

VIDEO

PIX DESERT, ARTIC
UNDERWATER, MARS
(SURFACE)

INTRO..ANNCR...

MONTAGE EFFECTS..WORLD
AS KNOWN IN ANCIENT
DAYS...DAYS OF COLUMBUS
HOW DISCOVERIES CHANGED
KNOWLEDGE UP THROUGH
FIRST SATELLITES

ANNCR:

DAYS OF COLUMBUS...
MAPS...ANIMATION...
SHIPS...EQUIP
(ASTROLOBE)..STILL
PHOTOS

FILM..OR STILL SEQUENCE
ON ARTIC...ANDREES
BALLOON AND EQUIP.
NANSENS' FRAM....
RUSSIAN MINING TOWN...

film...McMurdo or
other antartic activities
sound on interviews...
possibly model of
nuclear power plant
pix Navy plane...
pix Byrd at weather
station.....

AUDIO

INTRO AND TEASER: Compare desert, antartic, underwater world and Mars in terms of temp, pressure, oxygen...what man needs to survive there to make point that although space is hostile environment, man has already conquered many environments that at one time were hostile until technology made it possible to conquer them.

Man's history as an explorer...changing maps of the world.. the world as known by Ersothenes...circumference of earth... Ptolemy...ancient Greeks...Hereford world map...Toscanelli ...the Behaim Globe....map in 1584....map of artic and antartic...globe...pear shaped globe with satellite.

now on threshold of man in space...what is needed for man to survive there: outline problems: atmosphere, pressure temperature, food, psychological factors, weightlessness and radiation. Many of problems of technology in these areas have plagued man in his desire to explore since the beginning of time. (Dollars for space program...dollars for knowledge...how to get there...how to survive there)

In terms of thinking in the days of Columbus...relate adverse conditions he had to overcome...lack of knowledge ...no maps, equipment, problems of food for such a voyage ...psychological factors of crew...how Columbus made the biggest mistake in history...brief mention of Magellan and problems with food.

Artic exploration...Andree's attempts to explore by balloon. failed because misgauged effect of cold air on balloon. Early attempts to penetrate ice failed until Nansen designed special ship to be frozen in ice and float with currents. Later exploration in terms of importance of knowledge for survival, equipment, psychological factors, Russian activities in artic.

Antartic...what faces man here...most foreign environment on earth...interviews with Baltimore nuclear people covering life at McMurdo: supplies, natural deep freeze, importance of food as psychological factor, temperature, condition zero, psychological tests for men wintering over... problems of waste, power supply...nuclear power unit... importance of Navy plane designed for antartic operations... aloneness...Byrd days alone at polar weather station.

VIDEO

AUDIO

EARLY

EARLY DIAGRAMS OF
SUBS, BATHYSCOPES,
RECENT BATHYSCOPE
ATOMIC SUBS...
DIVING GEAR
BREATHING APPARATUS ETC.

underwater exploration...back to early historical attempts of man to sustain himself underwater...early bathyscopes, diving suits, submarines...mainly from point of view of oxygen, pressure and such technological problems as they were overcome up through atomic sub...long times under... psychological tests for submarine service...what would people in days of Columbus have thought of this?

MONTAGE...ALL OFFBEAT
CLOTHING...AND EQUIP
FOR SURVIVING IN
ADVERSE CONDITIONS...
HEAT...COLD...UNDERWATER

summary....of equipment: clothing transportation etc. that man has used to overcome adverse environments... montage effect...as off beat as possible.

ANNCR:

Now man going into space...cannot afford to take chances or make a mistake like Columbus. Atomic clock...timed by pulsations of atom necessary because error of 1/2 second could make rocket miss moon by 100,000 miles or more.

INTRO DR. GAUME..HEAD LIFE SCIENCES..BALTIMORE DENVER...

SOF QUOTE GAUME

"All factors must be as preplanned as possible...man must not be expected to improvise"...

ANNCR:

What we know so far: America and Russian accomplishments: oxygen, pressure in Mercury, Vostov, brief review of what has been needed in terms of life support on these jaunts...

problems still to be solved....

weightlessness...INTRODUCTION...Dr. Grotzky...Baltimore

S O F...GROTSKY

"STATE OF ART OR KNOWLEDGE ON EFFECTS OF WEIGHTLESSNESS"...

radiation...introduce Sid Russek

S O F...WITH VIDEO
VAN ALLEN BELT MAPS
SOF HUMAN FACTORS
EXPERT (VIDEO TESTING
BOOTHS?)

"STATE OF KNOWLEDGE ON DANGER OF RADIATION".....
"PSYCHOLOGICAL FACTORS"
"Psychological factors...state of art...on research"

ANNCR:....

This is where we are now...dollars for knowledge...how to survive there...test flights...research rockets..project Mercury to obtain info...what is needed future LIFE SUPPORT SYSTEMS....

S O F GAUME

"Short operations will have stored oxygen, food and water and chemicals for absorption of carbon dioxide, odors and chemicals for absorption of carbon dioxide, odors and other noxious gases will be carried in sufficient quantity to last the duration of the mission. As trips become longer the point will be reached where generation of oxygen from carbon dioxide, water, or materials at hand may be used to extend the length. Use physico chemicals to recover oxygen and water, food in sufficient quantity for length of mission.

VIDEO

AUDIO

FILM FOOTAGE OR
MODEL OF ARIES
SPACE LAB

Such a mission is ARIES....

DRAWING SHOWING
PLANNED ORBIT

description "living" in ARIES Space lab.

DRAWING SHOWING
REGENERATIVE CYCLE
LIFE SUPPORT....

ANNCR:

This sophisticated environmental control is calculated to give a healthy atmosphere for the five crewmen for tours of duty of 30 to 90 days. New crews and fresh supplies will be put aboard ARIES at these intervals.

What about trips longer than this?

S O F GAUME QUOTE

EXPLAINS CONCEPT OF CLOSED ECOLOGICAL SYSTEM

ANNCR

much research going on to solve these problems, one method of regenerating oxygen is algae...descrip why... at Martin's Denver division Dr. Dyer is experimenting with this.

S O F DR. DYER

Statements and film clips of experiments on algae as oxygen converter and as food

ANNCR:

Man needs greater variety of food...another important part of life support research is hydroponics...Dr. Pote has been growing tomato plants that average $1\frac{1}{2}$ inches growth per day

S O F DR. POTE

Statements and film clips of experiments

ANNCR

Tomatoes and algae limited menu...food all important psychological factor in space...Dr. Pote working on entire scheme: goats, chickens, rabbits, rice, soybeans, sugar beets, tomatoes, peanuts and kale.

S O F DR. POTE
CHART..CLOSED SYSTEM
CHEMISTRY

explains entire regenerative cycle in terms of chemistry.

VIDEO

AUDIO

S O F DR. GAUME QUOTE

"The third system is one which theoretically could be used indefinitely. It would be self-sustaining and would regenerate and purify its own atmosphere, produce its own food and would re-utilize all its own wastes in producing food. In its essentials it would be a miniature replica of the closed ecology of the earth system - a terella."

ANNCR:

much research going on to solve these problems...one of the foremost possibilities to solve the problem of oxygen regeneration...is algae...descrip...reason why...

at Martin's Denver Division Dr. Dyer is experimenting with this....

FILM FOOTAGE EXPERIMENTS
Dr. Dyer...to match
AS NEEDED

algae...what characteristics they are looking for or trying to develop.
work actually going on...types of algae (show microscopically) advantage of blue...growth...light factor...amount of water...amount of space necessary...regenerative ability when out of water....
been tried as gas exchange with mouse...facts on this....

algae as food...how treated...blanching effect...found quite palatable. Food value in terms of proteins...what would happen if animal lived on algae alone...
dangers with disease in crop...must have standby supply. effect of weightlessness on algae...Project GIPSE.

ANNCR:

Man needs greater variety of food...another important part of Life Support research is hydroponics...where large amounts of food can be grown in a small space by using a chemical solution of nutrients instead of soil for plant feeding. Dr. Pote has been growing tomatoe plants that average 1½ inches growth per day

S O F DR. POTE

facts learned from tomato research...drugs to accelerate growth...possibility on moon of using rocks from surface as body so wouldn't have to carry this along.
how do plants grow in weightlessness???????

ANNCR:

Tomatoes and algae still is not very exciting menu...food all important factor as shown in antartic and sub... psychologically. Dr. Pote and...working with an entire scheme that includes: goats, chickens, rabbits, rice, soybeans, sugar beets, tomatoes, peanuts and kale.

DR. POTE S O F
CHART CLOSED ECOLO

...why these things are good.
chemical makeup...how they figure this out...
entire regenerative cycle.

Important part of this cycle...waste converter
continue explanation with what has been done in this field.

If cleared...mention potential of this in artic and antarctic.

(man in space will eat better than other explorers)

ANNCR:

Review concept of closed ecological system...could be
used anywhere...supposedly with this system man could go
on without renewed supplies for as long as he wanted to.
Problems to be solved...trace elements...weightlessness...
night and day...cycles...

PIX OF APPOLLO...
PIX OF MOON...

Man into space...first target is moon...plans for
Project Apollo...and further...(Briefly)
FACTS ON ENVIRONMENT ON MOON

MOON BASE DISPLAY

A moon base...based on present technological know how might
contain these features...

housing....

power plant...

life support systems

underground algae colonies...smaller tanks siphon off the
oxygen and introduce it into the lunar base's air-conditioning
equipment. Underground Farm where fowl and other small
animals and vegetables are raised with artificial light.
Above ground water is extracted from the crystalline structure
of the rock. A huge furnace powered by concentrated heat
from the sun's rays breaks down rock crystals, after which
a still-like device traps and separates water vapor from
the other gases.

2
PIX MOON PLEASURE DOME
...SERIES...

LOOKING FURTHER INTO FUTURE - bat man - etc. briefly

MOON
DIS TO SURFACE MARS...

Moon is extremely hostile environment...compared to the
moon Mars is like a Garden of Eden...
A man landing on the surface of Mars could step out of
his space ship with no pressure suit...dressed as he
might be on a mild winter day in New York...without an
oxygen mask he might think everything was fine then pass
out from nitrogen? or what?...at any rate he does need
atmosphere to breathe. NO

PHOTOS MARS....

WHAT do we know about MARS.....

VIDEO

AUDIO

atmosphere of Mars...temp. pressure, etc.
polar caps...proof water ice and not carbon dioxide frozen.
two theories for dark regions...

PHOTOS LICHEN...

volcanic...
vegetative...(as much as exists in antartic?)
final proof of existence of plant life on Mars...

VIEWS ON ADAPTING ECOLOGY ON MARS....could man use algae
as food?

FARMING?

What do we know about Venus
scientists have suggested changing the entire ecology
of the planet Venus to make it suit man's needs...

photos Venus...
drawings of semi-perm
markings.....

atmosphere...
semi permanent markings
two alternatives about surface....
possibility of life....

ARTISTS CONCEPTIONS???

suggestion...send algae to convert CO^2 to oxygen.
summary compare ecology with Mars - Venus - earth

CROCCO ORBIT...
VIDEO DRAWING...

an interesting side note...these two most fascinating
neighbor planets will line up in 1971 to form a nice one
year round trip for space ship from earth....
will someone try?????

Ecology...man adapting ecology is nothing new....
examples...redefine science of ecology....

desert irrigation
timbers...conservation
hydroponics...
tundra living (Russia)
draining swamps...
seeding hurricanes

one scientist has even suggested melting asteroids or
hollowing out centers to make miniature terrella for men...

3 pieces of art.....explain Don Cole's asteroid living.....

several scientists have suggested that satellites of Mars
because of low density might be hollow satellites of this
nature of past higher life... on mars.

No!
Do we
want to
Boost GE?

VIDEO

AUDIO

Fantasy or fact? Man will argue, discuss, philosophize... but never really know until he goes...

Mining operations On Mars?
Algae colonies to convert the ecology of Venus?
blowing up an asteroid to make a little terra for humans? science fiction or realistic dreaming?

Certainly not next week or next year. Maybe not even a hundred years. Need time for technology...man's unending quest to explore...adapt...convert to fill his needs...the same quest that took him to the New World... the Antarctic...to the bottom of the sea...seldom able to foresee what will result from his first crude efforts...

DESERT...OPEN PIX
DESERT...OIL DERIVATIVES...

the desert....temp...etc....early history....now important because....oil....etc.

PIX ARCTIC...OPEN
PIX RUSSIANS OR MAP
SHOWING FLIGHT LINES

the arctic...unimportant so long as ice-filled seas prevented use of direct transportation routes, now with aircraft and atomic subs...new technology to uncover and oil resources... weather stations...importance to defense...a land once isolated and looked upon as worthless is today of great importance to all nations.

PIX ANTARCTICA...
PIX LAKES...SPRING FED
OR SCIENTISTS...

the other end of the earth...once thought to be a frozen no man's land that supported no life. Recent scientific investigations indicate that in past geologic ages this frozen desert was a warm region with abundant vegetation. Fossil woods and rootlets were found...green ice free lakes 40 miles wide in Knox Coast area are believed to be fed by hot springs...support fresh water algae, fungi, mosses, and lichens. Plays an important role in heat and water budget of the earth. Resources? still unexplored... International territory...this might be indication of ways all nations can cooperate in space.

PIX UNDERWATER
PIX ATOMIC SUB...
Paxon's firing

The silent world... of interest to early man only in terms of the food it could supply...now with atomic subs... strategically important...scientifically...will soon be probed by a fantastic ocean bottom research sub resembling an underwater helicopter with TV cameras, robot hands... manned by a pilot and two scientists.

pix...NEW RESEARCH SU....

finding oil...one writer states possibility that within 50 years, hydrodomes housing whole communities will be constructed deep in the sea with the economy depending on farming, fishing, and mineral extraction.

Polaris firing - importance to defense

VIDEO

AUDIO

Man can't foresee what comes of his exploration.
possibilities in future:

THE MOON...possibility that direct sampling and probing of the surface and crust of the moon may help discover clues to the origin mode of formation and prehistory of the solar system...an excellent observatory for an unclouded view of the rest of the universe...

MARS...exciting possibility that direct exploration may place us in contact with extraterrestrial forms of life whose study may help solve the problems of the origin and evolution of life under different planetary environments.

but don't really know what we'll find

But first...knowledge...technology...how to get there...
how to survive there...

Mercury...

Aries...

Apollo...

FAST SEQUENCE..MAN AGAINST ADVERSE CONDITION.....