitive technical phases of animation are those outlined from 1 - 5 while 6 and 7 are very current. In addition to the above mentioned techniques, the professional animators have also experimented with the following more modern techniques.

Graphic style
Plasticine flexible toys and puppets
Object animation
Cut-out animation
Drawn-registered peg animation
The background animation.

(8) <u>The Graphic Style</u>: In this case, drawing are normally streamlined with only essential background which gives maximum effect. The U.P.A. style is a basic of the graphic stule of animation, they were style more liberated, simplified angular and sometimes stylised. The disciples of this period who experimented

on the graphic style are Walt Disney, whose drawing was circular and Revbenesque before the war. The demands of T.V. Commercials created an opportunity for the more simplified animation art, such as the ones produced by Picasso and Paul Klee, George Donnings 'Yellow Submarine', whose most of their art excluded details.

(9) The Plasticine: Flexible toys and puppets are especially very useful for children display in this case no drawing is required but objects can be made more interesting by shooting their limbs at an angle 45^{0}. This is normally done a frame at a time.

(10) The Object Animation: The field of view is of primary importance in this case, bottons, scissors, colour bottles, covers of bottles are very useful for creating decorative abstract background.

(11) Cut-out Animation: This technique provides ample opportunity for adding more interest to cartooning. It affords the opportunity of cutting out pictures from newspapers and magazines, so that the artist can get more effect into his film. The methods of this technique are as follows: The background may be sketched onto a paper or cel and the characters are moved a frame or two at a time across the background. This technique can be used to convey messages of violence, impact, quick actions and shocking images. It can be used for telling stories bearing a lot of action in it.

(12) The drawn register peg-animation: This is done by simply drawing onto a paper. It is also possible by this method to trace and paint each stage of the character cartoon in action onto a sheet of transparent cel. However, in this case the background is static while the cel is not. The advantage of this technique is that it provides a maximum naturalism of movement and the rostrum filming is much quicker.

(13) The Background: The background animation is very important in the successful creation of fun. Paper drawings, paintings, collage, cut-out, photographs, and pin-ups can be stuck to it to create tension, harmony, naturalistic abstract, childlike, simple, complex or functional work. It is worth spending time on the background creation since it needs not be repeated line for line.

2.6 DEFINITIONS OF ANIMATION

According to Raymond Spottishwoode (1964) animation is described as

> "the idea of bringing to apparent life and movement of inanimate objects set before the camera by employing the joint capacity of film and eye to fuse disparate images into an apparently continuous flow"

To summarize Spottiswoode definition of animation the materials listed below must be present before the idea of animation art can be fully understood: a

set of inanimate objects, a camera and film and the eye or the observer. John Halas and Roger Manvell (1951) in their glossary of animation terms, define animation as: "The art of giving apparent movement to inanimate objects". Godfrey and Jackson (1974) also define animation as "The artist interpretation of natural movement in a creative manner without directly copying nature."

The word animation is also applicable to the sequence of drawings made to create movement and also for the movement itself when being observed on the screen.

Animation art in simple definition can thus be described as a series of illustrated drawings that gives an impression of movement when viewed all together at the same time and it is an illusion to the eye. Actually, the drawn objects have been altered in its original positions slightly and a fast projection of these drawn objects makes it appear to move.

"Animation" is used in a specialized sense by film makers, film producers, cartoonists artists and animators to reflect the idea of the procedure and the processes of making things to move or to possess life. (Spottiswoode, 1951).

While it is true to say that everything that moves is animated, the film makers are mostly concerned by the

process and the nature of breaking down of movement into series of controlled phases. Animation, in its practical sense, is however, not complete until still objects like photographs or hand drawn cartoons and images reintegrate themselves to create the illusion of natural and even flow of movement on the screen.

Animation art when seen on the screen, actually portrays a degree of "graphic stylization". This adds more life to animated films and makes them look funny. This in turn create fun and entertainment for the viewer.

Ely and Garlach state that, animation art can creditably be described as a branch of film making which exploits the mode and powers of motion picture. Almost all aspects of nature can possibly be infused into it naturally. Halas and Manvel add that the blowing strong wind, the moving sea wave, the stormy weather, etc. the dancing elephant, and when thoughts of incredible motion comes to mind, such thoughts can be executed using the art animation procedure.

Animation art can be tailored to result in a lot of visual conjuring tricks. It deals with ideals and it can communicate ideas quicker than any other medium. With animation art, the impossible can be communicated in a simple manner to the viewer. It is not surprising that a little toddler or a baby can be shown lifting up an elephant, thus making him look like the most powerful

and wonderful baby that ever lived. The images for animation are usually drawn, composed and coloured by the artist. The artist controls the technicalities, the movements and the presentation of it. Some other forces, like the winds, the waves, temperature and tides, can be resisted to certain extent, but the laws of friction and gravity is absolute."

It appears there is nothing really impossible to create, in the world of animation. An elephant large as it is, can be made to fly and birds can be made to sit and dine with lions.

In order to make an impact on the viewers an animator may have to invent through his imagination a way of making his creation to withstand some of the forces like that of the wind and the tide.

2.7 ANIMATION PRODUCTION

Godfrey and Jackson (1974) stated that Film animation is based on ideas of artist interest to improve on reality, and to add to nature. Film animation can therefore be regarded as a medium of disseminating knowlege and communicating ideas quickly. The principles involved have been stated:

(1) The principles of animation art are based on the idea of making films of one frame at a time. By so doing the artist has a better control of his ideas and when these ideas are well manipulated

the artist can easily conjure visual tricks. (Halas and Manvell, 1951).

(2) Animation art was developed to impress the observers thus it is quite possible when still picture frames are projected continuously at the same speed it gives the illusion of movement.

(3) Animation production begins with sketches on a story board.

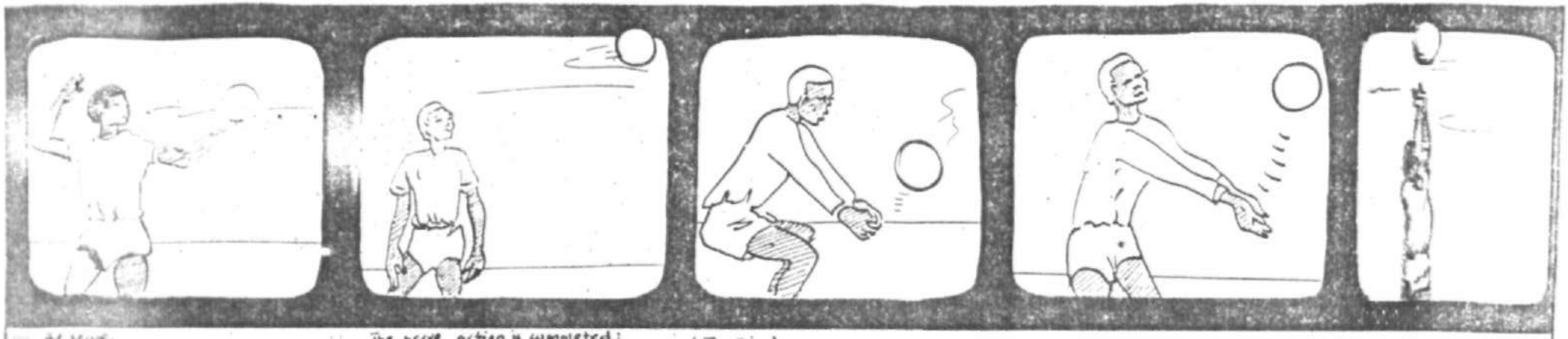
Burke (1973) considers the story board as "a visual plan for advertising message". It consists of a sequence of illustrations that gives a rough idea of the total commercial. The key scenes are sketched and each is accompanied by its video instructions and the copy or the audio.

It should be obvious that the story boards are a useful, and handy device for explaining and interpreting commercials and advertized products.

The story board makes it easier for the film maker to get quick access to the technical, conceptual and aesthetic problems.

Another advantage of a story board is that it makes available to the film maker the ordering and choosing of images. The way these arrangements are made could give a true impression of the idea being communicated.

THE STORYBOARD



At serve.
Concentration is very necessary to make a good tennis service.

The serve action is completed!
Ball has been hit forcefully to travel in the air over the net.

(The Dig)
This action is meant for initiating an attack – Hands are held together, straight back, flexed knees

Action completed.
The ball is hit with joined hands to initiate the 'set' action.

Jump
There is a lot of [illegible] with [illegible] the toss



The action for set up is completed
What follows is the 'spike' action to effect an attack of opponent.

The movement for spike action.
Preparations for the jump
Timing of the ball is very important.

The Jump
The jump is made with two feet and flexed knees.

The Spike action is completed
The ball is hit down with open palm forcefully.

[illegible] action.
[illegible] with left foot for [illegible]. The reverse [illegible]

EXAMPLE

Table 2.1 A Storyboard: (built on an aspect of Volleyball game)

Topic: Playing Volleyball Game

Subject	Duration (Seconds)	No Frames	Sound
1. The ball is thrown up and hit over the net	15"	360	Konk!
2. Preparation for the 'dig'	10"	240	Wheeeee
3. Setting up the ball	5"	120	Vvvrooom
4. Spiking the ball	5"	120	Zzaaaap

A story board is very essential for building up a complete statement about a situation. However, it is the written 'script' that leads the ideas to progressive flow of information when sketches are expressed to show the key positions.

The Format for the Story Board

The standard story boards viewing format has its width wider than its height. This is in conformity with the television screen shape and design. The normal format is 8cm x 10cm with due consideration for the depth of field. Immediately under the screen, there is a space measuring 1cm x 10cm for the writing of the short visual commentary.

The second large space that comes under the screen measured 5.5cm x 10cm. This space is generally used for the explanation of the story to be animated.

A story board can be of any size provided it is not too large or too small for the rough ideas to be expressed quickly. But the enlargement of the drawings on paper or cels must fall into any of these format: field 9, field 10 or field 12, it must be in proportion of 3 x 4. The idea is to get all the images that may fall inside the designed screen space sharply. Very often, depth of field that is too large to be covered effectively during shooting operation may cause the film to wobble during the projection of the film.

When objects are drawn and position into a sheet of paper of about twenty four pages, if the paper is then held on the left hand and with the right hand, if the pages are flipped through quickly, the object drawn in a set of different position appears to move. (An experiment on this was conducted by Mr. Rishante for the part II students of the Industrial Design department in 1982). (Actually most of the students' experiments were successful. Attempts were made using the ball to 'bounce' and an 'umbrella' was seen opening up as the rain pours from the sky.) Mention should be made of the Kaduna 'NETC' Animation Unit. For they designed a bird in such a way that the bird wrote out the letter 'NETC' as a prelude to their Education programmes.

is essential when preparing an animation film. The illustration of the movement of a snake, begins like this: The snake is drawn perfectly in its natural position and shot on to a frame. Next, about '¼' of a movement is made in the same position with its head and tail slightly moved. The consequent frame is also shot with the head, body and the tail slightly moved... and so on. If finally the series of frames are projected rapidly one gets the impression of a moving snake. This principle is about the same with live film action. When pictures are prepared for animation, each strip of it would normally contain frames showing the successive stages of the movement and when spun in the machine and viewed through separate slits, the eye saw movement on the same principle as on a cinema screen.

The speed of an animated film has to be designed to suit the objective of the objects to be seen moving. The speed of an animated object also can be extended to create a forceful effect by allocating to a particular movement a larger number of single frame exposures. When the number of a particular movement is decreased, the object is seen to disappear very much quicker than others with a larger number of single frame exposure. Precisely, a movement which is allocated twenty-four frames will occupy one second of screen time when projected. One of 144 frames will lasts six seconds, so it continues.

Clarke (1974) suggests that when frame allocation has been made, the designer must carefully describe an exact position for the cut-out on each frame. He also stressed that art work for cut-outs should be prepared on thin card. The researcher tends to agree with him because papers will curl under intensive heat and they may be blown away as well.

SOUND

"Sound is a basic and indefinable psychic sensation aroused by vibrations of a certain character received through the ear and the bones surrounding the ear." (Spottiswoode, 1973). Sound can be transmitted through the liquids, solids and gas medium. Sound which is caused by wave motion can give rise to a sensation of sound. The periodic vibration of waves that emanate from chords, strings, column of moving air can cause sensation of sounds.

There are three basic characters of sounds, they are frequency, intensity and its phase. Sound which was recorded on wax disc was an improvement in sound and film synchronisation. The early film makers recorded sound on separate discs which made film and sound synchronisation very poor and clumsy.

Voice, Music, Sound and Sound Effects

Similarly when two objects touche or rob each other the air around the objects vibrates and emit sound. Film animation is more exciting when sound is added to it. It makes it more professional. There are different kinds of sounds that animation art can make use of effectively. These range from Music sound, Commentary, lip synchronisation and sound effects. There also is the 'mouth' sound and 'found' sound. Sound track could be used to complement the various movement in this project.

Sound tracks, however, are found only on 16mm and 35mm film (Bourgeois Jacquis, 1973). The images on films occupy only a section of the width of the sound film a straight band is normally reserved for the sound track. The sound often appear like small continuous design so that when it is passed in front of the electronic reproducer of a sound projector they are converted to noices and sounds. Generally the sound track unrolls ahead of the image frames.

The technique of synchronisation of sound and image works like this: On a sound film, the advances is based on 24 frames per second, but since some of these images will be displaced .... the sound image displacement corresponds to a total length of 21 frames in 35mm film and to 28 frames in 16mm film in other to obtain a perfect

synchronisation of sound and image. Very close attention should be given to this displacement. (Bourgeois Jacquis, 1973).

Local sounds can be produced by scratching on the emulsion side of the sound track. The sound will certainly be unusual but can add a lot of hatching and shrill sounds to the animated film. For this project, a sound track and 'mouth' sound could be used.

Sounds like voice, music and other special effects could play a key role in animation art. A few commonly used sounds in animation are the crash sound, this may be useful for indicating a mosquito alighting on the body of an organism, a camera shake to give vibrating sound and other sounds like, Whoooooomm!... Whheee! Zzaaaap! Vvrpppp,! etc. could be used to indicate movements of speed.

2.8 USES OF ANIMATION AND CINIMA

For many years now, the medium of motion pictures have become a standard means of communication in the classroom in developed countries. From observation, this medium is yet to be properly utilized in the third world countries. Nigeria is no exception. There are many advantages derivable from gathering information through motion picture. Here, in brief, are some of the advantages of the use of motion pictures. See Ely and Gerlach (1980).

Motion pictures can motivate students because they enjoy the medium. It can also create history accurately, especially when events are shown in detailed set, using the correct costumes, it can add to the learners experiences about what happens in the other parts of the world, be it the social or cultural accomplishment. And such activities can be viewed in the classroom.

Teachers may find it easier to use the medium to explain or to demonstrate to the students abstract concepts such as movement and formation of mountains earth quarkes, Light beam, laser beam, and even visual explanations of ideas of a theory in mathematics ..etc. and human reproductive processes can be explained in a simple and clear manner.

It is possible to demonstrate the experiment of the famous 'Test Tube Baby' by combining the motion picture and animation art medium. Since the mother had her second baby from the 'Test Tube' between the 12 and 14 day of June 1980 both medical and non-medical students would be willing to see the processes involved in order to increase their knowledge. Since Isaac Newton established the three basic principles of motion which give cue to animation art, the animator can therefore tailor his objectives following these laws which can be exaggerated or distorted, in order to arrive at a convincing objective based on natural behaviour.

The artist therefore has the opportunity to prepare drawings which can be photographed by a cine-camera to create an animated film. This media can extend

the limits of what the eyes can see to that which can be imagined. For example, the flexibility processes of preparing illustrations for animation can be manipulated in order to increase the time lapse so that it would be easy to watch an opening petal of a flower. So also it is possible to slow down the speed of an event or the processes involved in order to make a documentary or in recording of an educational programme.

One further advantage is that animation, provide enough choice and freedom to exercise the power of thought through imagination.

The idea of image reality is an added advantage. Apart from providing a unique learning experience for learners, both hypothetical and theoretical ideas can be broken down and expressed in simple mock ups models.

In 1922, Yale University, produced "The Chronicles of American Photoplays" It was a silent film but was accompanied with explanatory titles. This film was tested to find out whether motion picture really contribute to classroom learning experiences. Wittich and Schuller (1979) confirmed the findings ....."the use of the chronicles of American Photoplays series increased pupils' knowledge of places, personages and events from 19 to 33 per-cent.....The film stimulated 40% more free reading by pupils who had seen and studied them." See Knowlton and Tilton (1929).

While the first experiment was a success further tests were carried out on science and Social Studies. More films were tried in classroom situation and the result according to Wood and Freeman (1929) was that

> "that 60 per cent of those who saw the films achieved a level of proficiency attained by only 50 percent of the pupils who did not see the films".

It was also reported that there was an added interest in voluntary reading among the film using pupils.

From the literature review therefore, we have seen the development of the motion picture and that of amination. We have seen that amination art would be and is being used to concretize abstract concepts which has led to better understanding and proficiency in communication.

Summary of Findings of Literature Review on Communication and Animation

(i) Communication can be described as a structure of thought brought into action.

(ii) It was also found that a great deal of communication takes place which is not couched in formal language. Field(1970) this suggests that communication may be verbal or non-verbal.

(iii) Art communicates in a form of -non-verbal expression, it can be used as a form of communication such that all categories of people can relate to (the literates, non-literates, the children and adults). The fine artists communicate by expressions in forms of lines, colours, tones shape, mass etc.

Art is visual and it has been used to back up scientific findings and exploration. The exploration of the univers in 1960s by the austranauts was communicated directly to the world through visuals. Also, the Black American Neil Armstrongs stepping onto the moon from the space - ship was communicated directly to the Earth through television set.

Nigeria with her high percentage of illiterate can be helped through improved visual communication system, such that the gap of knowledge may be reduced, that is, if the functions of art which is to "express feelings and to transmit understanding" to the mass of illitrate could be employed.(Read, 1931).

(iv) It was also found that concepts about living things are often depicted in

static form. This can very easily be noticed in books and posters and also the bill board design. But this sometimes could be misleading. In any case, it does not give the true picture. Professor Uche Okeke in his letter of invitation to fine artists participation in the ulme programme in Kaffanchan in November 1985 also stressed the masses' misinterpretation of a "snake for a pyton". It is believed that people will understand processes and development within life-actions if the actions can be shown visually. The processes and the development of the measles seen in a living form - a nor static form, can be depicted in animation medium.

In the next chapter, the focus will be to report attempts made in this instance towards understanding the measles and developing materials that could lead to the presentation of the measles, through animation art, to produce understanding on the part of the target audience and possible reduction in the occurence and disaster of the disease.

Chapter 3

PROCEDURE

Oral Interview, Lectures, Observation Written Sources

For two years, 1982 to 1984, the researcher attended lectures with the medical students in the department of microbiology in ABU Zaria so as to grap the understanding of the pathogenesis of viral diseases generally. On 8, Feb 1982, Dr. Joseph Rishante the first supervisor of this project wrote a letter to Dr. N.E. Gomwalk a senior lecturer and specialist on measles virus, seeking for his co-operation with the research student. A reply to the request was sent through the Head of the department of Industrial Design of the need for carring out a research of this nature inorder to improve the lots of the science students by making them see the visuals of viruses replication which were usually very difficult to explain to them. Also, on 7, June 1982, the researcher requested for a letter to be sent to the Head of the peadiatric department, a unit in the Ahmadu Bello University Teaching hospital Zaria, so

that the researcher could study and examine patients of measles undergoing the various stages of measles diseases and to grasp the knowledge required inorder to be able to properly illustrate the course which the measles agent takes when it affects a child.

On 15, June 1982 Professor Abdulrahaman conceded and sent a letter of approval, not by post. All the departments concerned with treatment of children's diseases were requested to co-operate with the research student.

The researcher also visited measles patients undergoing treatment in their homes, in Samaru village, Sabon - Gari, and on the University Campus, visits were made to Areas, F. Bz, A and G to see and ask questions on how the parents of measles patients take care of their sick children. This study and observation was carried out through 1982 and 1984. The sick bay on the University Campus and the Medical Library of the University Teaching hospital were extensively used in search of current and useful information about causes of measles diseases its, prevention and its cure. Contacts were made with Dr. N.E. Gomwalk, ABU, Zaria, the supervisor of the project on measles

diseases. Other specialists contacted were Dr. C.S.S. Bello, a specialist on virus in the Ahmadu Bello University Teaching Hospital Zaria, Dr. Kolawole and Dr. Gbolahan, both are medical specialists on viruses in the Microbiology Department of the University of Ife. Professor Abdulrahaman was also interviewed on the probable causes of measles diseases in contrast with local illiterate women who relate the causes of measles to magic and supernatural powers.

When the researcher discovered that measles particle was responsible for measles disease, an attempt was made to get close to see the particle under an electron microscope which was later found to be unservicable. The search for measles particle itself was a major problem. The researcher visited the Heamatology and the pathology departments of the University Teaching Hospital in Zaria from Agust to November 1984 but no such record of measles particle was kept, either on bromide or otherwise. An attempt was made to contact a United Nations specialist who was working on measles virus in Kenya in October 1984, but the attempt failed because of financial reasons.

Since it became impossible to get at the measles virus particle to perform any experiment on its structure, the consultant, Dr. C.S.S. Bello and the head of the 'ABUTH' medical library suggested that I look through other written sources. It was the illusrated particle of measles that the researcher has used for carrying on with the studies. The book was written by Marthin(1983). The supervisor of this project approved of the 'visual' illustration of the measles particle before the researcher used it to illustrate the sequence of measles replication in human.

(See bibliography at back page for other relevant written sources.)

The use of the data on measles so far collected required to be prepared for animation in the near future. To prepare for this task, lectures were attended with Dr. Joseph Rishante and with Professor T.A. Montifa on animation art procedure and its techniques.

From 1982 to 1985, information was gathered on animation from two sources, the National Educational Technology centre in Kaduna 'animation and film unit', and from observing closely the

programmes of the Kaduna 'NTA'. Another source of information was the Nigerian Television Authority in Jos where the children's cartoon - programmes were featured. Occasionally informations were gathered from relayed cartoon advertisement and entertainment programmes during the interlude of the Lagos Net work news at 9.00 p.m. from 1980 - 1985. Some information was gathered through observation after seeing the video tape of cartoons of Walt Disney's series.

Apart from understudying the works and programmes produced by the National Educational Technology in Kaduna, a senior technician Mr. Felix Obialor, advised on the problem of shooting.

The head of the animation art studio of the 'NETC' (The National Educational Technology Centre) Kaduna, Mr. Moyo, as well as the Director of the 'NETC' were acquainted with the researchers endeavour, but the problem of finance did not allow the researcher to go into animating the prepared illustrations.

The validation of the research instrument used began on a 'story board'. The topics on measles was submitted to the supervisor on measles

virus for comments, scruting and approval. All the items illustrated on measles disease were examined to verify that:-

(i) only relevant information were illustrated

(ii) the illustrations were clear and precise

(iii) They were relevant to the problem of the study.

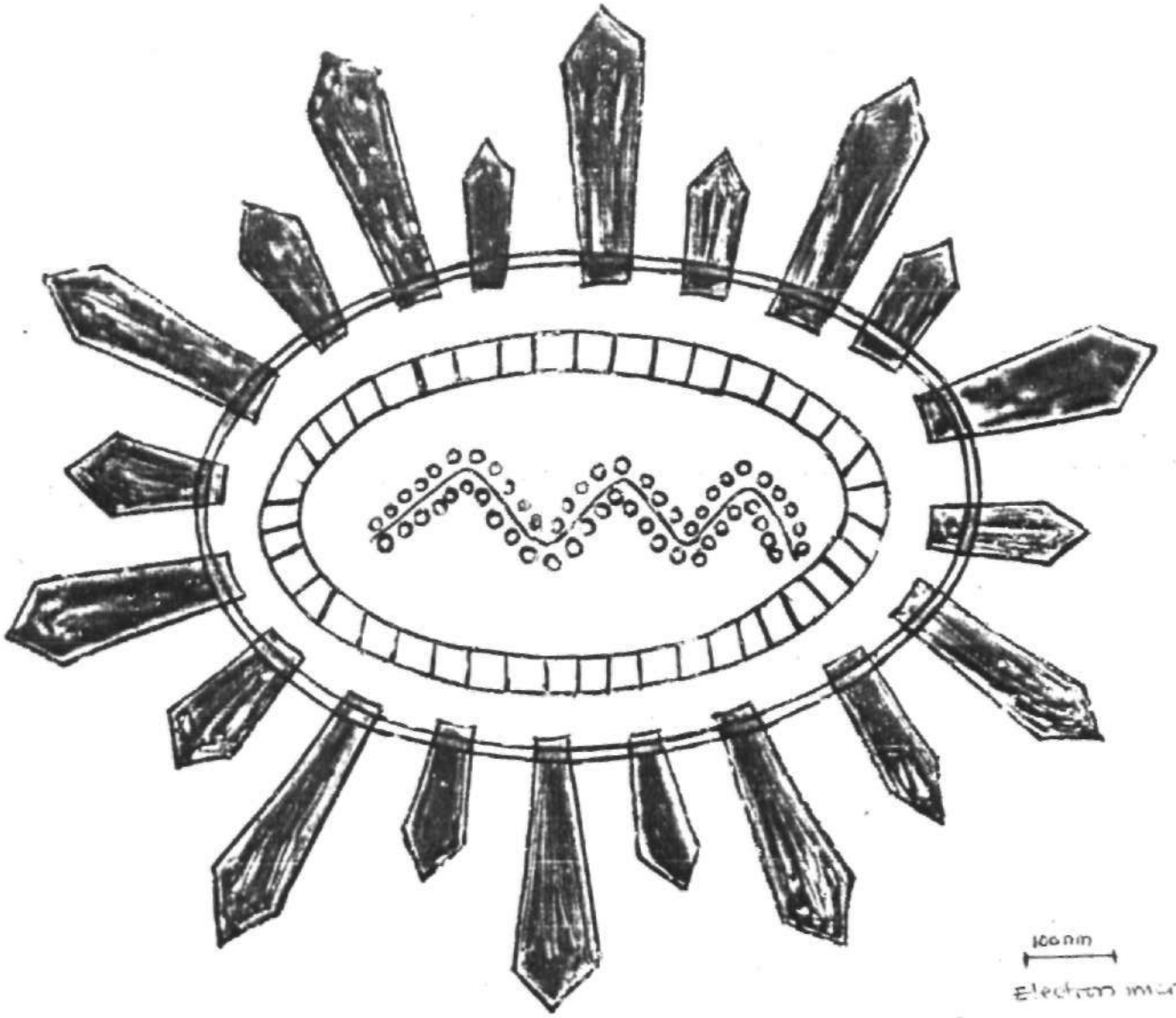
After all the above the possibility of putting the information and sketches prepared into animation was discussed. It was then discovered that this would be impossible for the following reasons:

(i) The machines were there at the NETC but the chemicals were too expensive for a project like this.

(ii) The materials e.g. cell paper, paint, Ektachrome films were not available; The sketches drawn originally in colour had to be put in black and white.

(iii) The charges even for black and white slides were too expensive.

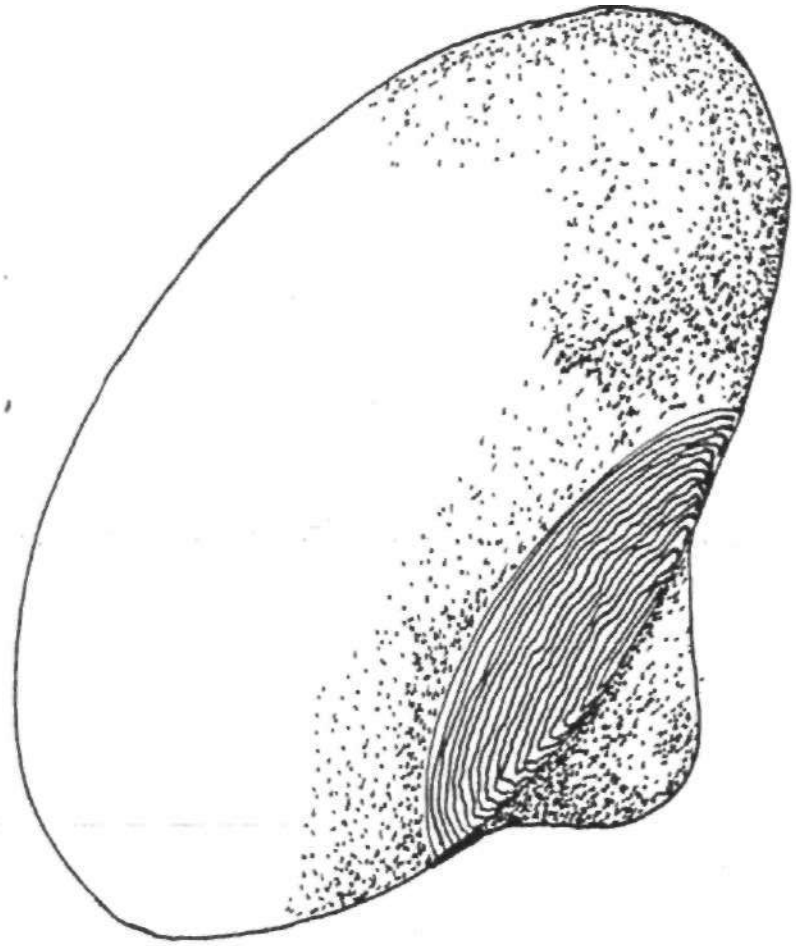
(iv) To produce the illustrations was too time consuming and very expensive.



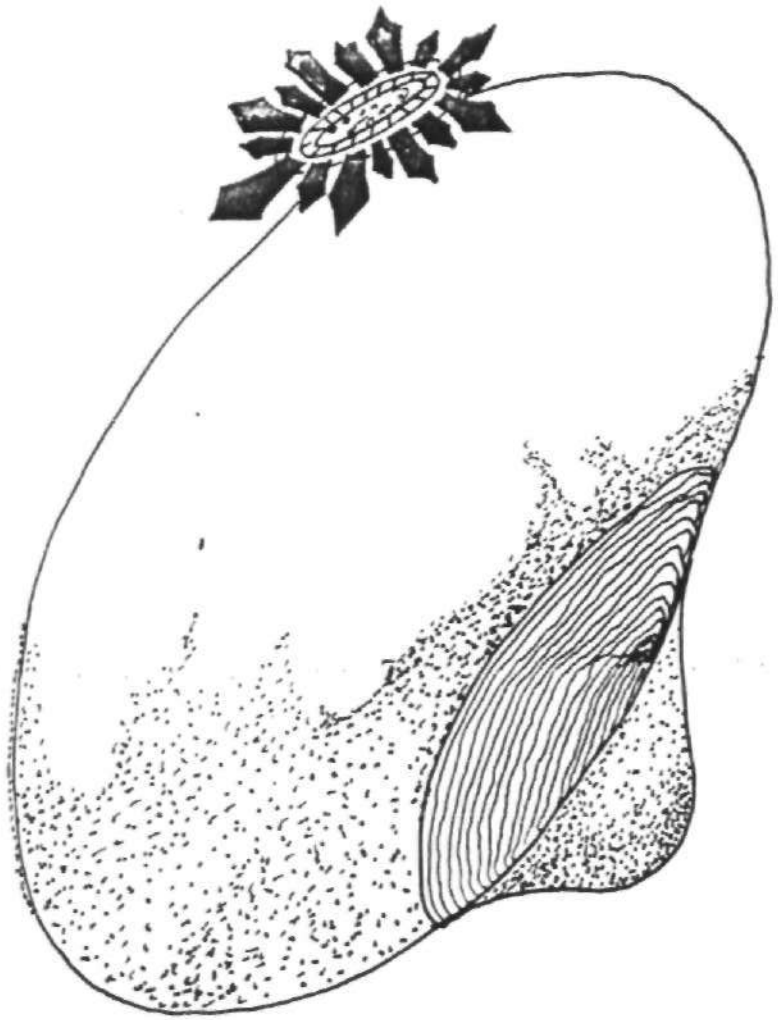
Electron micrograph.

A Particle of measles Virus.

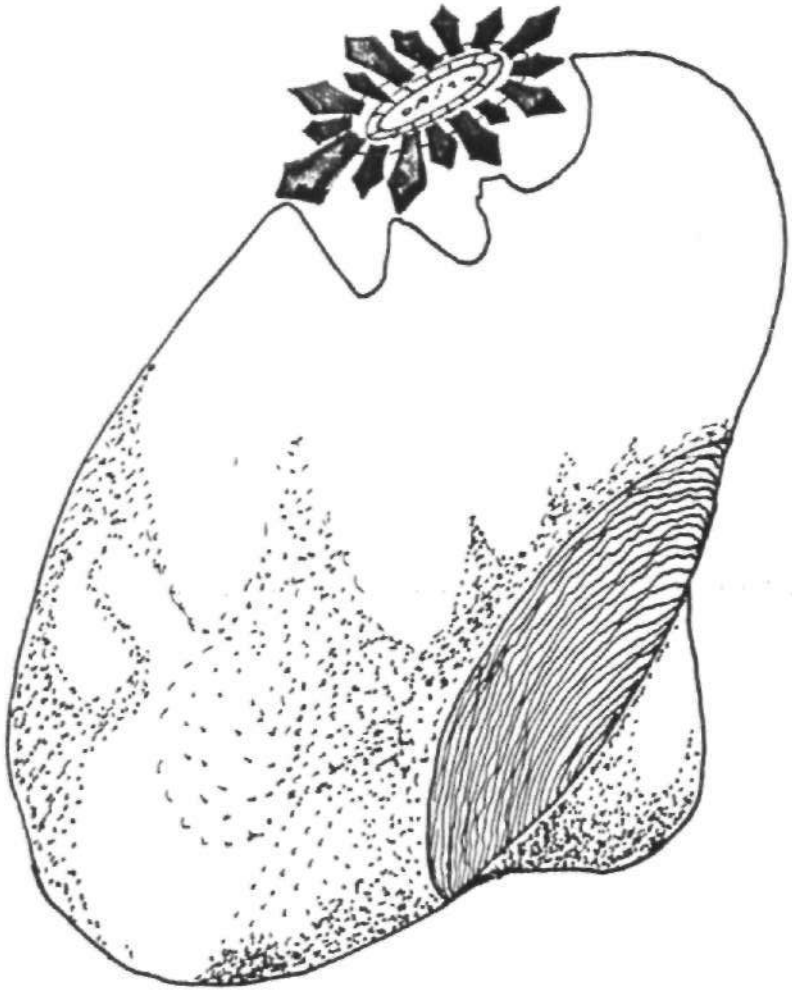




2 Norwalk Virus interaction with host cell.



Adsobtion Stage.

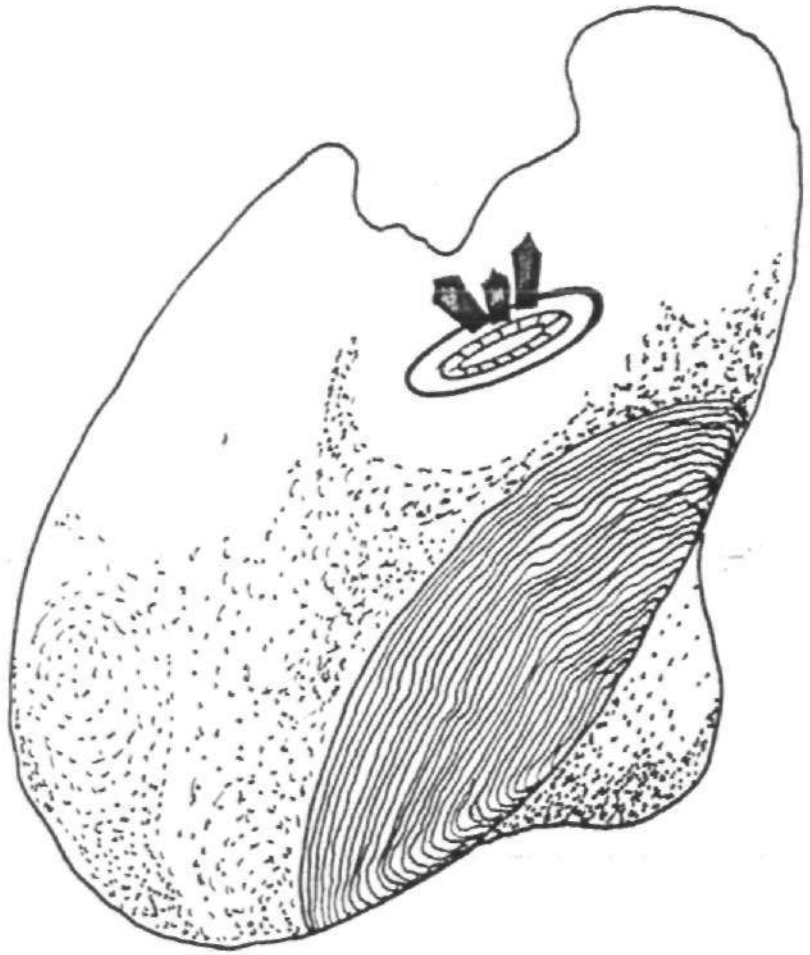


4 The hosts cell gives way to accept virus particle.

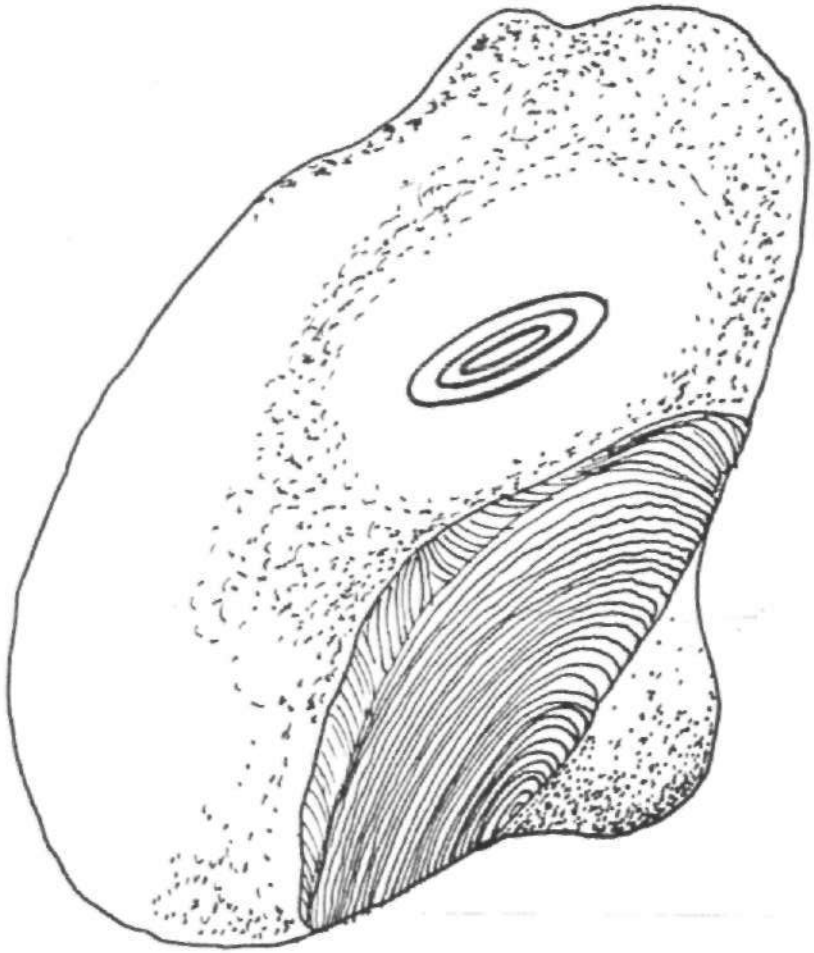


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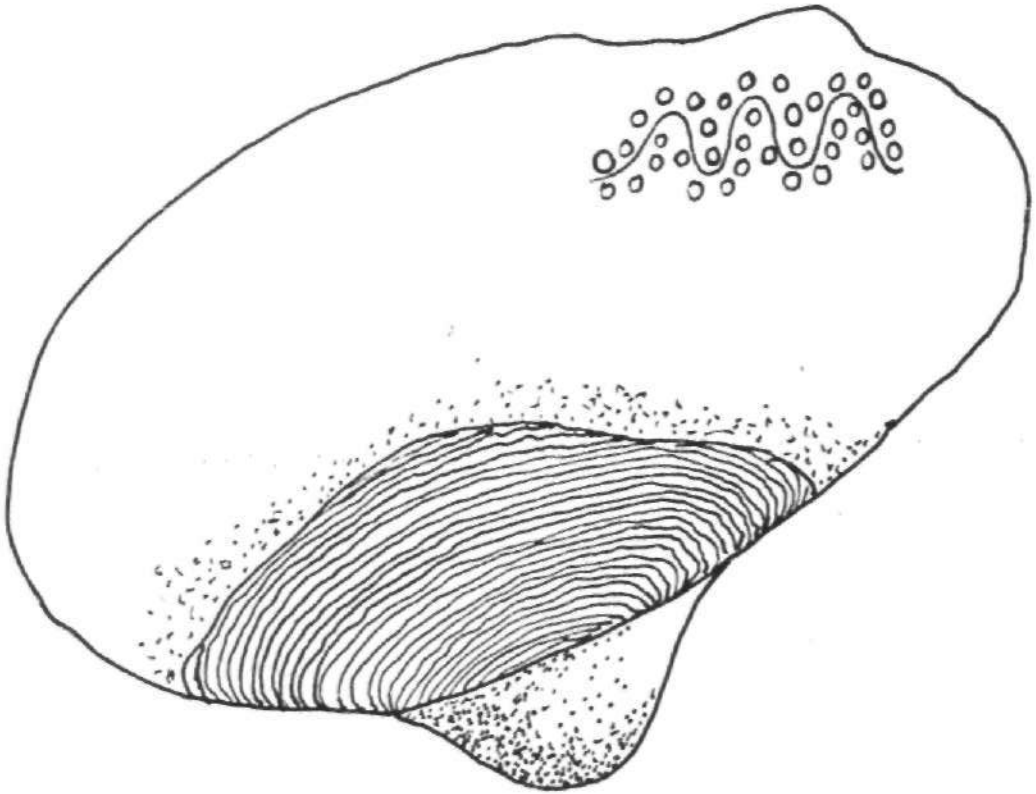
MEASLES PARTICLE INSIDE THE HOST CELL.



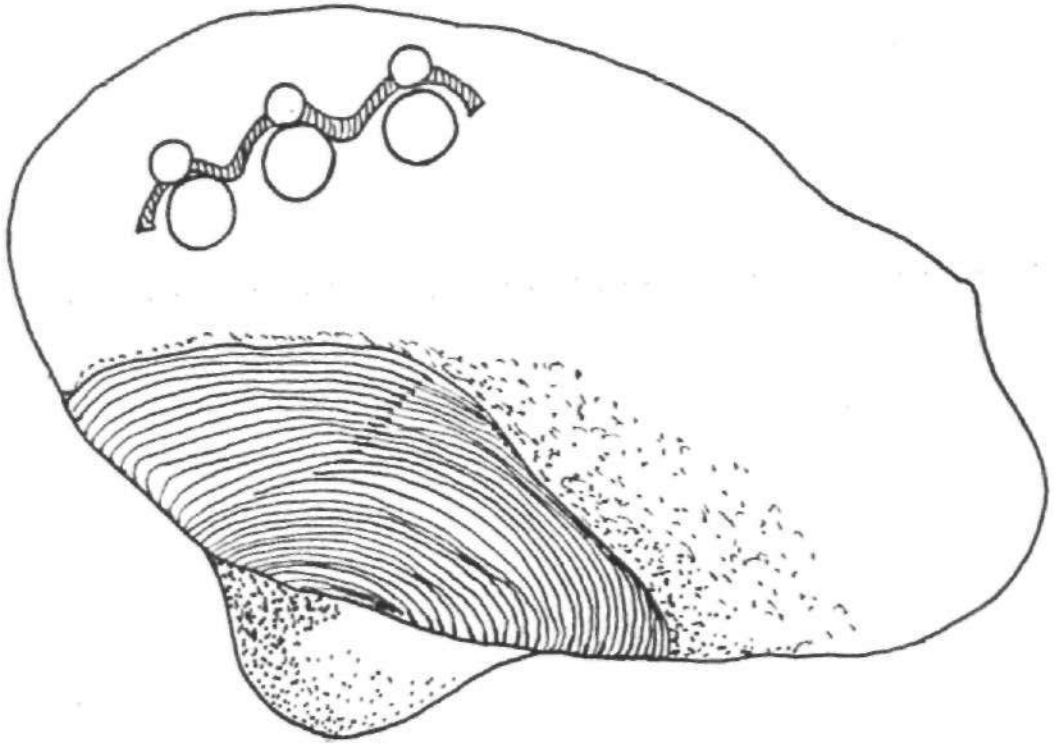
6. The particle is 'uncoating'



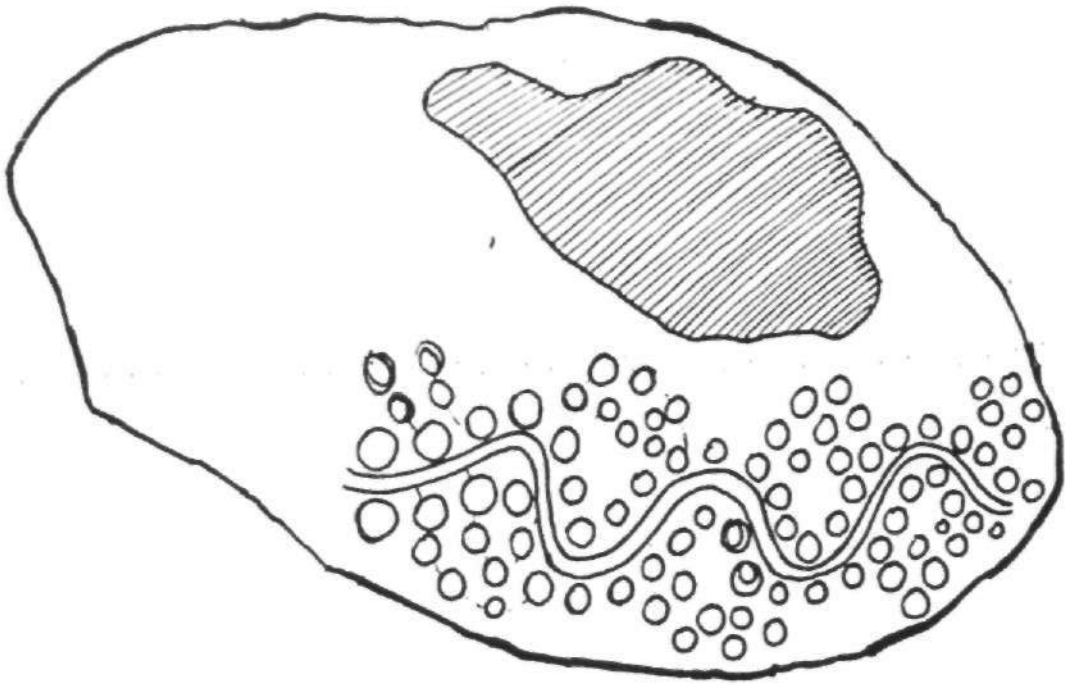
7 THE UNCOATED VIRUS INSIDE HOST CELL. 71



PRE-TRANSLATION STAGE



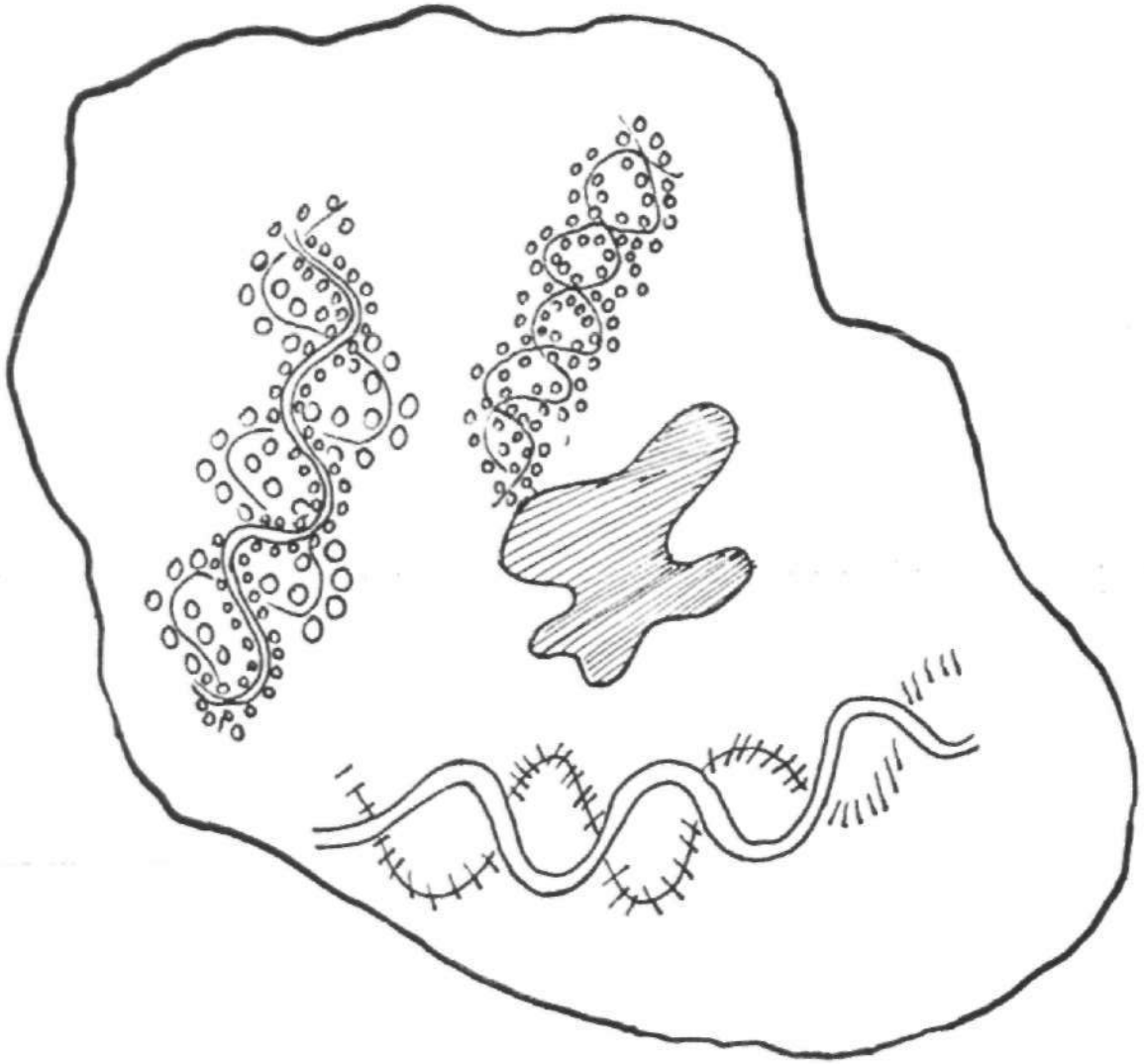
9 MESSENGER R·NA TRANSLATING TO FORM RNA POLYMEARSE 73



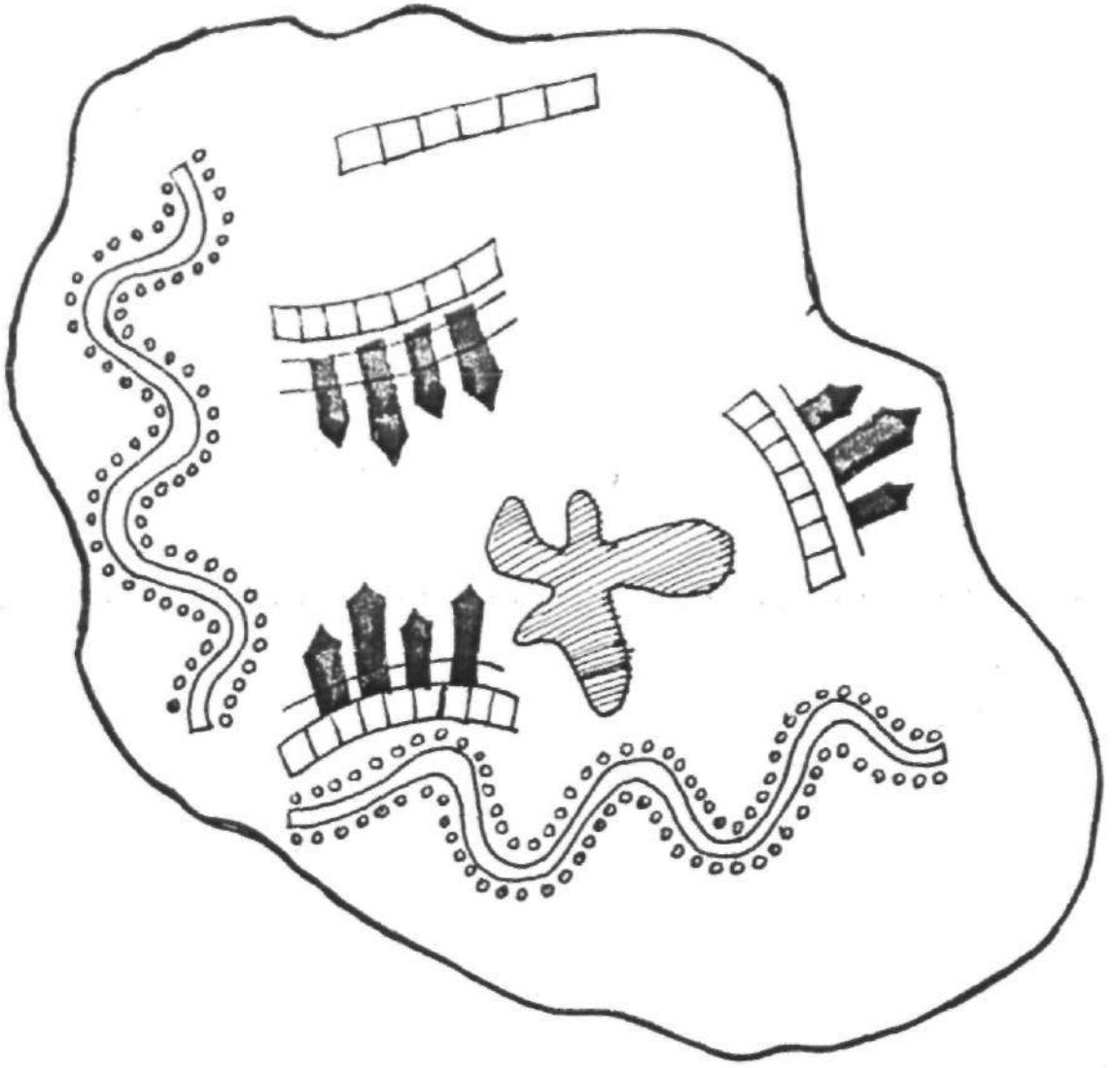
10

REPLICATION.

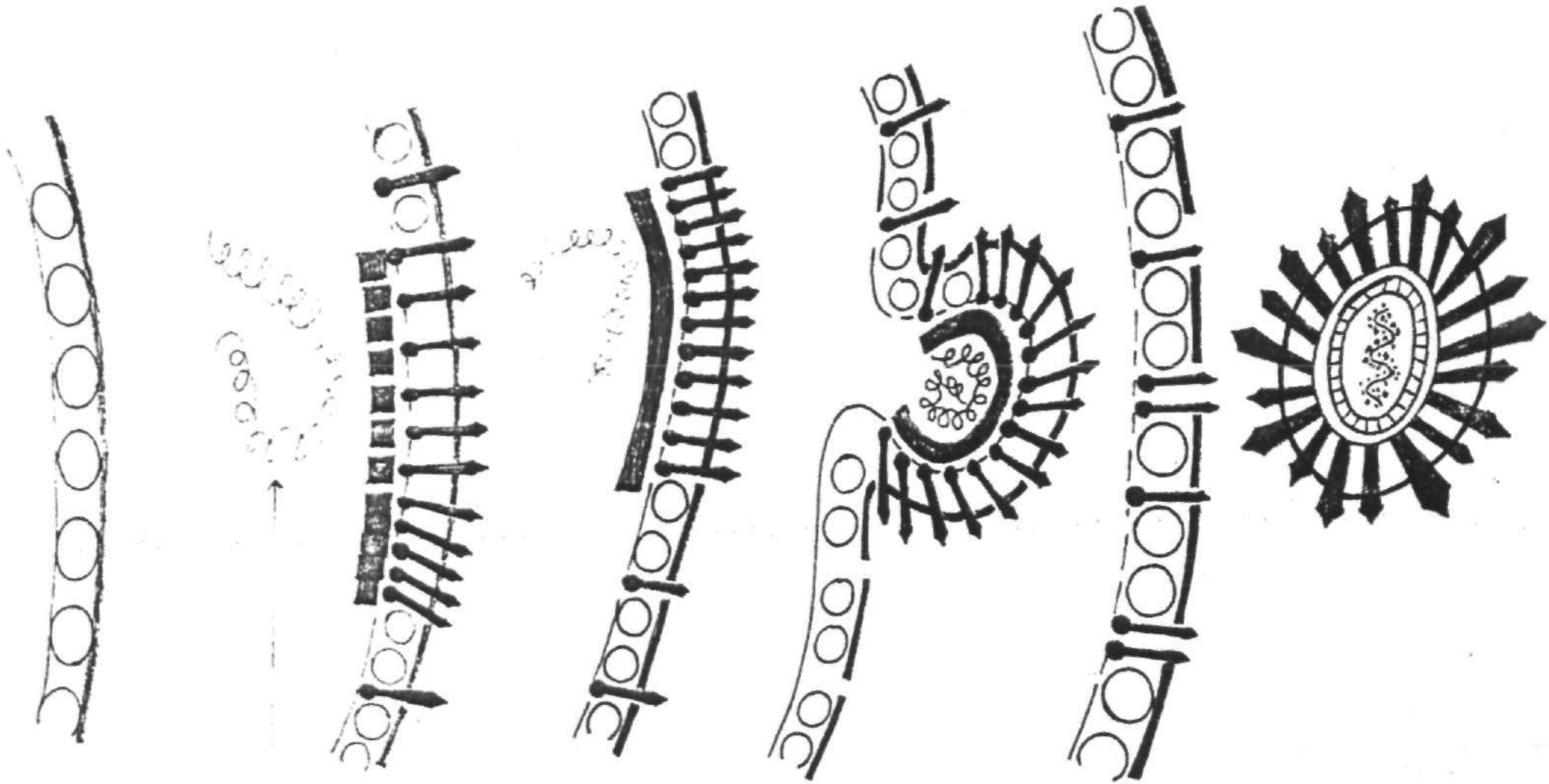
74



PRODUCTION OF PARENTAL RNA STRAND AND COMPLEMENTARY STRAND SYNTHESING

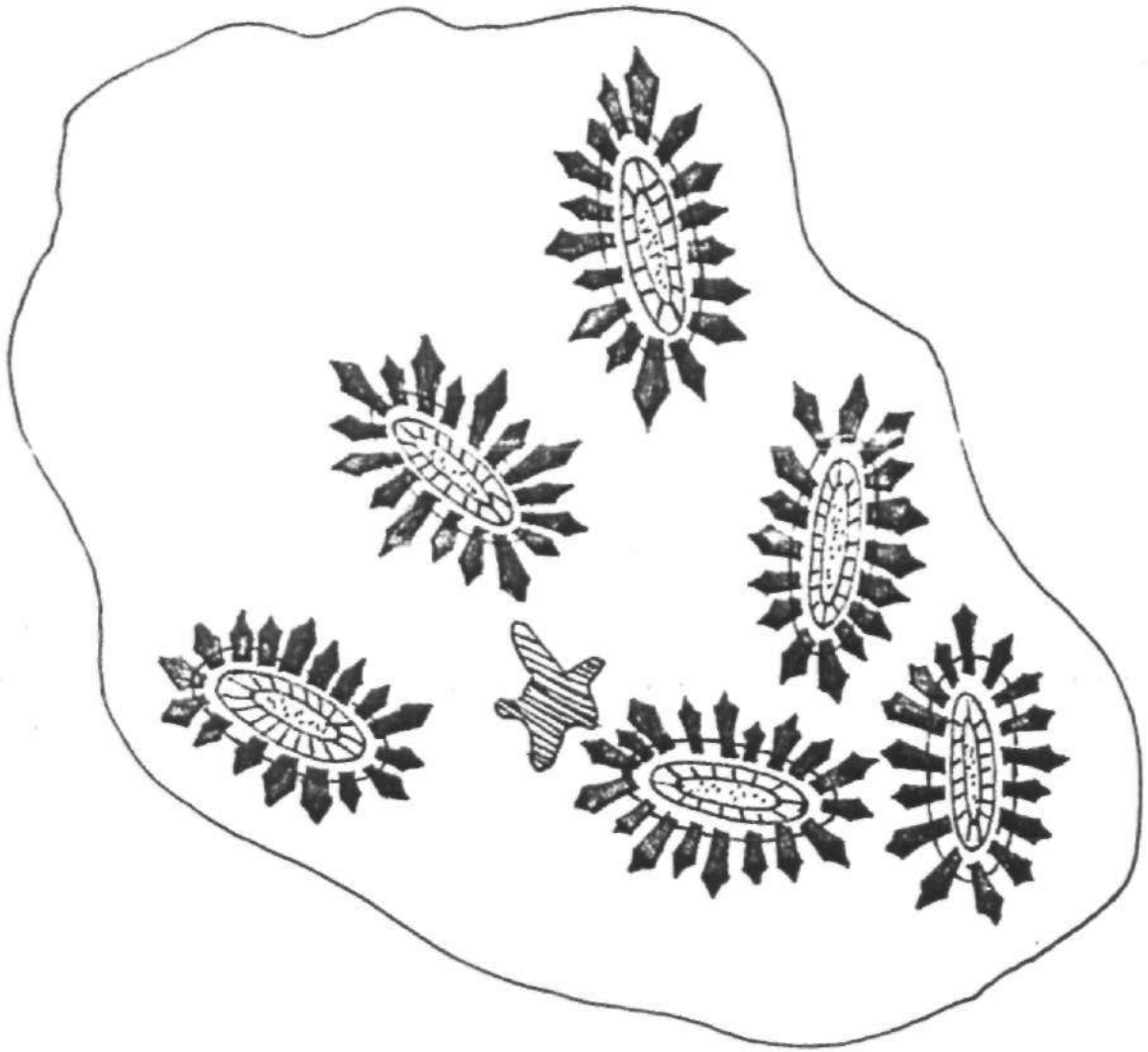


12 THE ASSEMBLY STAGE.

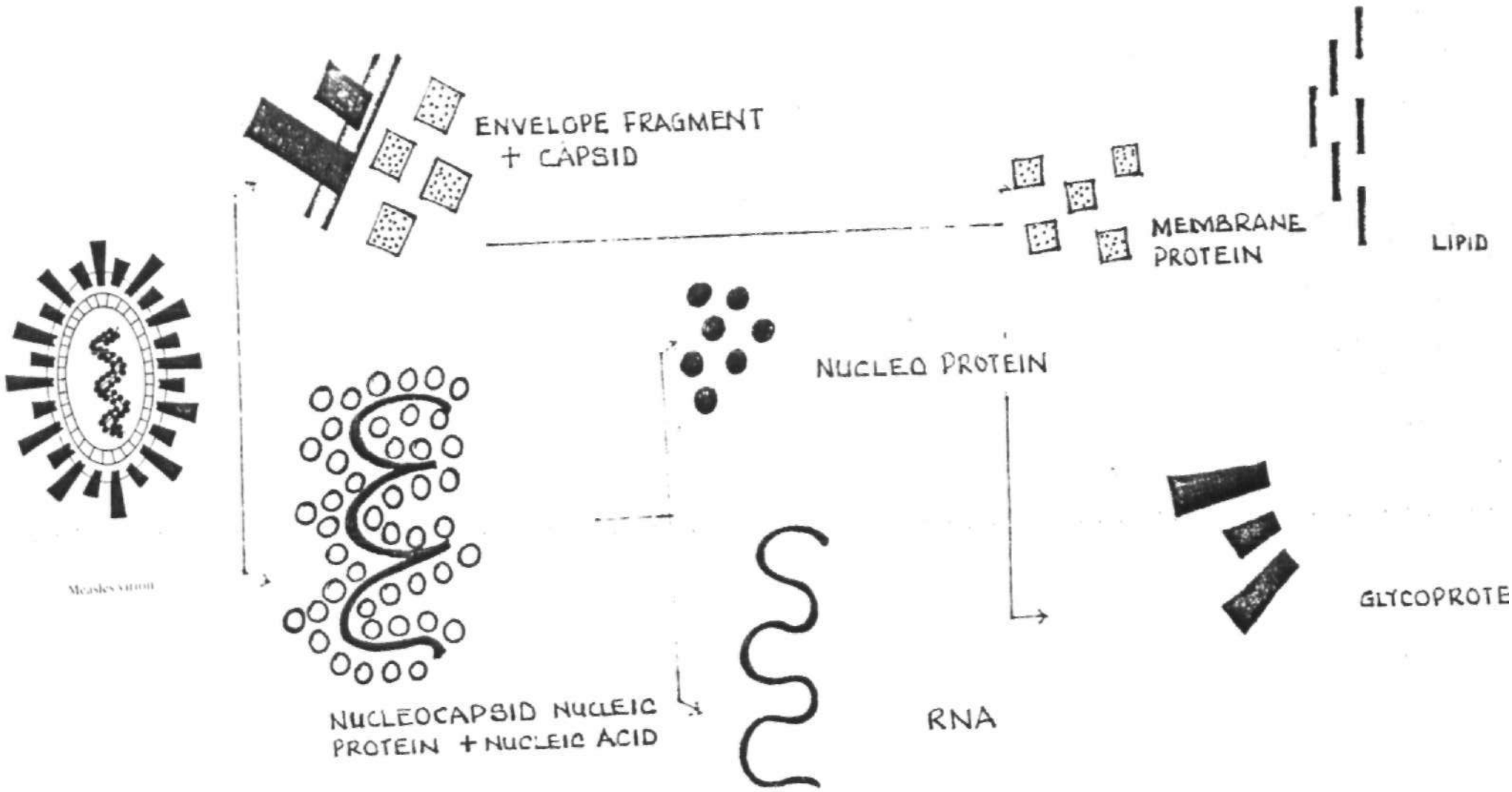


THE BUDDING PROCESS AND RELEASE

12.



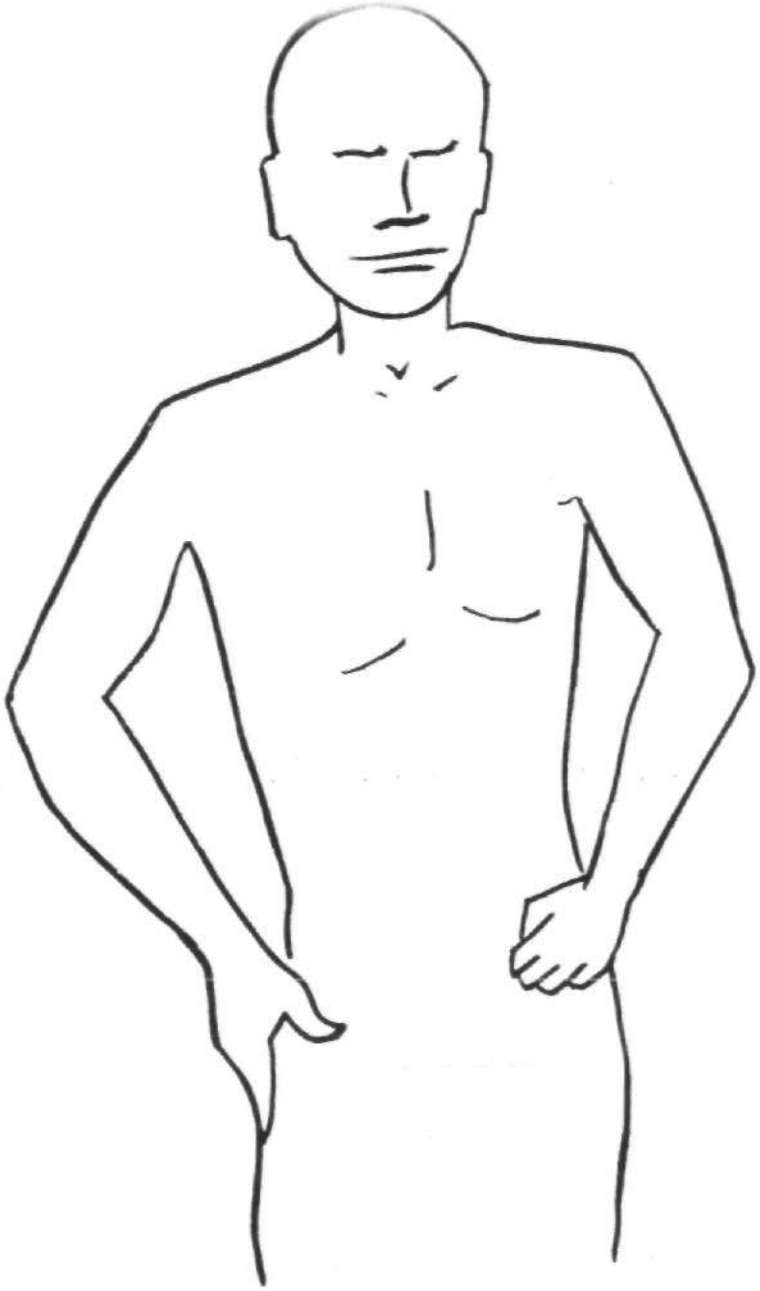
14 MATURED VIRIONS RELEASED INTO THE BLOOD STREAM. 78



BIOCHEMICAL DISSECTION OF MEASLES VIRUS.

Magnification — x 240.000 nm in length

MAN



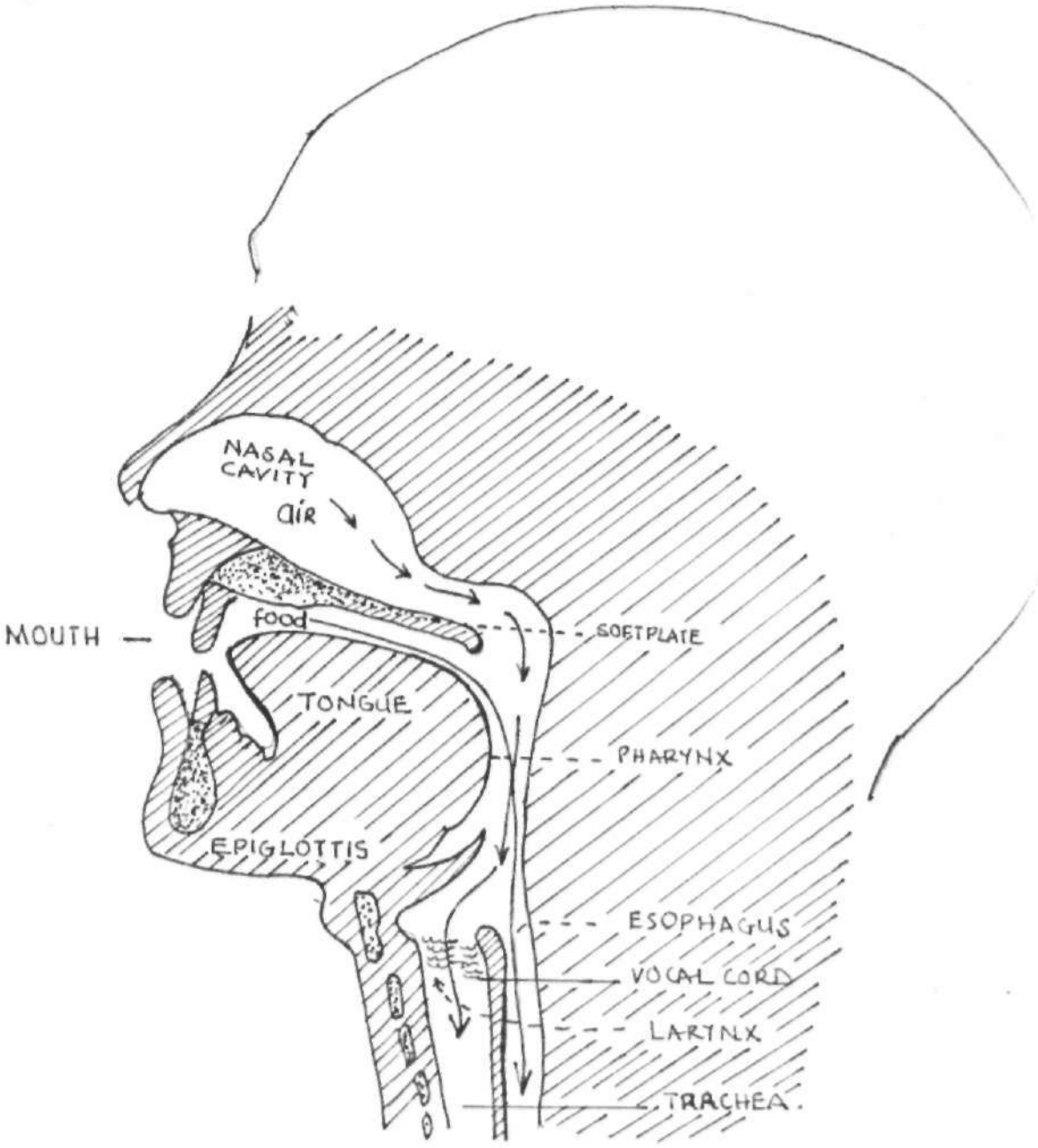
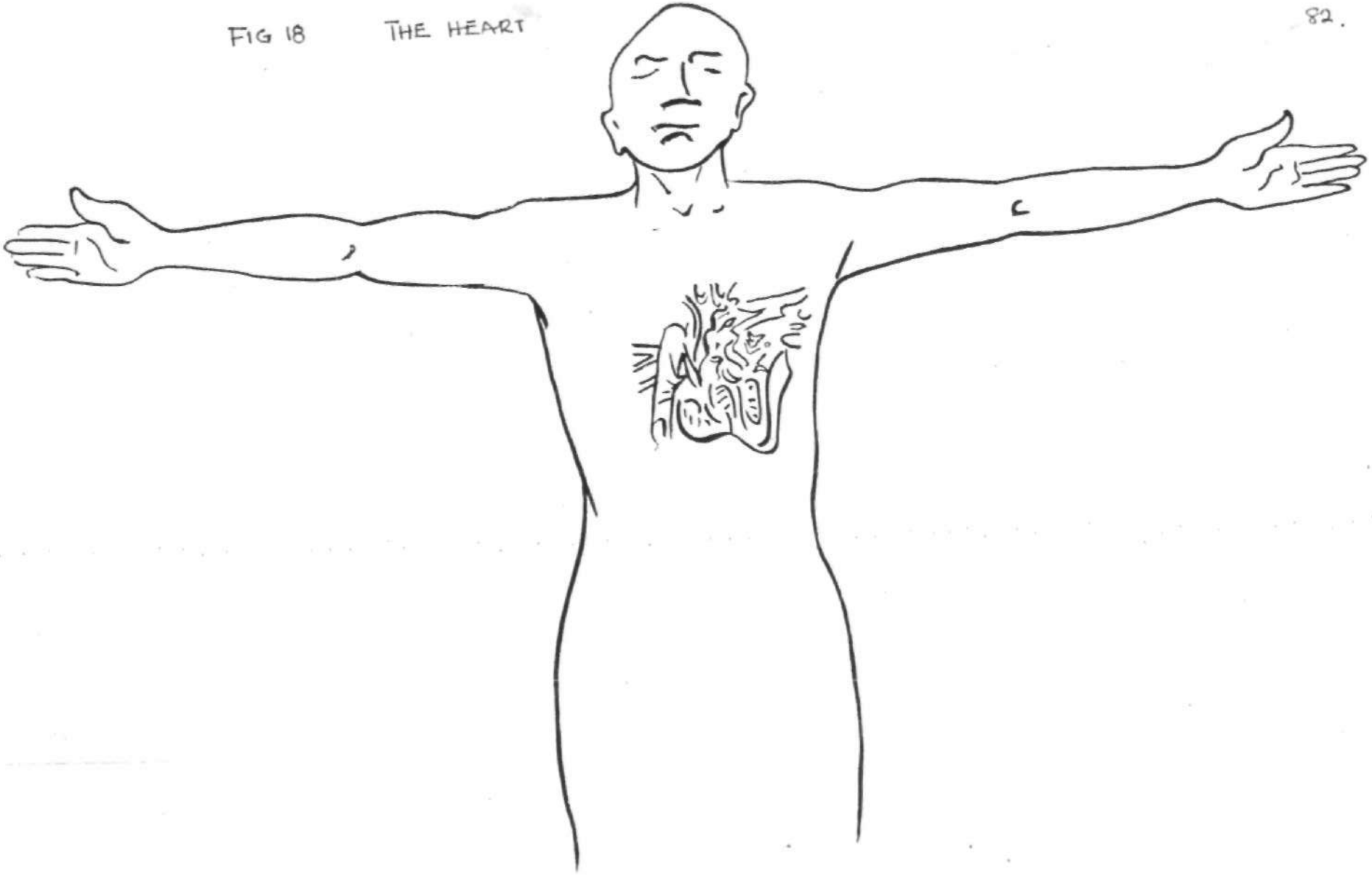


FIG 17. THE RESPIRATORY SYSTEM.

A DIAGRAMATIC SECTION OF THE HUMAN HEAD SHOWING AIR AND FOOD PASSAGEWAYS.

FIG 18 THE HEART



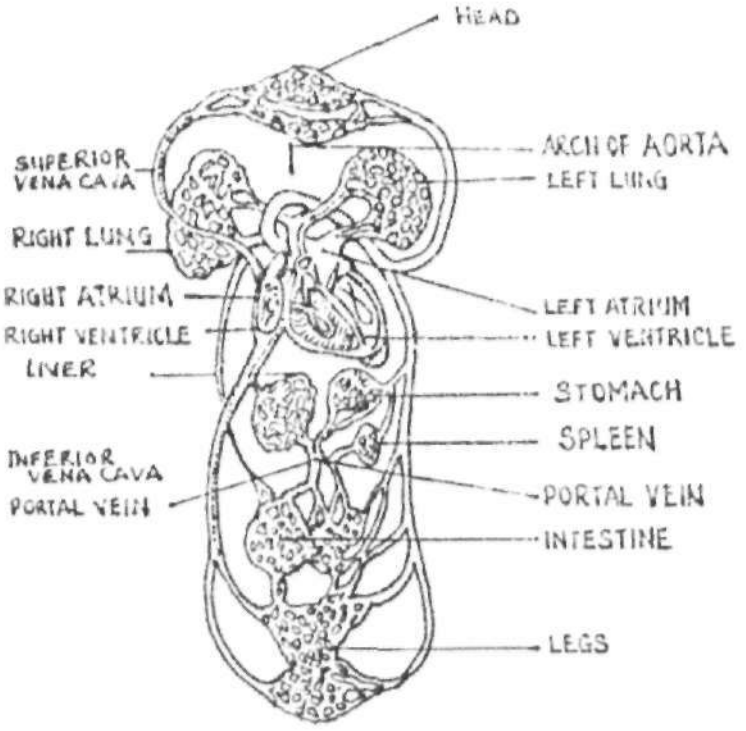


FIG 19 THE CIRCULATORY SYSTEM. 83

FIG 20. THE INFECTED MAN

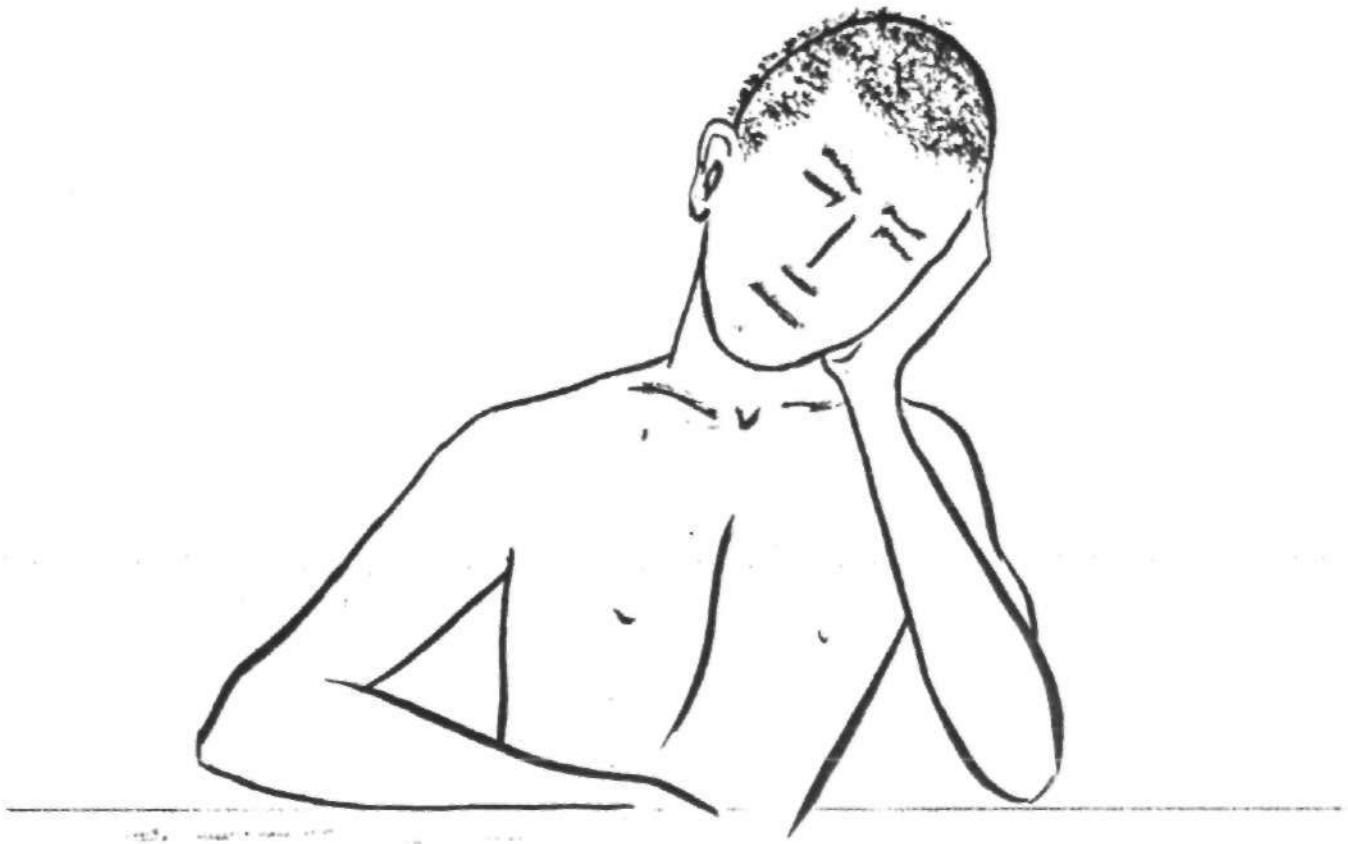




FIG 21

FIG 22

SIGNS OF MEASLES DISEASE

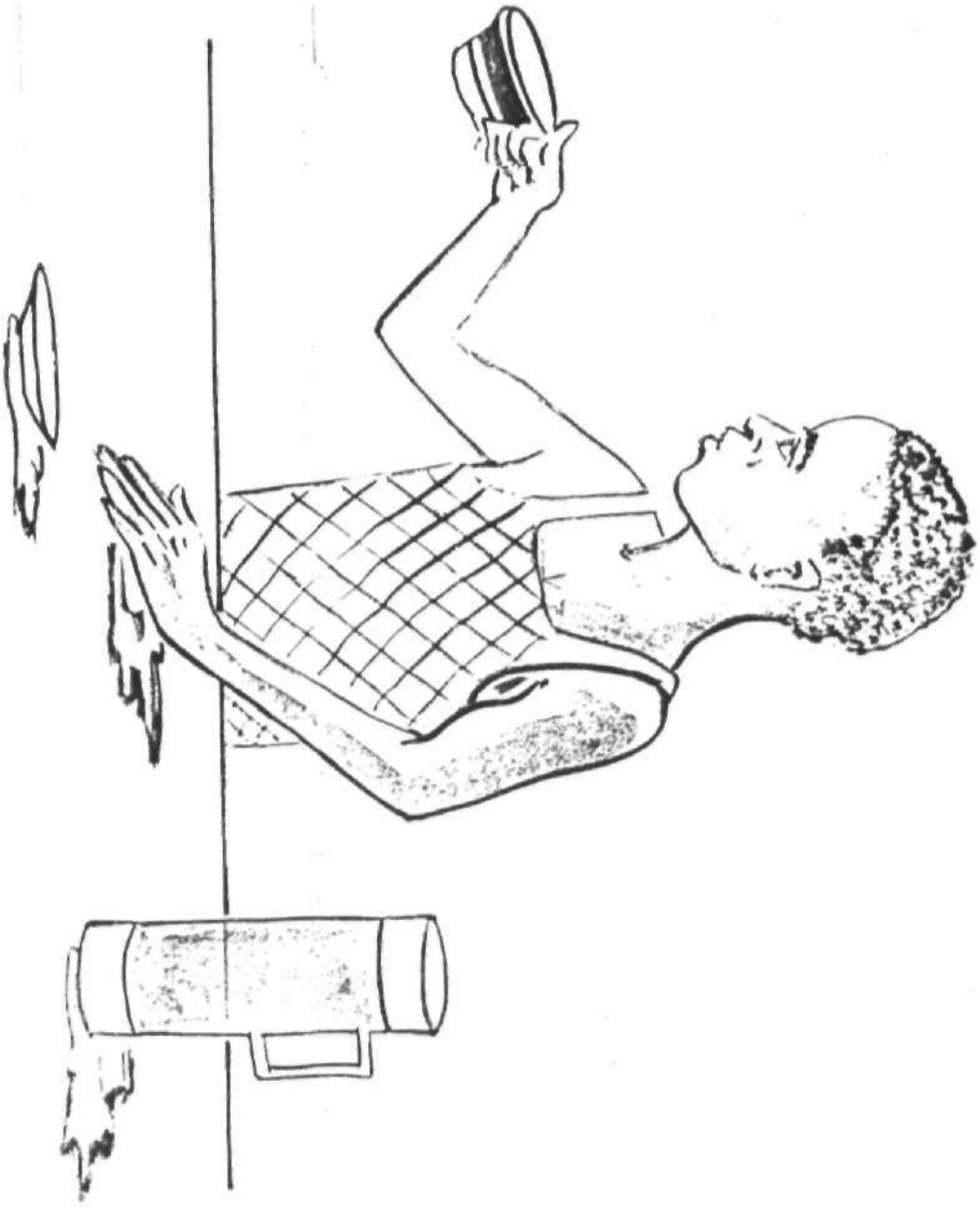




FIG 24

THE ANIMATION CYCLE







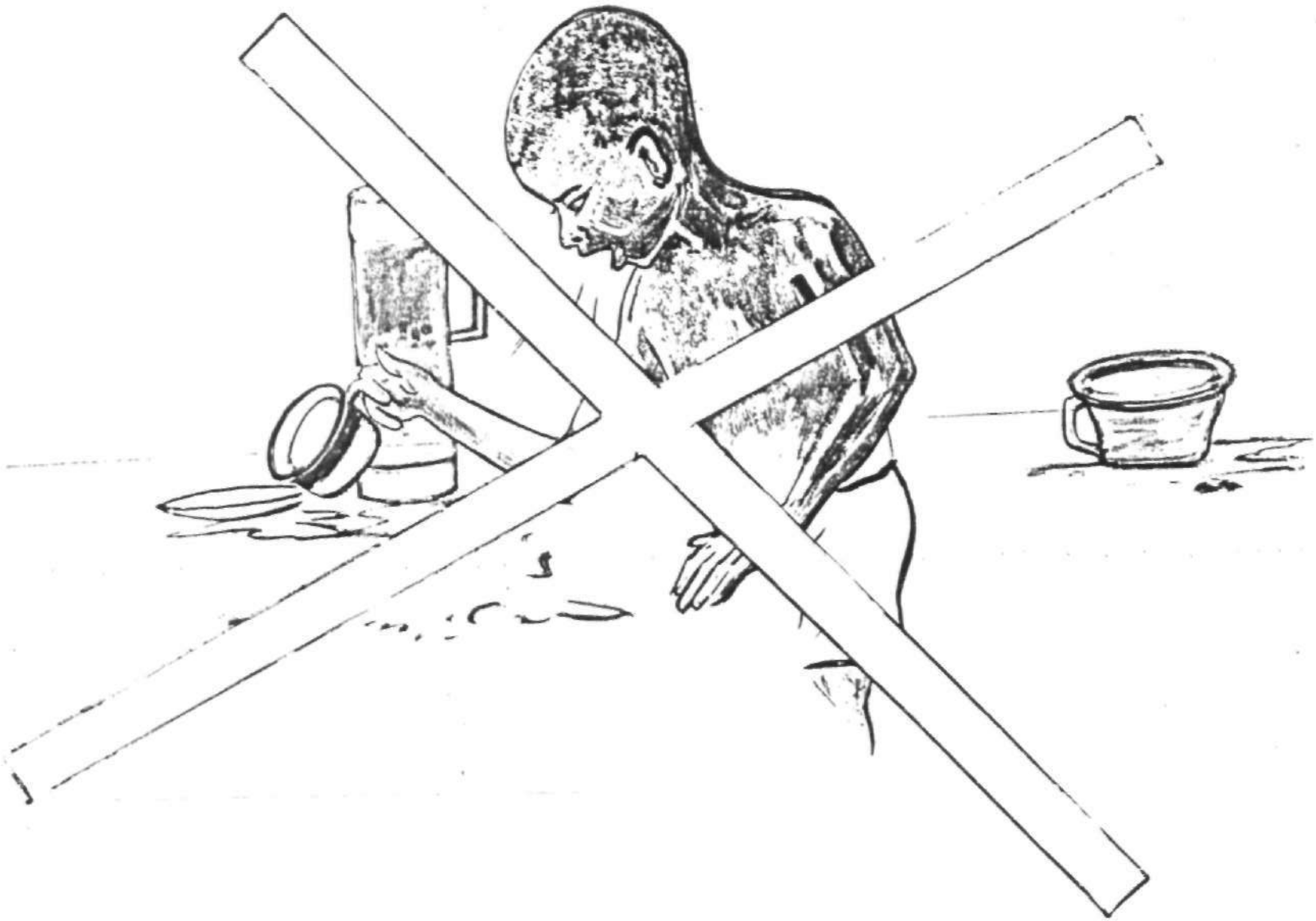


FIG 27 PREVENTION OF MEASLES DISEASE.

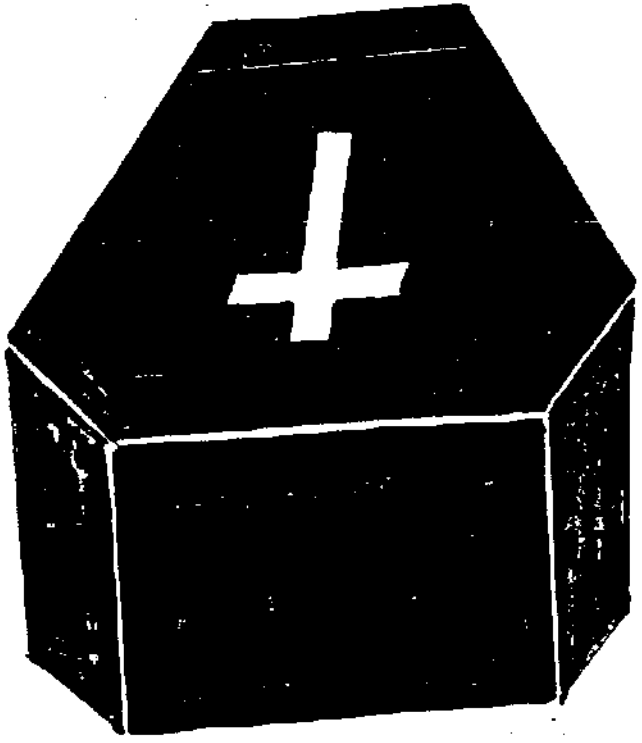


FIG 28. END OF A BADLY HANDLED MEASLES CASE



PLATE I THE VISIBLE RASHES OF MEASLES DISEASE



PLATE II THE UNCOMFORTABLE CHILD OF MEASLES DISEASE.

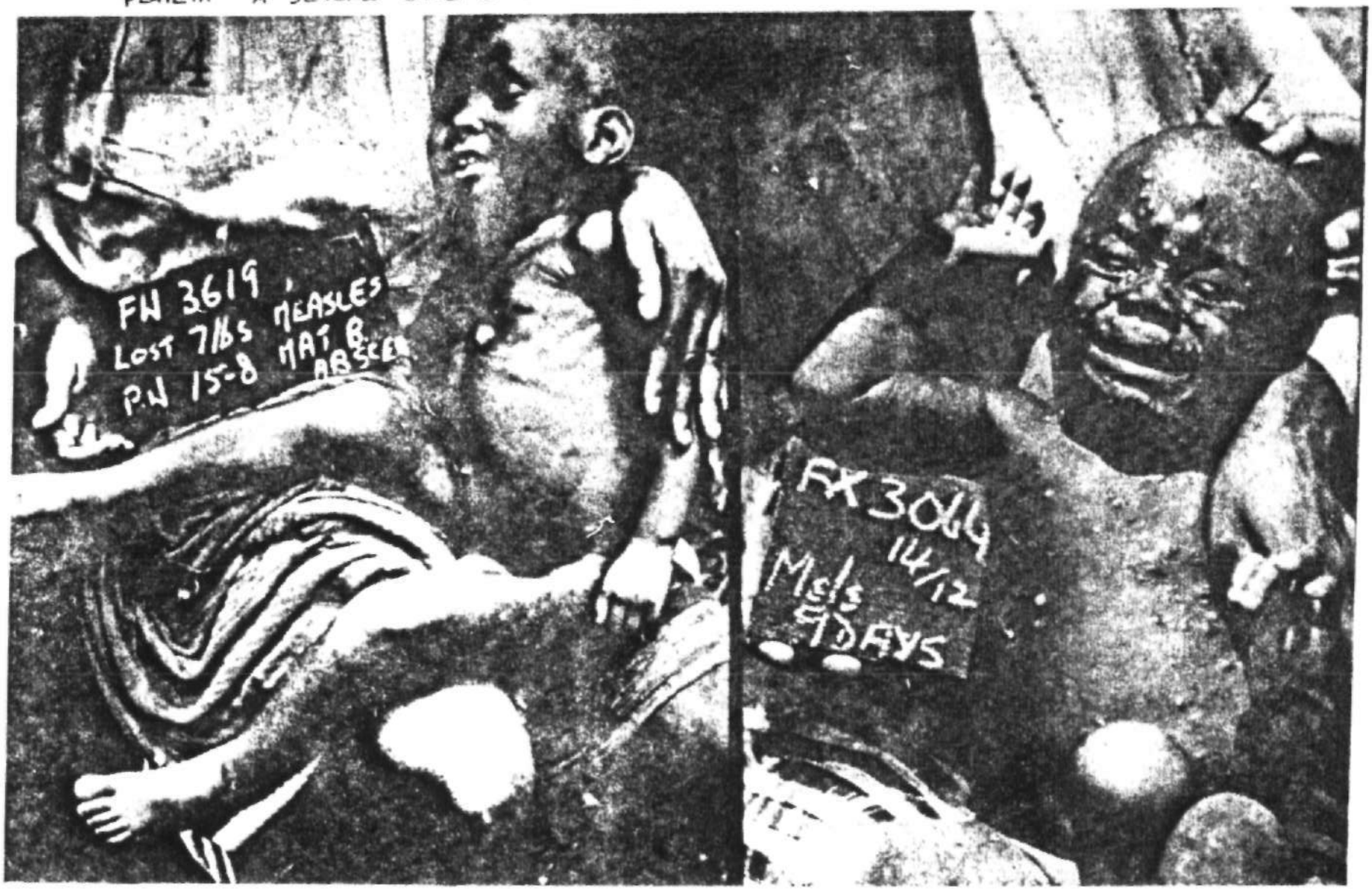


PLATE III A SEVERE CASE OF MEASLES DISEASE.

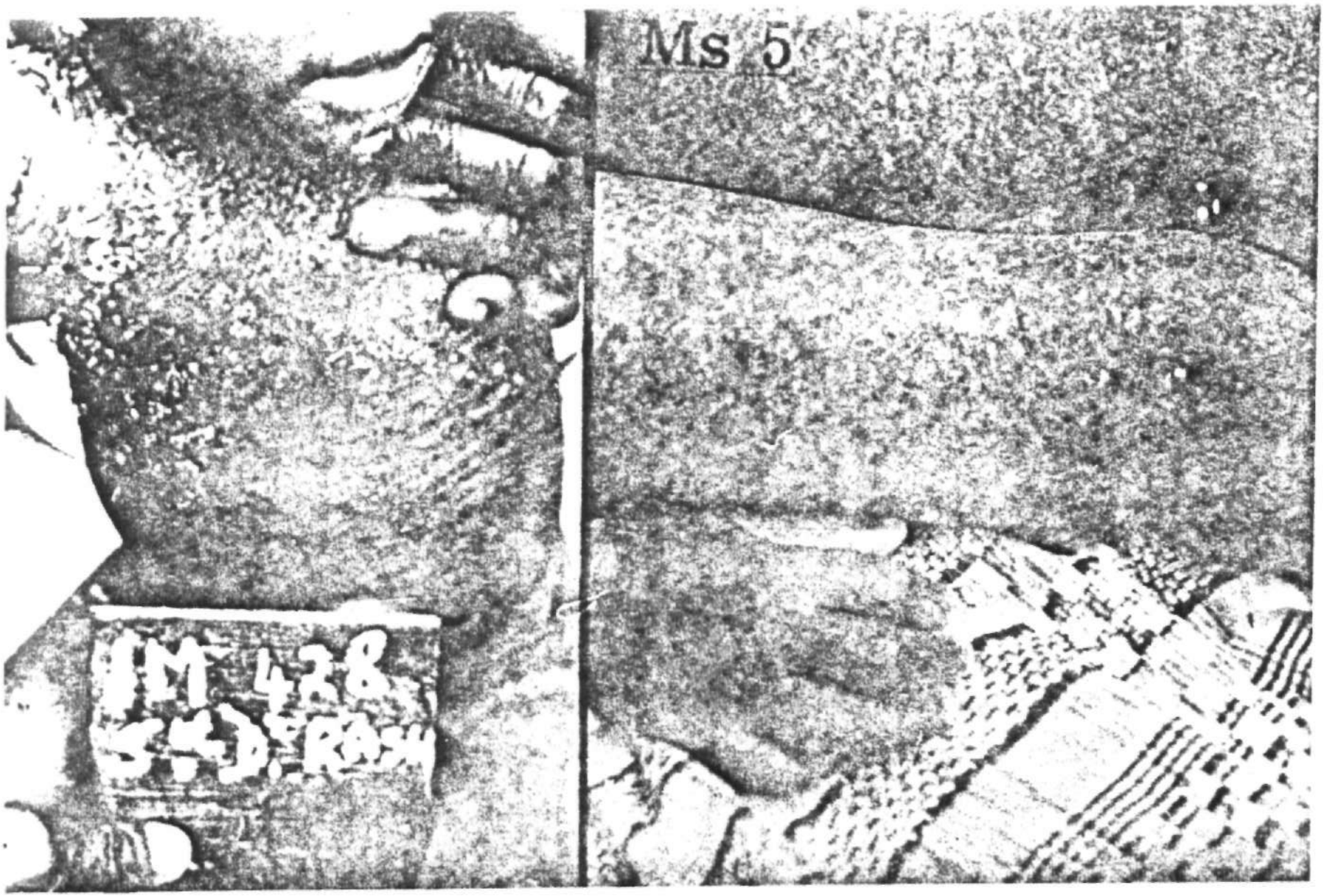


PLATE IV DESQUAMATION OF THE SKIN.



PLATE V EXFOLIATION AND DESQUAMATION OF THE SKIN OF MEASLES DISEASE.

Chapter 4

FINDINGS AND DISCUSSION

Definition Of Measles Viruses

Viruses are very tiny infectious particles about 20-300mm in diameter. Usually, they contain a molecule of nucleic acid. (RNA or DNA) as their genome. According to Jawetz, Melnick, Edward and Adelberg(1974) in Review of Medical Microbiology PP. 292, the nucleic acid is encased in a protein shell, and the entire infectious unit is termed a virion.

Characteristics

Virions replicate only in living cells. Furthermore the information contents required by the virions to synthesize a number of specific Macro-molecules of its own nature is always present in the viral nucleic acid which is either double stranded or single stranded. Viruses have no ribosones, mitcochondria or other organellies hence, they are solely dependent upon their cellular hosts for protein synthesis

and energy production. Viruses cannot be regarded as micro-organisms, since a true micro-organism generally has the characteristic of multiplication by binary fission. However viruses may be regarded as living as exemplified by the experiment performed by Spiegelman, and Kornberg in the (60s') which showed that purified viral RNA or DNA multiplied in a test tube when the requisite conditions were made available. Viruses were metabolically inert, they are not susceptible to antibiotics that may act against specific steps in the metabolic pathways of micro-organisms. Generally, viruses can be referred to as obligate intracellular parasites.

Measles virus is a paramyxovirus. An electron microscopic examination of the particles has been carried out mostly on impure specimens, and the results shows measles particles which are highly pleiomorphic. Measles virus has a diameter ranging from 100-300 nm and the virus itself consists of an outer membrane covered in spikes 9-15 nm in length surrounding the tightly coiled helical nucleocapsids which also has a diameter of about 16-17 nm. Measles virus is temperature sensitive, and is rapidly inactivated at 37°C (98.6°F).

299761

A number of scientists have worked on viruses but Anderson and Goldberger are among those who have contributed most to our knowledge of the nature of measles virus. They successfully produced measles in Macaca Monkey in (1911). Also Hoktoon (1909) used subscutaneous injection to infect the human volunteers with measles. Home (1959) transferred measles using soaked cotton wool from blood of patient to units of volunteers who have never suffered from measles. (See Blank and Rake, 1955).

Measles is a helical virus and the capsids are composed of repeating units of different kinds of polypeptides. Each capsomer of helical neuclocapsid has a single polypeptide molecule. In virus of Vertibrate, the tubular neuclocapsid is wound into a coil and surrounded by a loosely fitting envelope of lipoprotein, such envelope has an inner membrain protein which is virus specified. The outer lipoprotein complex is derived directly from the cellular sytoplasmic membrane during the release of the neuclocapsids from the infected cell.

Virus structure can also be binal or complex, though some formation are seen to be spherical in shape others assume cuboid and rhomboid shape. Measles virus derives its

formation during the budding process.

Robert W. Home said that the basic requirement for virus to appear as regular or symmetry is a biological one which may be for biological purposes. And since the physical dimension of a virus is so small, the investigator is of the opinion that they can only contain a little amount of nucleic acid which require absolute protection. This protection is given by the protein covering.

The Pathogenesis of Measles

The Pathogenesis represents the history of virus within the host and its passage from cell to cell. Measles virus after it has invaded the respiratory tract, undergoes minimal growth and then enters the blood via lymphatics and lymph nodes. It then affects the intestinal and the renal tracts after which the nervous system is affected.

By the time the liver and the spleen are affected, viral growth have extensively spread, as a result of which measles becomes highly contageous. As the epithelial surface gets affected, the growth of virus causes visible rashes that are noticeable. This stage is

referred to as the prodromal stage of measles infection. The prodrome pericd of measles infection is marked by the presence of widespread hyperplasia of the lymphoid tissue, when large giant cells are noticeable in the mucosa of the upper respiratory tract as well as in the skin.

A few days after the rash appears, measles virus is already present in conjuctival and respiratory secretions, also in washed leucocytes and lympoid tissue, the kidney and the mucous surfaces of the skin. In urine, measles virus persists for up to four days(Mims., 1977).

Since measles virus multiplication area is the lungs, it is common to see measles virus antigen in the endothelium of the glomeruli and the pertibular capillaries in biopsy tissue. Mims, Adelberg, Robbinson et al state that measles may be associated with sclerosing penencephalities as it is known to persit in human for years, measles may therefore be responsible for the slow progressive disease of the brain. (Mims, 1977).

Symptoms Of Measles Infection

Measles begins with high fever, and the temperature often rise to 113°F. Paleness of the face and weakness follows after which

the child would not be able to eat or drink for fear of vomit. The body itches very badly and with constant scratching the skin beomes very rough and thick. This stage is followed by rashes behind the ear lobes, the fore head; and the face. Rashes later on spread onto all the other parts of the body surface. The rashes develop to Koplics spots which form in the wet areas especially round the mouth parts. "---the foci in the mouth breaks down because of the wetness".(Mims., 1977)

A few days later, the rashes turn deep red and violet colour which later change to dark colours and undergoes desguamation as they spread all over the victim's body. The desguamation then exfoliate in large shhets off the epithelial surface of the body. Other visible signs of measles include the swollen glands of the neck, mild fever, running nose, red eyes and diarrhea. Mothers who are feeding have indicated sorencess of the mouth of infected children on their breasts. The incubation period for measles is 18 days. (See suringa - et - al 1970; also see, Robinson and Heath 1983).

Measles victims often loose their voice due to infection and develop cough. The eyes may be damaged if care is not taken since deficiencies of vitamins A, B, and C in this case, may lead to impaired integrity of mucosal surfaces. (Morley et - al 1962).

Immunity

A person may be said to be specifically immuned if sufficient antibody is present in a given situation to cause a reaction with virus before it reaches susceptible cells. In the case of actively acquired immunity. This is the type of resistance which follows recovery from infection, it can be further explained that such acquired immunity occur because some vaccine have been introduced into the body.

Immunity to reinfection is lifelong according to Nims; (1977). So far, only one antigenic type of measles virus have been discovered and an unmodified attack of measles usually confers life long immunity to exogenous reinfection. But an actively acquired immunity is the result of vaccines introduced into the body. Measles reoccur only in cases where

diagnostic errors were made, and reoccurance is possible in patients of immune disorder. (Robinson and Heath 1983).

Epidemiology:

Measles is endemic throughout the world other than in few isolated populations. Robinson and Health, (1983) stated that Measles epidemic is noticed every 2-5 years and each epidemic lasts 3-4 months. Measles epidemic is closely tied to school year and it builds to the peak in Nigeria, before the rains begin especially January to March. (See table 1.1) . Measles ceases at the beginning of summer recess.

According to Ernest, Jawetz Melnick and Adelberg (1974) children are mostly affected by measles, and in most cases 80% of all adults have had an attack by the time they are twenty years old. They also stated that the severity of measles largely depends on the number of susceptibles which may not be more than 10% of the susceptibles who had failed to contact the disease on their first close contact.

Cedric Mims (1977) further stressed that the minimum sized population of 500,000 is

required before measles can be stable in a community without introduction from outside.

Meanwhile measles does not kill if well handled, but it makes a child who is suffering from the disease very weak and miserable.

Treatment And Prevention:

There is no specific therapy for measles, but for the treatment of fever, headache and malaria, asprin may be used, to treat the cough bouts, codeine will help. In the case of photophobia, the patients should be allowed to stay in a darkened room. Antibiotic may be used to reduce bacterial super infection.

Active and passive immunization may be used to prevent measles. Passive immunization is recommended for debilitated children, especially those with chronic chest disease when they contract measles diseases. For women with pregnancy and individuals with impaired immunity, there should be some consideration before passive immunization is recommended for them because the dozage may lead to unforseen complications. It is advisable to administer passive immunization to a patient of measles

within five days of exposure of measles in order to attenuate measles.

Cases of serious complications involving the nervous and respiratory system have been successfully treated with active immunization. The vaccine used for the treatment known as 'polled human gamma globulin' is made up of very weak, Virus inorder to counteract the growing measles in human. Some of the people who have worked on vaccines are Enders and Peebles et - al, in (1954, 1959), 1962 and 1965).

Schwartz (1962) also worked to develop vaccine from the duck cell. "Only. 0.5ml of reconstituted vaccine may be administered to children at age of 9 months through subcutaneous route". (Robinson and R.B. Heath, 1983).

Measles can be preverted at its early incubation period by use of antibody such as gamma globulin which contains antibody titers of 200 to 1000 against 100 $Tc^{D}50$ of virus. A large dose of it may prevent measles outright but with a small dose the disease is made mild and immunity is precipitated.

dose :

In the non-munized children, the suggested/i:

0.2ml/kg - fist 6 days after exposure.

0.12ml/kg - between the 6th and 10th days after exposure.

It is important to administer the gammagloublin before the rashes appear in order to intefere with the development which will lead to active immunity.

Control of Measles:

According to Jawetz, Melnick and Adelbert (1974) Live attenuated measles virus vaccine can effectively prevent measles and that represents the most effective control measure.

In U.S.A. measles occur sporadically in areas where there are non-immunized children, such that the attack rate for immunized is 2% while those with no immunization is 34%. This indicate that vaccines can be used in Nigeria as a major control of measles disease. (See the record of measles figure in Nigeria 1978-82) tuble Guardian, July 8, 1984. The decline was brought about by effective vaccination programme, the action of the Expanded programme of immunization, (EPI) and generally the awareness of measles disease by mothers(parents).

Measles can further be controlled by avoidence of measles droplets from patients, the slime, and vomit should be avoided.

Personal cleanliness and good sanitation will be of paramont importance.

Society festivals and ceremonies are places where nursing mothers should avoid carrying their children to. A lot of dust is often raised behind them as they dance along. The dust they raise may contain droplets of measles virus which may cause the disease.

Adequate provision of foods like cereals, eggs, milk and fish should be made available for the undernourished. The World Health Organization and the Food Agricultural Organization and the Nigerian government should make protein food supply available. They can also mount up educational bulletin posters and visuals on the risk of eating only starchy food.

The discongestion of our urban centres may be a correct step of controlling measles diseases. New towns should be planned with adequate medical facilities in mind. Some of the Nigerian University villages are so poorly planned that an outbreak of measles will be very disastrous because of overcrowding.

Summary of Findings Measles.

(i) Virus causes measles disease and it cannot be seen with the naked eye.

(ii) Measles is found among children aged 9 months to 6 years old.

(iii) Meales case in Nigeria is very common before the rain begins(March, April and May)

(iv) Measles epidemic is noticed every 2 to 5 years and each epidemic lasts between 3 to 4 months.

(v) Measles patients develop complications which kills at least 10% of the children. Some of the common complications are pneumonia, laryngitis, conjuctivities, encephalities, convulsion etc.

(vi) Measles spread very easily through contact with the slime, faces and droplets from measles patients. The respiratory tract is a common place for measles mutiplication before it is transported into the other organs in the body.

(viii) Virus live on hosts cell to replicate

(viii) Measles epidemic is endemic throughout the whole world, Robinson and Heath (1983). But the effective use of immunization has reduced the severity and the number of attacks.

(ix) Measles virus are responsible for measles disease and not by any other means. (There is no truth in the superstitions).

(x) In availability of materials and the impossible costs have frustrated the intention to animate, the information and illustrations prepared.

By mounting up mass immunization and vaccination campaign, measles disease in Nigeria could be significantly reduced.

Chapter 5

SUMMARY, CONCLUSION AND RECOMMENDATIONS

The purpose of the study was two-fold. First, it was to find out the usefulness of animation art to concretize abstract concepts for better understanding. The measles was chosen as a test case. The researcher wanted to see if there was a way of providing the science students with the illustrations of the agent causing measles such that the students and their lecturers could have visuals to support the lectures they recieve and which should lead to better understanding. Secondly, it was the intention of the researcher to animate the agent causing measles disease for the literate. Animation art medium has the advantage of showing life processes involved in measles virus replication. Even though time and finance was a handicapp to the second objective, the illustrations and the slides provided could be used to some extent to communicate effectively about measles virus disease to the target audience.

The method used for collecting information was by interviews, observation attendance of lectures and from literature review.

The uniqueness of animation art for communicating facts about processes that may seem too abstract to understand was investigated.

Conclusion

The search has shown that there is no doubt about the usefulness of animation for communicating ideas. The researcher's experience have shown that it is extremely costly, it requires a lot of effort on the part of the artist because of this it is not a thing that an individual can easily dabble into, and it will take a long time before it can become a common thing in our institutions and in the public because of the limitations. Also the problem of time have been a limiting factor. Richard Williams, the animator and winner of Hollywoods 1973 'Oscar' Award on a version of Charles Dickins' explained that animation is slow and difficult to produce. For example it took a team of a dozen people a week to produce a thirty seconds commercial(Bob and Jackson 1974). It is therefore not surprising that the researcher has expended money and lot of time for five years to single handedly illustrate and produce a project on measles replication in humans.

Therefore, the researchers recommendations should be taken and should be considered in respect of the findings recorded in chapter IV of this thesis.

The researcher prepared all the illustrations required for the future animation of this project and it is only the 'Key-positions' that have been bounded as thesis.

Recommendations.

On the basis of the findings so far the following recommendations are seem logical:

1. Animation art should be used to enlighten the public on health matters.
2. Animation art medium should be used in prosecuting the various stages of War Against Indiscipline.
3. Use of animation art in teaching theories, difficult concepts to pupils in elementary school and adults attending literacy classes, need to be encouraged.
4. To this end, it is suggested that animation be used in schools as a tool for communicating such complicated structures like the action of the DNA, RNA, human reproduction, logistics of space travels, our arts, cultural accomplishment, our music and our general life styles.

5. Since the cost of animation is so much beyond the means of individual communicator the Nigerian Government should take every step necessary to make it possible for Educational Resource Centres to train clients and produce animated programmes for institutions and the public.

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APPENDIX A

INTERVIEWS OF MEASLES PATIENTS

Between October 14th and January 12th 1982 I paid a visit to five close families, three of the families were quite large, the two others were small.

A child from the large family became sick with fever, and later, she came up with rashes behind her ear lobes, the fore-head and the face. A few days later she looked pale weak and sick. She couldn't eat or drink, every other person in the family became worried. The child was very uncomfortable. Her temperature rose to 113°F. Kalamine lotion was used to kill off the rashes. About a week later, she was cured. This is the child from the 'A' family.

From the family ('B' the children happen to come in close contact and two days later a boy became sick and had to go through the same painful process of being nursed back to health. The first week of December, a child from the third family "C" became infected too. The last week of December through January 1982 a child from the fourth family was going through the same illness.

To sun up, from the family 'A' two children were cured of measles within the same month of October. Also from Family 'B' three children were infected and cured of measles. From family 'C' one child was

treated and cured of measles. From the fourth, family 'D' one person was cured of measles. A grown up girl of about eighteen years old was also treated and cured of the diseases in about seven days, when she contracted measles disease.

There was a report of measles outbreak in Sokoto state which was relayed over the National Net work news at about 6 minutes after 9 pm between December/ January 1982. It is the researchers opinion that, measles is deadly and very contageous, and contact should be minimised with patients of the disease, who should be segregated or kept in quarantine for treatment. The slime, vomit and faeces of patient should be avoided as much as possible.

On Wednesday 10 of January 1982, the researcher interviewed a victim of measles. 'X' represents the researcher while 'Y' was the response from the victim of measles disease.

X. How did you feel about this illness of yours? Can you explain just how you feel?

Y. Ah! its difficult for me to explain but I'll try to Go on .... Generally I am very weak, I can hardly raise my legs, arms and neck. As a matter of fact, I feel feverish. I think it is the feel of a person having Malaria fever.

X. How about the spots on your face. "Oh that's what I found. It started just a day before. The Itching Sports are not only on my face they are spread all over my body".

X. What sort of itching did you say you feel?

Y. "Well, my body is rather itching me all over, my skin is rather rough and thick, I am not feeling comfortable at all about that."

X. Your eyes are rather pale and reddish, could this be connected with your illness "in fact, I feel the itch even right inside my eyes. I have been scratching all over my body." It's a pity, am sorry, but have you eaten, some food of recent?

X. "No! I have lost every bit of my appetite. I don't think I will be able to eat anything now. I have been using some multivite tablets to induce my appetite. I have since used it twice daily as prescribed by the doctor. Pertaining to my eyes, I have since been using eye ointment to reduce the itching and redress." Well, I believe you are going to be alright soon. Make sure you use your medications to the doctors prescription O.K. Thanks and good luck.

DEPARTMENT OF MICROBIOLOGY

AHMADU BELLO UNIVERSITY

ZARIA-NIGERIA

Vice Chancellor: **Prof. ANGO ABDULLAHI** B. Sc. (Lond.). M. S. (Kansas State). Ph. d. (A. B. U.).

Registrar: **YAHAYA ALIYU.** B.A. DIP. TESL AMNIN

Head of Department:
PROF. S. O. EMEJUAIWE, Ph. D.

Telephone: Zar
Telegram: UNI

Our Ref:

Your Ref:

8th February, 19

Mr. J. Rishante,
Department of Industrial Design,
Ahmadu Bello University,
Zaria.

Dear Sir,

MASTERS PROGRAM OF MR. J. L. ADEYANJU

Mr. J. L. Adeyanju has contacted me in regards to his Master's Pro involves the animation of the pathogenesis of measles virus. It w be impossible for him to do this effectively without some knowledg nature of viruses. As such I have recommended that he attends som virology lectures I give to BSc. students. He has since attend of these lectures.

Measles infection is the most important viral disease in the count such any effort that attempts to accquaint the public with the nat disease is highly commendable. I therefore strongly recommend thi and suggest that we work together in order to potray accurately th important viral disease.

Yours sincerely,

Dr. N. E. Gomwalk.

Mr A Adeyanju
above for your
information a
nec. action
J.S.
9/2/8

Department of Industrial Design
AHMADU BELLO UNIVERSITY, ZARIA, NIGERIA
Telephone: Zaria 2581/3 Direct 3231
Telegrams: Unibello Zaria
Ag. Head of Department: Y. B. HASSAN

Your Ref:

Our Ref: F. ID/83/82

9th February, 1982

Dr. N. A. Gomwalk,
Dept. of Microbiology,
Ahmadu Bello University,
Zaria

Dear Sir,

MR. J.L. ADEYANJU: MASTERS PROGRAM

In acknowledgement of your letter of 8th February, I must say we are highly encouraged by the tremendous interest and co-operation you have shown towards Mr. J.L. Adeyanju's Master's degree program.

I agree with you entirely that he needs to attend all the virology lectures you may recommend, for unless he grasps the basic pathogenetical processes of the measles virus, it will not be possible for him to illustrate same on animated film from the stand-point of a visual communicator of internal and microscopic processes.

As soon as Mr. J. L. Adeyanju has collected substantial background literature for his project, I shall arrange to meet and discuss with you in greater depth the artistic approach to communicating measles to the public and/or microbilogy students as the case may be.

Yours sincerely,

J. S. Rishante

cc: Mr. J.L. Adeyanju.

June 7, 1982

F.IU/83/82

The Head of Pediatrics, Department,
Ahmadu Bello University Teaching Hospital,
Zaria.

Dear Sir,

Post-graduate Research Student

Please allow me to introduce Mr. Joel Lade Adeyanju to your Department. The bearer of the above name is a Post-graduate Student in the Department of Industrial Design. His studies has much to do with the children suffering from measles.

I feel that his studies will be incomplete without some practical studies of patients undergoing the processes and receiving treatment.

Could you kindly grant him an entry into the hospital premises to carry out his research. He will need some current statistics, about the Viral disease, current report about receiving patients and a few photographs of the patients. These he intend to animate so that people can see.

The medical centres and the Ministry of Information may have to use this project to educate villagers etc. etc., about measles, its stages of development, treatment, its cure and prevention.

Thank you in advance for your co-operation.

Yours faithfully,

DEPARTMENT OF INDUSTRIAL DESIGN
12 JUL 1982
Y.I. Hassan
Ag. HEAD OF DEPARTMENT

DEPARTMENT OF PAEDIATRICS
AHMADU BELLO UNIVERSITY HOSPITAL
ZARIA
NIGERIA.

INTERNAL MEMORANDUM

FROM : Head of Department OUR REF : MBA/RE.174 DATE : 15th June 1982	TO: POPD Staff EPU Staff
SUBJECT : Mr. Joel. L. Adeyanju.	

Your Ref:.....

The bearer is a postgraduate student of Department of Industrial Design of this University.

He has my permission to carry out his project as stated in the attached letter. Please give him every assistance.

M. B. Abdurrahman.