

***INVENTING THE WORLD***  
A PUBLIC OBSERVATORY FOR MAUNA KEA

by  
Mark Burkart



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## ABSTRACT

Inventing the World  
(A Public Observatory for Mauna Kea)  
by  
Mark Burkart

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This Master's Degree Project, both practical and theoretical in its scope, was an exploration into the relationships between science, architecture and the world. These relationships are discussed within the context of the question: Is the act of Science/Architecture one of discovery or invention? Although Science is a dominant world-view that we all live within, it is widely acknowledged that this world-view is reductionist in its inherent attempt to quantify and objectify everything. In this attempt to objectify Science strives to divorce itself from the subjective (that which pertains to culture, society, etc.) because this is the way science functions. Woven within the scientific paradigm is the Realist position: the belief in an objective truth independent of our means of knowing it. Although we live within the dominant world-view of Realism, scientists themselves understand this model to be a subjective, invented one. The Scientific method is a construct of culture. While widely acknowledged by scientists, in our day-to-day life within the paradigm this subjective component to science is forgotten. Anti-Realism, while embracing science, suggests that truth is subjective. Theories are metaphors for the real world - valuable but not necessarily true on a one-to-one basis. This is the paradox: *In order to function within our current paradigm (Science) we must adopt a world-view based on Realism and suspend a world-view based on Anti-Realism (the belief in the subjectivity of Science)*. The question I ask is: can one develop an architecture which acknowledges this contradiction? Can there be an Anti-Realist architecture? - one that allows for the instruments of science and the pursuit of the 'Real' as well as Anti-Realism. There is perhaps no better architectural forum within which to explore these questions than the bastion for the Real - the observatory - and perhaps no better place than Mauna Kea which has the largest concentration of big telescopes on earth.

These questions are investigated through the design of an observatory  
for Mauna Kea

**Key Words:**  
**Anti-Realism**  
**Architecture**  
**Architectural Theory**  
**Astronomy**  
**Mauna Kea**  
**Observatory**  
**Realism**

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Finally, I would like to express special gratitude to Julia for her patience, encouragement and love.

Mark Burkart, 1997.

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## INTRODUCTION

“He lifted up his eyes and saw a burnished  
Disc in the air and realized, stunned,  
That somehow he had forgotten the moon.”<sup>1</sup>

Absorbed in the overrationalization of scientific realism, modern culture becomes increasingly estranged from the world on a fundamental level. On one hand, our understanding of the world outside the subjective, the ‘true’ world, nature, our environment, the mechanics of life, the physical relationships of things...has been handed over to science and the scientist. This entity, Science, we regard as pure, neutral, absolute. The evening moon is nothing more than a collection of elements held together by gravitational forces which circles the earth in an orbit dependent on the mass of both bodies, their distance apart and the perpendicular velocity of the moon. Our understanding of the moon is buffered by the stoicism and sterility of Science. Does this constitute an estrangement from the world or merely a new understanding? I would argue ‘both’ and ‘neither’. Science is a human endeavour, intimately linked to culture and forever bound to it. Science and Culture, the objective and subjective, are codependent, symbiotic. Arguably, we are less aware of the natural world around us than we were even a hundred years ago. Perhaps this has more to do with what applied science has given us with respect to conditioning our environment - attempting to provide a controlled environment within a natural world of chaos. Whatever the reason, I believe that, at the present moment, culture is characterized by a tension between a movement away from an intimate relationship with the world and the fact that the relationship between culture and world is inherently intimate. Ironically we blame science for our estrangement with the world, but it is not the scientist that has forgotten the moon, it is the rest of us.

The observatory is a place where we reacquaint ourselves with the world. A place to contemplate ourselves in relation to the cosmos. It is fitting, therefore, that it is the design of an observatory which will be used here to investigate the relationship between ourselves and our engagement with the

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<sup>1</sup>Jorge Luis Borges, “The Moon,” *Dreamtigers* (Austin: University of Texas Press, 1964), p.64.

world. This project seeks to understand architecture through a close examination of the state of science. In this investigation, *the paradox of the simultaneous denial and celebration of subject in science is used as a metaphor for an understanding of architecture*. 'Subject' in this case refers to culture, society, individual, etc. Science, more specifically astronomy, and more specifically the observatory, is used as a metaphor to help describe the state of architecture today. Besides drawing this parallel, I wish to revisit the observatory as a building typology and create an alternative to the typical modern observatory - in particular, an alternative to those that presently exist on Mauna Kea.

Barbara Maria Stafford remarks that "academic culture wars derive from the essentialist impasse of yearning for an original, holistic experience while claiming that none is possible".<sup>2</sup> The search for a holistic experience must occur within the context of the discussion which claims that phenomenological experience is unattainable - within the paradigm of science. Current avenues of thought either ignore the loss of experience or wholeheartedly accept it in all its nihilism. What I propose is a reconciliation of differences. In a desire to dismiss the finger-wagging and deprecating rhetoric so popular among adherents to Post-Modernism, Neo-Vernacular, Phenomenology and even Deconstruction, I posit that cultural criticism lies outside the responsibility of architecture in any direct way. By exposing the cultural condition for what it is, architecture will always be critical without attempting to be so. The infinitely complex dynamics of cultural change are severely misunderstood and unappreciated if one adheres to the belief that architecture is the key to social change. This is not to downplay the very important role architecture has within these dynamics - as long as it is understood that it is one role of many. The prepossession of both the discussion and the design is towards acknowledgement rather than judgement. The design of the observatory describes the contemporary cultural climate and explores the inherent tension therein in an attempt to arrive at an understanding of culture rather than a reaction to it.

This is not a investigation into the history of astronomy or archaeoastronomy, nor is it a philosophical discourse into the validity of perceptual theories - those topics are covered at great length in other forums. The discussion merely serves to provide a theoretical foundation from which to design. The

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<sup>2</sup>Barbara Maria Stafford, Good Looking: Essays on the Virtue of Images (Cambridge: MIT Press, 1997), p.210.



structure of the discussion consists of three parts. The first section introduces the paradox, discusses its nature and explores various responses to it. The next part is somewhat divergent in that it is less theoretical and more descriptive: a discussion of the site is followed by drawings and documentation of the finished observatory. This provides a context for the final section, which concludes the initial discussion through an explanation of the essential design ideas surrounding the observatory - the conclusion is implicit within the design.

## FRAMING PARADOX: SCIENCE AS METAPHOR FOR ARCHITECTURE

Scattered over the summit of the largest mountain in the world sit a number of structures - or rather monuments - after all, high ground has always been sacred ground, so this must be the most sacred ground of all. And to what religion do these monuments owe their inception? The answer is obvious... Science. On top of the largest mountain on earth sit the high temples of Science - the observatories of Mauna Kea (fig.1). Not only do they occupy a sacred and important site, but collectively within these monuments are invested hundreds of millions of dollars - the truest contemporary testimony to their importance.

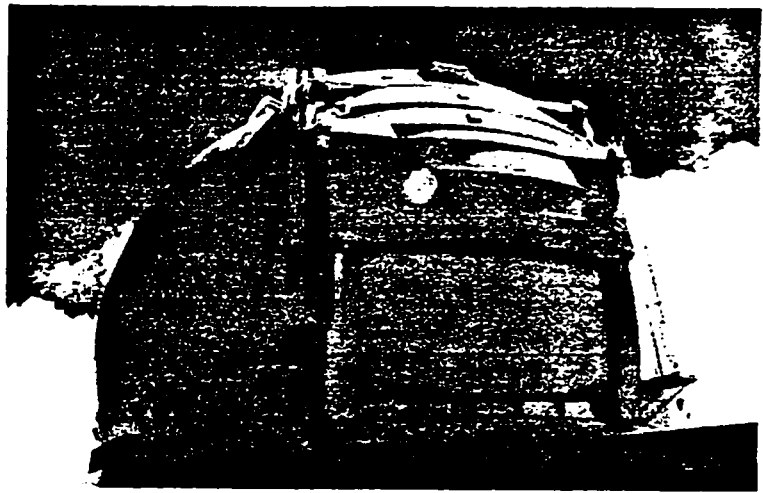


FIGURE 1

Speaking of Science in terms of a religion is not for its value as hyperbole. A religion of less archaic method perhaps, yet religion all the same. Science even has its own martyrs and messiahs in Galileo and Einstein (to mention just two). However, the defining factor of all religions is its reliance on the prime constituent - Faith. The New Penguin English Dictionary defines 'religion' as, "a cause, principle, or system of beliefs held to with ardour and faith; something considered to be of supreme importance." Undoubtedly many scientists would claim that faith is the very thing that Science does not depend upon and, therefore, the very thing which separates it from traditional religions. Occam's razor is the principle which scientists use to determine which theory, given two or more conflicting theories for the explanation of the same problem, becomes the standard. It suggests that, all things being equal, the theory with the greatest simplicity is the best and, therefore, is the one adopted by the scientific community until a simpler or better theory

comes along. The fact that much of the construct of science is based upon a faith in this marginal and wholly “unscientific” principle proves my point. The scientist as modern-day priest asks for popular acceptance of phenomena and theories which are entirely out of the realm of experience by the non-scientist and, in many cases, beyond their comprehension. The Pauli Exclusion Principle is an example of this<sup>3</sup>. It attempts to explain the contradiction of our experience of matter as something solid and the scientific description of matter as being comprised of more than 99% space. The principle states that the reason why objects do not pass through one another is because certain sub-atomic particles may not occupy the same energy state in the same location. There is no grand thread of reasoning to support this statement, it merely must be accepted with “faith” - now termed logic or reason. I make this point that Science can be understood as a religion (more specifically, the religion) not to marginalize it, but merely to demonstrate its power over the culture of understanding in contemporary society.



FIGURE 2

On top of the largest mountain on earth sit the high temples of Science (fig.2). About what do they really speak?

Do they speak about us?

For us?

To us?

Or perhaps they speak only to themselves. Their language a two-number alphabet of infinite combination.

What do they say about our faith in science?

The observatories of Mauna Kea (as well as modern observatories everywhere), cloaked in Platonic geometric forms - arrogant, each new observatory only bigger, muscling its way onto the mountain...pushing with elbows and shoulders, but with the same arrogance and indifference.

Science has, over time, divorced itself from culture. In the past, the observatory typically facilitated the collection of visual information directly

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<sup>3</sup>John Linke Heintz, The Architecture of Uncertainty (Calgary: University of Calgary, 1992), p.4.

by an observer - the experience was one of stepping up to the telescope eyepiece and losing oneself in the expanse of the stars and darkness of space. The telescope is more than the sum of its lenses, mirrors and casing - it is the lifeline holding one out at a manageable depth - without which one would plummet even further into the pitch of space. Astronomy transcends the mere collection of data, it is about peering into the heavens so that we might see ourselves. Through the telescope we dream.

“As I stood in contemplation of the garden of the wonders of space, I had the feeling that I was looking into the ultimate depths, the most secret regions of my own being.”<sup>4</sup>

The modern observatory denies this. It collects information outside of the visual wavelengths and translates the data through a computer for our interpretation. Even optical observatories which collect light in the visual range have abandoned the eyepiece for ultra-sensitive detection equipment which act as proxy for our eyes. We experience the majesty of the universe through the banality of the computer screen. Something is lost - the base experience is tempered by the machine. The astronomer need not even be at the observatory any longer since data, once received, can be relayed anywhere in the world. In fact, there are certain advantages for the Astronomer not being present; the heat and light necessary for the comfort and convenience of people interferes with the observation conditions.

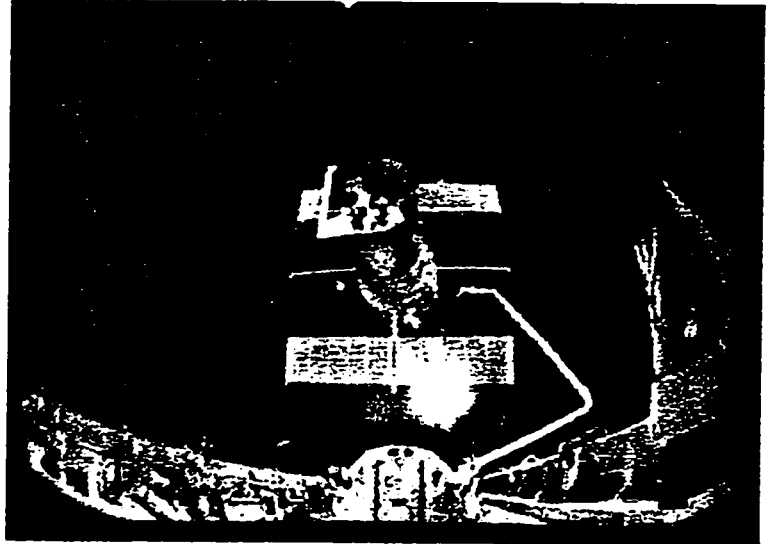


FIGURE 3

The Hubble Space Telescope (fig.3) is the ultimate extension of the observatory which denies the presence of the user. It epitomises the rift between Science and subject. Granted, there remain amateur and professional astronomers who continue to use traditional telescopes; however this type of observation lies behind the frontier of Astronomy, which continues to be pushed using information gathered from the larger, more sensitive telescopes. The continued desire to look at the phenomena of space directly as well as the

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<sup>4</sup>Milosz, L'amoureuse initiation, p.64: quoted in Gaston Bachelard, Poetics of Space (Boston: Beacon Press, 1992), p.64.

popularity of amateur astronomy does prove a point which I wish to expand upon later: the simultaneous celebration and denial of subject.

Science, a product of culture, has succeeded in marginalizing culture to the point of ignoring it. It now sits above our own system of ethics in many cases (this is not to say that scientists are unethical, but merely tries too make the point that science is sometimes understood as a wholly neutral endeavour, detached from, and therefore not answerable to, culture). In the name of Science we can do no wrong. In divorcing itself from society/culture, Science has become increasingly self-referential and self-driven. Data are gathered to support other data which are collected to support...etc. Science has become conversant with itself. In many cases, information is collected for no expressed purpose other than the value it holds as autonomous information. The tendency of modern science towards a self-perpetuating system owes much to attitudes towards perception. The prevalent world-view is one of Realism. That is, the belief that "statements of the disputed class (e.g.. statements about the physical world, mental events, statements in the past tense and future tense, mathematical statements, etc.) possess an objective truth value, independently of our means of knowing it: they are true or false in virtue of a reality existing independently from us."<sup>5</sup> Given that the Realist understands the activity of science as one of discovery, in which knowledge derived therefrom is autonomous and possesses a value of truth other than that which we project onto it, it is small wonder that its motivations also become independent of the motivations of subject/culture.

The tendency of science towards the self-referential and the denial of subject is also largely the result of certain revelations "discovered" through science over the past two centuries. Astronomy, in particular, has proven humankind's irrelevance in the larger scheme of things. The telescope provides us with the knowledge of how little we know. Belief in our privileged position as the centre of the universe has disintegrated, along with our self-importance and conceit, leaving us only with the image of "our" world as "a mote of dust suspended in a sunbeam."<sup>6</sup> Astronomy consistently forces us to face the fact that our position in the grand scheme of things is marginal at best. What a cruel blow to the collective ego of society! With Astronomy on one side continually delivering messages of our unimportance and quantum physics on the other telling us that our supposedly

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<sup>5</sup>Michael Dummet, Truth and Other Enigmas (Boston: Harvard University Press, 1978), p.146.

<sup>6</sup>Carl Sagan, Pale Blue Dot (New York: Random House, 1994), p.9.

divinely-inspired forms are merely a collection of subatomic particles in motion, it is not surprising that the role of culture in science has been pushed to the periphery.

“Look up. A hundred billion stars in our galaxy, the Milky Way. Unconcerned with me, that confidence of stars, light offerings, two thousand years old. If they are anything to me they are jewels for my shroud. I cannot know them. I cannot even know myself...what can balance the inequity of that huge space, which never ends, and my bounded life?...Bounded yes, but not by mortality, which is not what I fear, but by smallness, insignificance, which is what I do fear.”<sup>7</sup>

Of course the fear that technology will engulf humanity is hardly a new one. In film, the image of the renegade computer from 2001: A Space Odyssey, “Hal”, has become an icon of this fear. As I hinted at earlier, I believe that there is more to the picture of science than a movement away from subject/society. I suggest that while Science increasingly moves away from Subject it is inherently bound to Subject at all times. After all, Science is a construct of society.

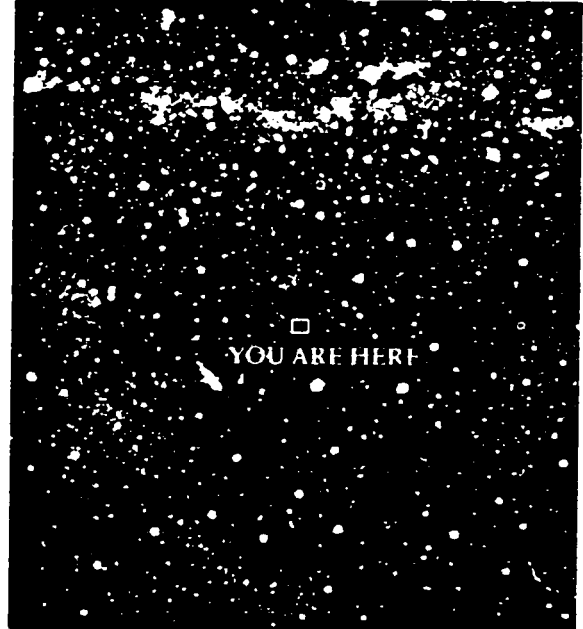


FIGURE 4

Once again I look to a discussion of perception in order to explain myself - only this time as evidence for the opposite argument. Anti-Realism, as a school of thought, suggests that statements of the disputed class (mentioned earlier) do not have value independent of our knowing it. Where the Realist views scientific activity as an enterprise of discovery, the Anti-Realist views science as an activity of invention.<sup>8</sup> By no means is this an argument against the value of Science. To the Anti-Realist the theories of Science need not be true to be good - the true nature of the world is, at best, enigmatic, and any ‘order’ that may be perceived is as much a product of perception as reality (whatever that may be). Science is as much a creative process as a process of ‘revealing’ and is, therefore, governed by intuitive intentions as well as subjectivity. A good scientist is also a poet of natural phenomena. Theories are metaphors of the real world (valuable, but not true on a one-to-one basis).

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<sup>7</sup>Jeanette Winterson, Art and Lies (Toronto: Vintage Canada, 1994), p.137.

<sup>8</sup>Bas C. Van Frassen, The Scientific Image (Oxford: Clarendon Press, 1980), p.7.

The poet, Borges, provides some of the most evocative testimonies to Anti-Realism and the essentially enigmatic nature of the world. He realises the contradiction inherent in Science: we are driven to know the world, yet ultimately we know that it is unknowable.<sup>9</sup> He is convinced that the chaos of the world is impossible to reduce to any law, arrived at scientifically or otherwise; however, within the confusion of the world he understands that something deep within us compels us to try to understand, even though the scenarios we assemble are nothing more than provisional: “Ernst Cassirer has already warned us that all forms of human knowledge are but ‘arbitrary schemes, airy fabrics of the mind’, a kind of fiction. A fiction that recommends itself by its usefulness, but must not be measured by any strict standard of truth, if it is not to melt away into nothingness’.”<sup>10</sup>

The point which I am attempting to make with this line of thought is that despite the fact that the popular understanding of the world is one of Scientific Realism, which has fostered the disengagement of Science from subject, Science is at the same time intimately tied to society and the individual by the fact that everything we know and are able to know exists because of and is characterised by our perception of it. While it posits ‘truth’ to its method, the folly of an overrationalized, technological Realism is the fact that it is as much story as it is truth. Science is our story.

“No matter how meticulous the scientist, he or she cannot be separated from the experiment itself. Impossible to detach the observer from the observed. A great deal of scientific truth has later turned out to be its observer’s fiction. It is irrational to assume that this is no longer the truth...the neutral observer is in fact romantically involved with his subject...”<sup>11</sup>

If the story of Science is our own, then the placement of these monuments to Science on Mauna Kea must also indicate that they are monuments to ourselves. In cultures and religions the world over, high places close to heaven have typically been associated with the home of the gods (Mt. Fuji, Mt. Olympus, Potala Palace, etc.).<sup>12</sup> A celebration of humanity or Science? Herein lies the paradox of the modern world: Science’s simultaneous denial

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<sup>9</sup>Ana Maria Barrenechea, Borges the Labyrinth Maker (New York: New York University Press, 1965), p.50.

<sup>10</sup>Jaime Alazraki, “Architecture as Outlook in Borges’ Fiction,” Via, 8 (1986), p.48.

<sup>11</sup>Winterson, p.30.

<sup>12</sup>Bernard Tschumi, “Questions of Space,” AA Files, (1990), p.49.

and celebration of subject. I suggest that this seeming contradiction is descriptive of the world in general (e.g.: It is arguable that the world would be better off without the subject (humanity) but at the same time it is all about us - in the sense that it is impossible to consider a disengagement from the world on the grounds that our perception of it requires our engagement with it).

The paradox of Science may be used as a metaphor for an understanding of architecture, for as Science has become increasingly self-referential and exclusive, so architecture begins to deny the subject (culture, society, individual, etc.) in favour of self-generating, autonomous systems. As a current architectural position, this thinking advocates formal interpretations of architecture which consciously renounce cultural concerns - be it phenomenologically associated 'truths' of form or historical concerns.<sup>13</sup> Peter Eisenman is a good example of this tendency (fig.5). He and the other

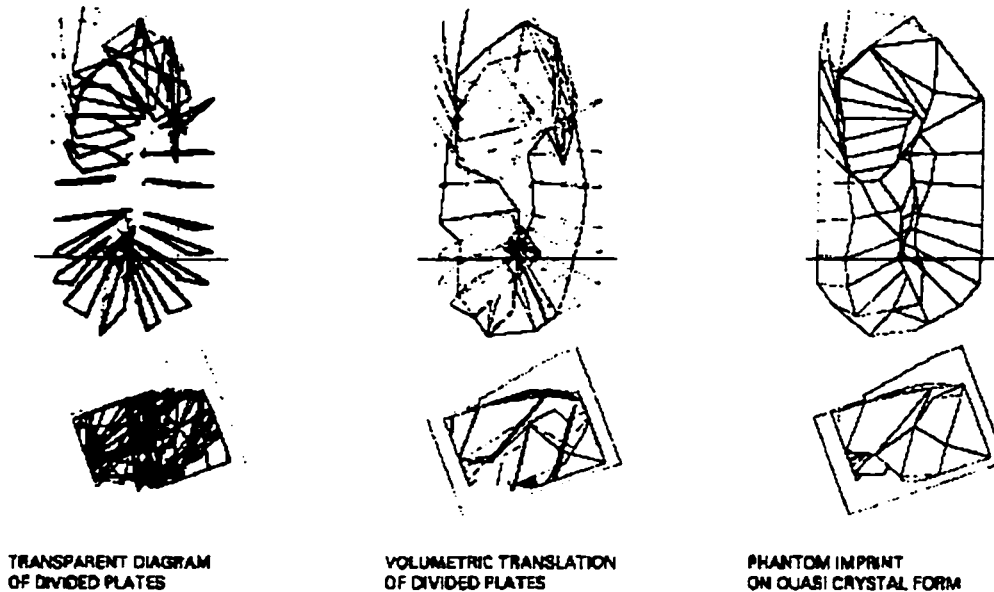


FIGURE 5

so-called Deconstructivists would like to believe that this is a critical response to the state of the world. That is, assuming that form can no longer hold meaning in the contemporary world (in the Heideggerian sense), the only legitimate response is to attempt to arrive at a systemized design process whereby form is generated independent of the architect. The arena of engagement is reduced to questions of how the parts (in the formal game)

<sup>13</sup>Michael Hays, "Critical Architecture," *Perspecta*, 21 (1984), p.16.



relate to one another and to how they may be systemized to produce other assemblages - nothing of which is externally referenced. What this does is openly oppose popular rhetoric which champions a work's humanistic value



by asking how such claims can be made in a world ideologically shattered by the scientific revolution where media and modern production have fragmented and confused any meaning in the cultural object. Eisenman's experiments in computer-generated design and his interest in design generated from fractal theory are evidence of this (fig.6). The idea is to strip form entirely of meaning - or perhaps merely to acknowledge the assumed ideological independence of form as a present condition.

FIGURE 6

There are many other examples of this, from Gehry to Coop Himmelblau, where the human presence in architecture has become consequential. It is no surprise that, considering how scientific principles and theories are so fondly adopted by the leading architectural theorists, architecture should be characterised by the same subject-object rift as currently appears in Science. It is ironic that these disciplines, which initially served as tools of control over nature now seemingly control culture. Can architecture ever completely remove itself from the cause of its inception - culture? For many of the same reasons that Science cannot, I would have to say 'no'. The type of formalism previously discussed is unavoidably contaminated by the fact that its method originates in a particular paradigm which is, by default, culturally motivated. Form is always consequential to culture.

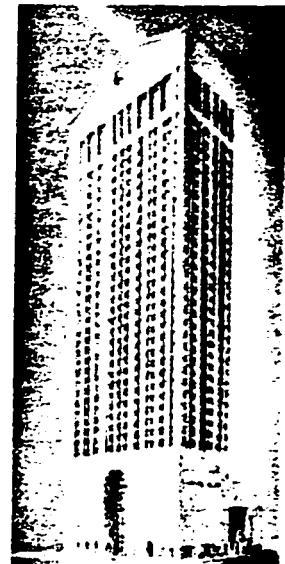


FIGURE 7

I would argue that the current state of confusion and disorientation in architecture owes much to the tension in that, though culture is inherently bound to it, there are attempts in architecture to disassociate itself from culture. Reactions to this paradox tend either to be nihilistic, as is the case with Deconstruction and the complete acceptance of the subject-object/form-meaning rift, or nostalgic, as is the case with PoMo and its complete denial of the rift (fig.7). Advocates of this latter school of thought believe that with the revival of past symbols, meaning and humanity

can be reinvested into architecture. It is ironic that what Post Modernism has actually accomplished is a further cultural alienation. Being blind to the state of the world and endeavouring to erase the historical impact of science on world ideology is no way of arriving at an appropriate architecture. Perez-Gomez believes that the state of the world is characterised by “a simultaneous belief in reason (with its infinite capacity to discover absolutely certain mathematical truths) and the belief in the radical subjectivity of each human being, condemned to his own perspective of the world (providing only a limited access to ‘objective’ reality).”<sup>14</sup> He, however, interprets the situation as detrimental to architecture and seeks to explore solutions which reunify the subjective and objective. This response is, once again, one of denial and nostalgia. Architecture is not about formal games nor the denial of history.

“We should stop trying to design better buildings and start learning how to design better cars.”<sup>15</sup>

The architect, Craig Hodgetts, makes a good point in indirectly reminding us of how we are often more comfortable in our cars than in the city. The urban landscape, to many, has become a place of disorientation and anxiety, not to mention fear, while the automobile, a machine, is often associated with security and comfort. While opposing the strong trends of bifurcation in architecture today - the development of an architecture devoid of meaning and one which adopts meaning through the superficial use of historic forms - it is important to resist the urge of adopting economic determinism in the search for appropriate form. The danger of such a utilitarian outlook, as a development of modern scientific thinking, lies in the fact that it is an “act without an image”.<sup>16</sup> The indifference to form of such determinism is only another form of nihilism, eventually becoming an end in itself. “Being, in this kind of thinking, consists of being *usable*.”<sup>17</sup> The nuclear age, characterised by the constant threat of world-wide destruction, is partially responsible for this type of thinking. The past exists only in relation to the

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<sup>14</sup>Alberto Perez-Gomez, Architecture and the Crisis of Modern Science (Cambridge: MIT Press, 1992), p.274.

<sup>15</sup>Craig Hodgetts: quoted in Aaron Betsky, Violated Perfection (New York: Rizzoli International, 1990), p.202.

<sup>16</sup>Martin Heidegger: quoted in Robert McCarter, “Escape from the Revolving Door: Architecture and the Machine,” Building: Machines (New York: Princeton Architectural Press, 1987), p.7.

<sup>17</sup>Robert McCarter, p.8.

future and, with certainty in the future eliminated, the past must also collapse. An architecture which is suspended in the present moment is of questionable cultural value - it is produced to be consumed.<sup>18</sup>

Within science, the cult of utility has succeeded in undermining much of the creative act of science.<sup>19</sup> Experimentation and invention, as methods of knowing the world have succumbed to the tyranny of an intention which is more about reducing risk, optimization and economic concerns than it is about experiment.

“The inventions of these original technologists are, by today’s utilitarian standards, arcane, outmoded, excessively gestural, inefficient, and frequently ‘failures’ - failures as machines but wonderful successes as human endeavours.”<sup>20</sup>

An architecture which confronts technology as a vehicle of both hope and cultural criticism must do so by adopting the quintessential nature of technology as well as transforming it into something which is fundamentally different from it.

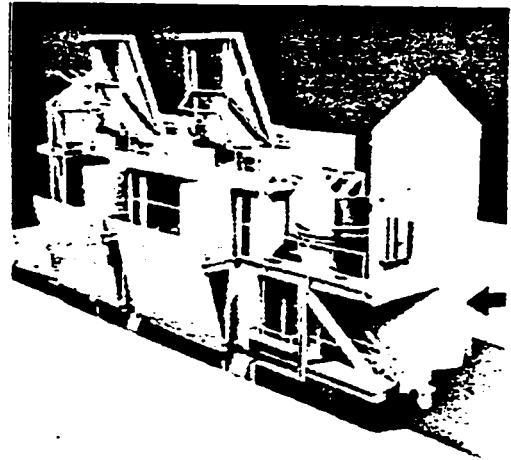


FIGURE 8

Wes Jones and Peter Pfau explore an alternative relationship between architecture and technology (fig.8). Rather than attempt to represent a technology which is increasingly abstracted and diminished in its expression, they opt for an architecture of expression where architecture and technology become an “object of excess”.<sup>21</sup> The design of current modern observatories is much like the design of computers and other high-technology tools - expression is internalized with the economically determined exterior revealing little of the true nature of the instrument. The tool as mediator between world and culture is inherently descriptive of the relationship it negotiates, however, with the nature of the tool increasingly being rendered invisible, so our understanding of this relationship suffers. The appropriation and glorification of the language of the machine and its images (factories, refineries, infrastructure), by Pfau, Jones, is a struggle against the disappearance of our means of knowing ourselves. We begin to experience

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<sup>18</sup>Marc Hacker, “Notes on a changed World,” *Perspecta*, 21 (1984), p.108.

<sup>19</sup>Robert McCarter, p.11.

<sup>20</sup>*Ibid.*, p.11.

<sup>21</sup>Betsky, p.196.

architecture not through space and form, but through our relationship with the technological objects of architecture - the door, artificial light, kitchens, plumbing, electrical systems, etc. For architects, such as Morphosis, the building becomes something which can physically engaged and worked on, an intermediary with which world and body are reacquainted.

This type of bodily engagement with the world requires more than mere participation, it begins to demand a transformation, by technology, of the body. The distinction between organic and inorganic is already rapidly breaking down. The contact lens, artificial organs, prosthetics and plastic surgery reconstruct the body in the image of the machine (fig.9). On the other hand, developments with 'smart' buildings, artificial intelligence, and, most recently, the 'soft' engineering of polymers and gels metamorphose the machine into an animate being. Obfuscating the distinction even further, modern telecommunication systems and global positioning systems begin to break down traditional notions of space as they relate to the body.

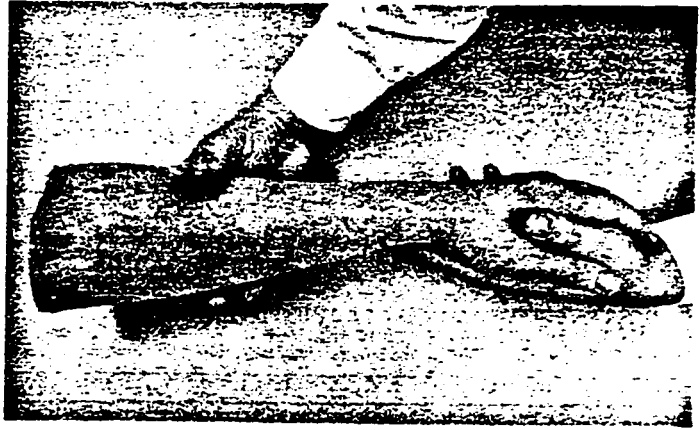


FIGURE 9

Investigations into an architecture which uses these ideas as a point of departure have been labelled, by Aaron Betsky, as Technomorphism.<sup>22</sup> The 'technomorphist' does not view science and the machine as dehumanizing elements (modernism does and accepts it; post-modernism does and rejects it) but as both the product and an extension of the body and mind. Insofar as the machine is born out of a human paradigm it must also be infused with some of the dynamism and depth of the body and culture in general. This is not an architecture of rhetoric and testimonials proclaiming new utopias (as is the case with modernism and post-modernism) or hells (as with Deconstruction), but one which finds renewed pleasure in the poetics of tectonics and structure rather than the "gratuitous aestheticism of abstract form".<sup>23</sup>

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<sup>22</sup>Ibid., p.183.

<sup>23</sup>Kenneth Frampton: quoted in Robert McCarter, p.61.

Although assuming a much bleaker outlook on modern culture, the provocative animations of the Quay Brothers use the detritus of the modern city as the characters and landscapes of their world. In "Street of Crocodiles" the architecture of the world is that of the machine (fig.10). More than an autonomous proxy for the eye, the camera takes on the role of an additional character within the drama. What this does is draw the viewer into the world of the machine, where the body of consciousness is gradually transformed. The Quay's method is less one of resurrecting dead objects into a world of our understanding than it is persuading the viewer to enter into the inanimate life of the machine. Movement and rhythm take on a menacingly calculated



FIGURE 10

pace and the drama unfolds in a tangential manner completely unlike the way the body is used to understanding temporal events. The space of this world is secondary to both movement and the engagement of the apparatus or machine as an alternative way to engage the world. The subject is neither the cornerstone of science nor rejected by it - science becomes subject.

The reciprocal nature existing between man and machine - between body and object - has fascinated thinkers for millenia from the myth of Daedalus to Mary Shelley's monster in Frankenstein. Considering the way in which the machine has begun to invade the body today, the hybrid human/machine captivates the imagination more than ever. At the forefront of this investigation, Peter Salter appropriates fundamental aspects of the body and the world in order to rework them into a liveable engine or device. By engaging the larger powers of nature in a primary way, his architecture successfully avoids falling into mere mimicry of the machine or the gratuitous application of its language on a superficial level. Not only does he craft structure and skin with a machinist's precision, but the spatial and formal geometries have a looseness and freedom which lend his works a certain animation - an animation which derives its power from the way in which his buildings truly reside in the landscape. One of the unfortunate side-effects of modern scientific thinking is the way in which the universalisation and standardisation of technology no longer allows for the specific characteristics of place. Challenging this, Salter's architecture seemingly has the capacity to adapt to its particular context - responding to its site through form, materials (careful consideration is given to ageing and weathering) as well as in the way water is channelled, light is collected, wind is deflected, and experience is processed.

Hybrid architecture arises out of an interest in the organic nature of technology. Analogies drawn between technological systems and organic systems suggest the appropriateness of a biomorphic expression of technology. These analogies are hardly new - using architecture as a metaphor for the body is a relatively pervasive theme throughout history. Classical metaphors of the body typically dealt with physical relationships and proportions; whereas Romantic metaphors transcribe states of the mind onto architectural space and form.<sup>24</sup> Hybrid architecture, however, seeks more than a metaphorical relationship, it aspires to a more intimate and direct relationship between body and world.

"My body is everywhere: the bomb which destroys my house also damages my body insofar as the house was already an indication of my body."<sup>25</sup>

What I attempt to explore is an architecture of anti-realism. As science endeavors to *acknowledge* the world with the use of its own particular tools and methods, so too I strive to acknowledge the human condition using the tools of architecture. Although some would see science as the systematic discovery of a previously hidden *truth*, the anti-realist sees it as the incremental invention of a provisional reality. By the same token, any cultural *reality* acknowledged by architecture is an invented fiction. In this respect, an anti-realist architecture is somewhat nihilistic in that it champions the pursuit of understanding, yet, all the while, believes this pursuit to be folly. It is difficult to describe an anti-realist approach to architecture on the basis of concrete architectural moves - it manifests itself at the meta-level of decision making. It is an underlying attitude. An acceptance of anti-realism embraces intuitive decisions as part of the inherently enigmatic nature of the world. On the other hand, an architecture driven by realism searches for clearly articulated laws - every architectural move must be defensible with respect to a particular set of laws/rules.

The three tiers of understanding with which I approached the design of the observatory are: a meta-level of understanding that is Anti-realism, a perception of the world based on the paradox of the simultaneous denial and acceptance of subject in science and architecture, a specific attitude to architecture best described as hybrid - where hybrid architecture is loosely defined as embracing both the machine and the body simultaneously.

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<sup>24</sup>Anthony Vidler, The Architectural Uncanny (Cambridge: MIT Press, 1992), p.71.

<sup>25</sup>Jean-Paul Sartre, Being and Nothingness, quoted in: Ibid., p.69.

## THE OBSERVATORY

### SITE

The site of the proposed observatory is Mauna Kea, a dormant volcano on the Big Island of Hawaii. While the altitude of the summit makes it the highest point in the Pacific Basin, measured from the sea floor, Mauna Kea is the tallest mountain on earth. Its sheer mass makes it the second largest mountain in the solar system behind Olympus Mons on Mars. Being a shield volcano, its slopes tend to be relatively gentle, compared to other mountains of comparable height, with a mantle consisting of an array of cinder cones and lava flows.

Although it sits well within the tropics, the atmospheric conditions of the mountain are extreme. Temperatures on the summit often fall far below freezing while the base basks in tropical weather. The Hawaiian name, Mauna Kea, means 'white mountain', for snow sometimes falls on the upper slopes during the winter, providing Hawaii with its sole skiing destination. While parts of the lower slope are blanketed with tropical rainforest, the upper slopes are an alpine desert of volcanic rock and cinder (fig.11). The desolate, lunar-like landscape is a stark juxtaposition to the Hawaiian paradise below. Completely devoid of any visible forms of life, it is almost fitting that our exploration of the cosmos should begin on this windswept place - already we are on alien ground. The top of the mountain is so inhospitable that warnings are issued at the Visitor's Information Centre:



FIGURE 11

### CAUTION! CAUTION! CAUTION!

The summit elevation is 13,796 feet (4200m), where the atmospheric pressure is 40% less than at sea level. Less oxygen is available to the lungs, and acute mountain sickness is common. Symptoms include headaches, drowsiness, nausea, shortness of breath, and poor judgement. Weather conditions on Mauna Kea can be severe, including high winds, freezing fog and

snow. Warm clothing is essential. The air at the summit is very thin so children under 16 and people with respiratory, heart, severe overweight conditions, and pregnant women, are advised not to go higher than the Visitor Information Centre (9,300 feet above sea level). Extended exposure to high altitude can cause permanent damage to younger persons whose bodies are still developing. High altitudes can also cause the life-threatening conditions pulmonary edema (fluid in the lungs) and cerebral edema (fluid on the brain). Symptoms include severe headaches, vomiting, breathing difficulties, coughing, blue lips or fingernails, disorientation, and extreme drowsiness that may lead to coma. Immediate descent is essential if any of these symptoms appear.<sup>26</sup>

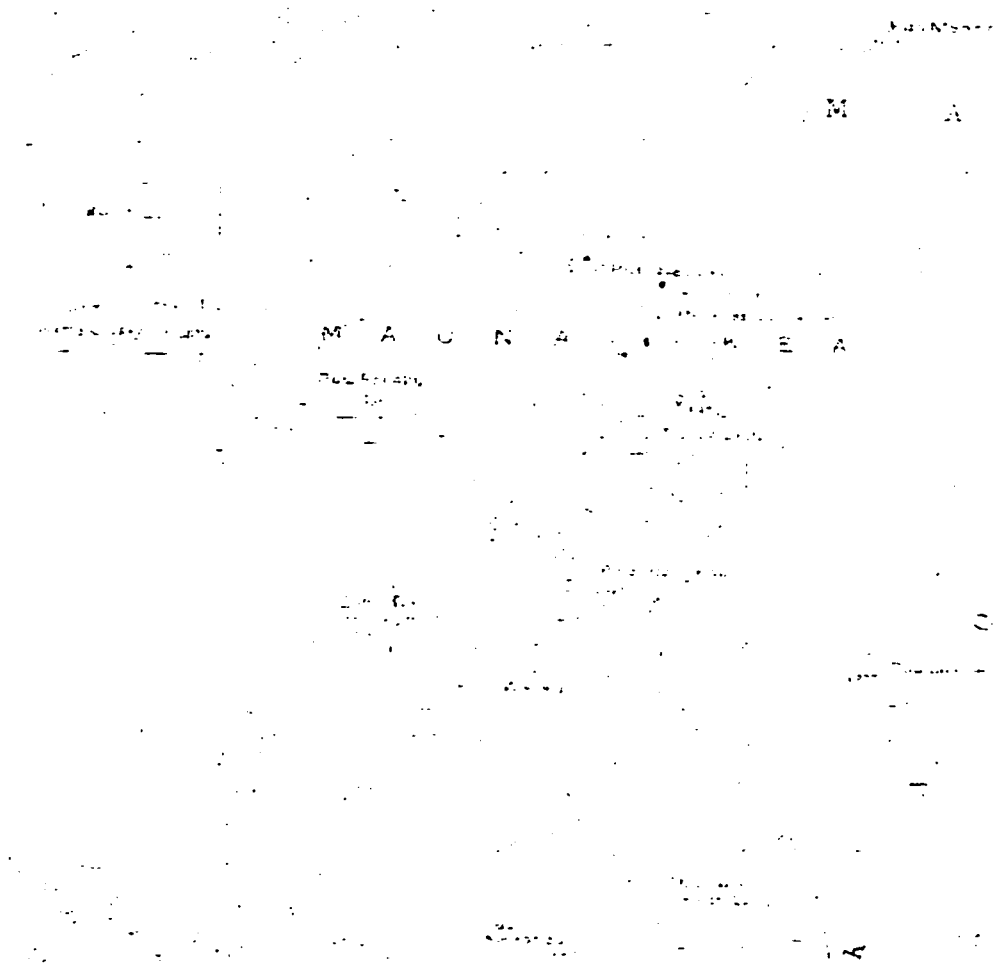


FIGURE 12

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<sup>26</sup>Information Bulletin 4, Institute for Astronomy, University of Hawaii  
(Honolulu: University of Hawaii, 1996).



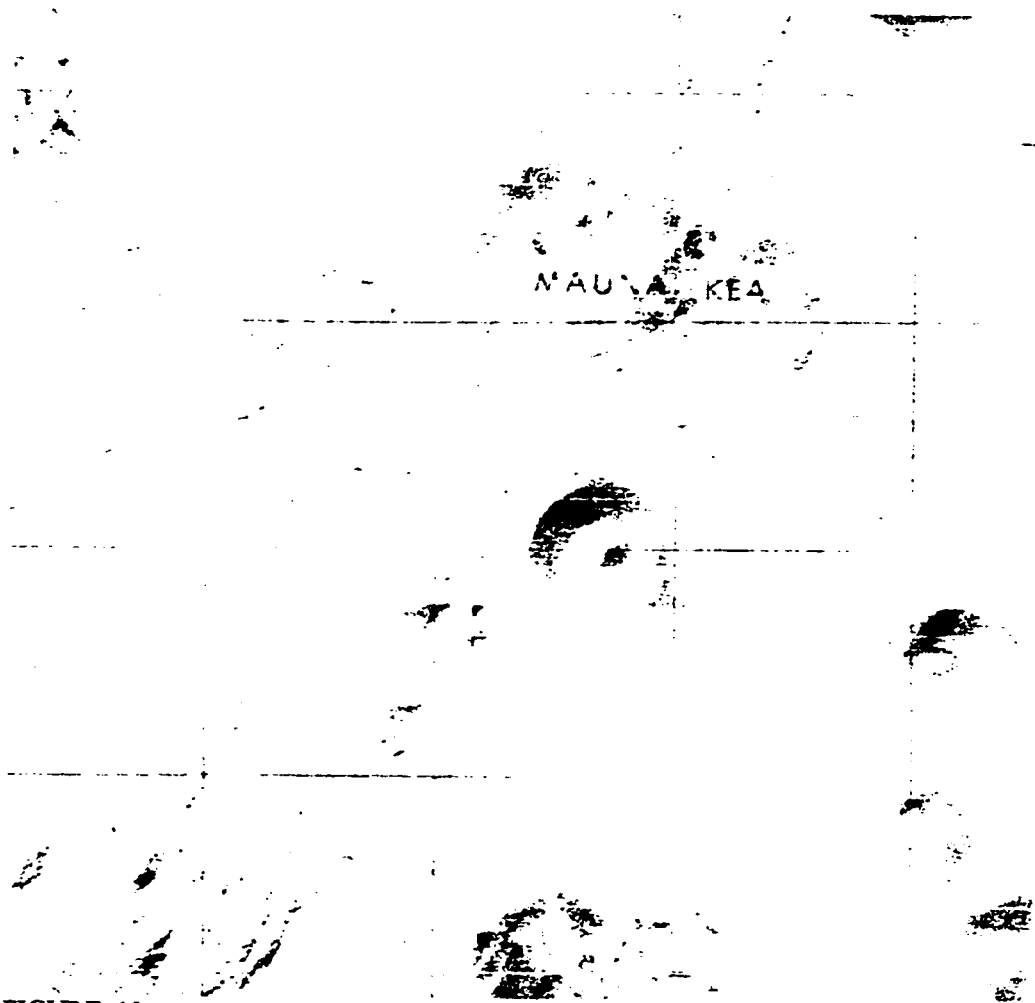


FIGURE 13

Mauna Kea is our window to the universe. Above half of the earth's atmosphere, with one tenth of the water vapor as at sea level, and blessed with extremely stable air, this is the clearest site on earth for observing the

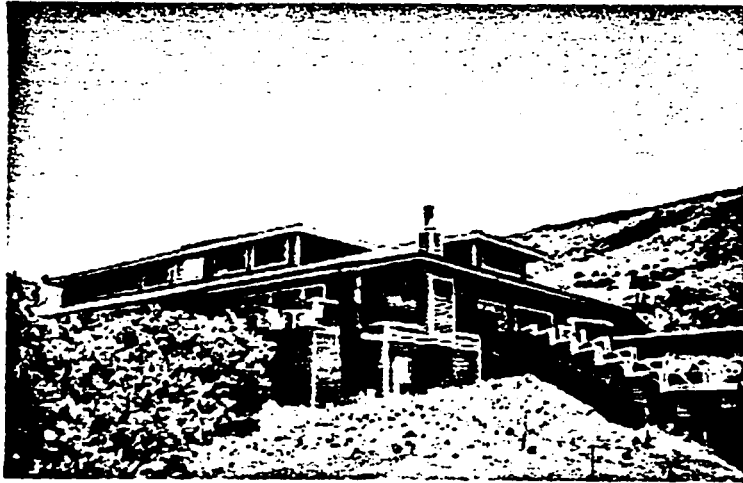


FIGURE 14

stars. It is also located far from major urban centres, sparing it from the light pollution that plagues many other sites. It is no wonder that the site has more large telescopes than anywhere else on earth.

Access to the mountain is gained by a steep and winding road, starting at the Saddle Road (connecting Hilo and the Kona coast) and climbing 5000 feet to the summit. There are no facilities for food, fuel or shelter. The Hale Pohaku Mid-Level Facility, about one hour travel by car from Hilo and Waimea, is situated at the 2800m level and provides astronomers with sleeping and

dining facilities (fig.14). It also includes a library, offices and space for instrument preparation. Down the road about a hundred meters is the Visitor Information Centre where information is provided about the astronomical, archaeological and geological importance of Mauna Kea. This is also the place where visitors to the summit rest to let their bodies adapt to the altitude.

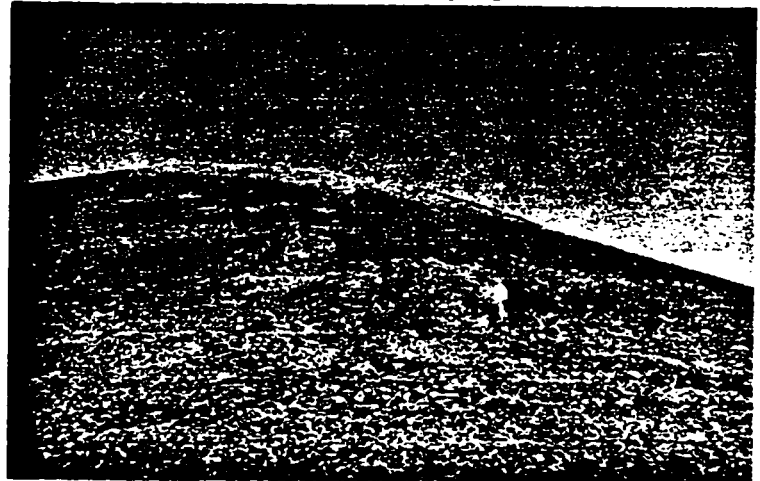


FIGURE 15

The specific siting of the observatory is on the crater rim of Puu Haukea (Goodrich Cone), a cinder cone southwest of the actual summit and south of the concentrated area of observatories (fig.15). Not only is Puu Haukea

distinct in the geometric purity of its form, but its positioning is such that the access road to the main observatories is forced to skirt part of its base. When driving up the road, the first view of the summit and the observatories is afforded at this point, providing the opportunity to use the observatory as a gateway to the summit - a navigational marker. The issue of controlling light pollution caused by automobile traffic could be mitigated by providing public access only up to this point - with further access provided by shuttle vehicles and footpaths. Another object of interest is Lake Waiau. Located near the southwest side of the base of the cone, this lake is the highest in the U.S.

Mauna Kea's history of geological violence has created a place of extreme and inhospitable conditions and at the same time a place that is visually overwhelming and truly sublime. The site demands an architectural gesture that is powerful, heroic. It is an interesting coincidence that the origins of the universe are contemplated at a place where scientists investigate the origins of our planet.

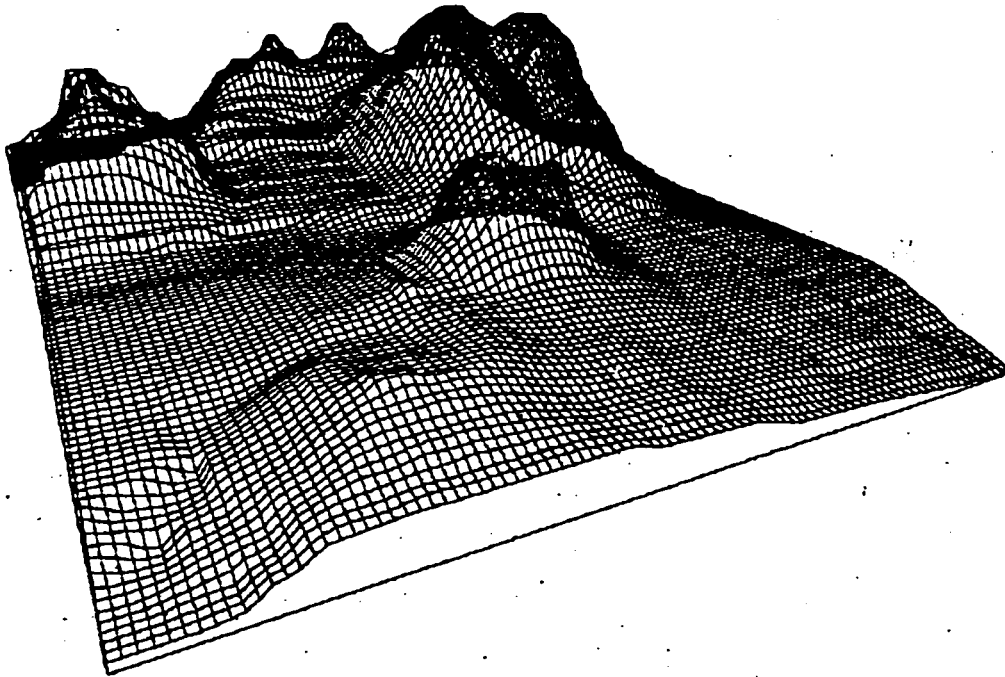


FIGURE 16

## THE PROGRAM

The facility is first and foremost a public observatory, designed to educate and excite the public with respect to Astronomy. It also serves as an interpretation centre for both the other observatories as well as the mountain itself. Although primarily designed for public use, the telescopes may also be used for research by students. The facility also serves the astronomers by providing a central meeting place on the mountain and a place to interact with the public. The new, pressurized lunchroom replaces the small, cell-like, concrete block lunchroom on the summit and the pressurized lounge affords some relief from the thin atmosphere.

### **The Observatory**

#### Level 1.

1. Entry
2. Reception/Information Desk
3. Maintenance
4. Gallery
5. Store
6. First-Aid
7. Storage
8. Vestibule
9. Washrooms

#### Level 2.

10. Cafeteria/Lunch Area
11. Researcher's Lunchroom
12. Theatre
13. Storage
14. Washrooms

#### Level 3.

15. Administrative Offices
16. Lounge
17. Theatre
18. Control Room
19. Projection Room
20. Washrooms

#### Level 4.

21. Upper Lounge

#### Level 5.

22.Observation Deck

**The Mechanical Tower**

Level 1.

23.Shuttle Parking

24.Vestibule

Level 2,3,4

All mechanical, electrical, plumbing, generator services

**The Static Telescope**

25.Control/Instrument Preparation Room

26.Seating

27.Washrooms

**The Kinetic Telescope**

28.Control Room

29.Viewing Deck

## ARCHITECTURAL STRATEGY

The observatory is comprised of three main parts: the observatory proper, the static telescope and the kinetic telescope (NOTE: please refer to appendix for all plans, sections, elevations, etc.).

### **The Observatory**

The observatory proper sits along the western edge of the crater rim and consists of a main building and a secondary building which houses mechanical services and acts as the 'life support' of the larger building. The architectural approach is to create a strong, bold physical presence in the landscape. The detailing is a juxtaposition of fineness and firmness. This is evident in the use of a delicate steel skin which embraces a system of concrete piers which firmly anchor the structure into the ground and adopt the geometry of the crater rim. Within the container defined by the skin, open space is punctuated by a series of objects. This strategy denies the traditional modern relationship of solid and void as a figure-ground reversible in favour of one influenced by the internal relationships of the machine. Within the space of the building, program unfolds as events within an open landscape. Space is consequential. The entire system is similar to the structure of an automobile where the engine parts sit within a space defined by a frame which is, in turn, covered by a metal skin. The metaphor may be carried even further to describe the human body - organs within the skeleton within the skin. Air ducts and power conduits run from the mechanical tower, through the connecting bridge, along the inside of the skin and finally branch off perpendicular to the skin to sustain the various areas within the main building. In the case of the main building, the skin is consistent over the entire west side of the building and breaks away to reveal the internal mechanics of the observatory on its east side. The surface of the metal skin is untreated, allowing it to oxidize over time, thereby blending in with the natural red oxide color of the volcanic stone of Mauna Kea. The rest of the metal surfaces are treated in a black enamel to prevent oxidation. Gutters, fire stairs, the guts of elevators, etc. become objects set against a ground of simple surfaces of metal plate and glass.

Access to the facility is provided by shuttle bus from the mid-level facility, serving to decrease traffic levels on the summit and thereby reduce light pollution from automobiles. The shuttle approaches from the south side of the building and parks under the mechanical tower. Visitors enter the vestibule on the first floor of the mechanical tower and, while crossing the

bridge connecting the two buildings, one is made aware of the fact that the link also serves to transfer heat, air, plumbing and power to the building as well as housing a wind powered turbine. The wind is channeled between the buildings and forced through the vertical fan of the generator.

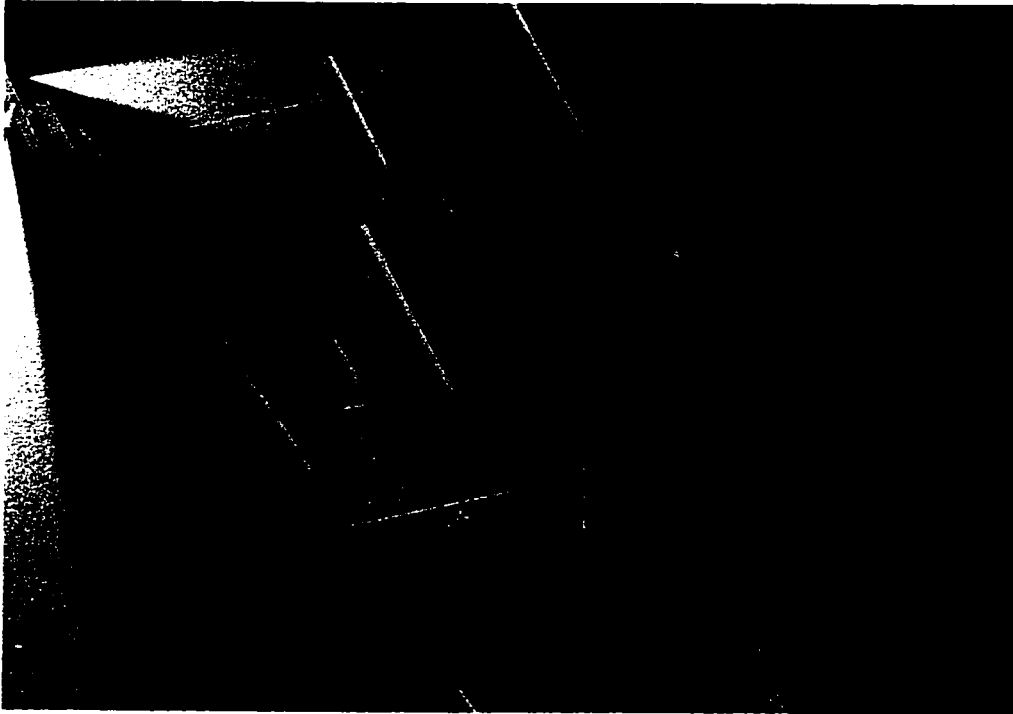


FIGURE 17

In the main observatory, horizontal circulation is organized along the skin of the building, much like the mechanical services. Vertical circulation occurs at the ends of the building and in the central hinge where the building's mass changes direction. The main space of the building is an open cavity, with catwalks, ducting and conduits supported off a primary steel structure (in turn, supported on the concrete piers). This open space is bounded on the east side by a vertical block of washrooms and dominated in its centre by an anthropomorphically sculpted object (fig.17). As it contains the only spaces within the observatory which are pressurized and oxygen-enriched, formally this object is of an entirely new language. Acting as the 'lung' of the observatory, its steel membrane is molded and curved over a steel skeleton. The summit currently has no space which simulates normal atmospheric conditions; therefore, anyone suffering from altitude sickness or even mildly experiencing altitude stress must undergo the long trek down the mountain to the mid-level facility. This pressurized vessel houses a first-aid room on the main level, a lunchroom for astronomers on the second level and a lounge for

the public and astronomers on the third and fourth levels. It was intentionally conceived of as a separate entity - an object within a container. The form is intended to be technological in an anatomical way - it is a machine for breathing in.

The mountain of Mauna Kea has significance which reaches beyond both its physical dimensions and its prominence as the prime observing site in the world. Mauna Kea is important spiritually for the Hawaiian people. Adze quarries, gravesites and stone shrines have been found on or near the summit. The mountain is also believed to be the home of Poliahu, the snow goddess, sister and enemy to Pele, the fire goddess. In order to recognize this very important characteristic of Mauna Kea, a gallery (most likely managed by the Archaeology Department of the University of Hawaii) on the main level would be devoted to interpreting the spiritual history of the mountain. The Polynesian traditions of Astronomy would also be well represented in the public display area, making the link between ancient and modern Astronomy. This seems particularly fitting for this site, for the super hi-tech observatories of today share the summit with the stone shrines of the ancient Hawaiians - the latter being oriented north-south leading many archaeoastronomers to believe that they had astronomical significance. The gallery is a free-space, primarily occupying the area around the first-aid room on the main level. Smaller display areas on the level of the catwalks would be devoted to modern imagery collected from telescopes on the mountain.

The theatre occupies the north end of the building. This space is for lectures and films but primarily used as a way to allow large groups of people to view images collected by the telescopes in real time. The theatre is oriented in such a way that one can watch the telescopes through the glazed wall while seeing images collected by the telescope projected onto the screen. The act of seeing and the results of seeing may be observed simultaneously. Suspended as an object above the theatre space is the control room. From here the telescopes are controlled and positioned by computers. Each telescope also has a secondary control room to provide space for computers and instrumentation within close proximity to the telescope.

A maintenance room and loading dock occupies the enclosed space on the south end of the building. Immediately above it on the second level is a cafeteria and above that are administration offices. An observation deck on the roof of the building allows for small telescope and naked eye observations.



Controlling light pollution is one of the most important technical considerations. Even small amounts of light pollution can seriously interfere with the highly sensitive telescopes nearby. All exterior glazing is mechanically shuttered from the outside so that, after sunset, artificial light is sealed within the building. Special revolving doors act as light locks to prevent any leakage when people move in and out. In order to reduce the effects of dehydration caused by the altitude, rehydration stations (water fountains) are placed throughout the building.

### **The Static Telescope**

The static telescope, sited at the centre of the crater, sits within an excavated depression. This allows for the purity of the crater's geometry to remain unbroken as well as providing enclosure for the telescope. When the telescope is not in use a steel platform moves across the aperture to seal the space from the elements. Access to this telescope is either overland between observatory and telescope or through a subterranean passage. Walking through the compressed space of the passage, one is liberated by the sky as the telescope is reached - the mechanics of the telescope and its mounting are set against the ground of the heavens.

In addition to being geologically significant as the focal point of past violence, geometrically, the centre of the crater is a unique and very powerful location. Lying on a flat prairie, the night sky has the appearance of a celestial dome of stars. At the crater's centre, however, the walls of the crater compliment this phenomenon to create the sphere of the universe (many traditional models of the universe are spherical). Laser sources positioned at strategic locations on the crater rim can then be used to map out the opposite hemisphere's night sky on the crater bowl. The experience of standing at the static telescope would be much like floating in a field of stars.

The east wall of the enclosure is a canted plane of glazing, positioned so that it sets up a direct relationship with a glazing wall in the observatory (directly opposite the main entry). A limited seating area occupies the opposite side of the telescope enclosure so that views are directed up at the telescope and out through the glazed wall towards the observatory. From within the observatory, the static telescope is directly on axis with the entry space. A path the width of the glazed wall is defined down the bowl, through a sloped trench and terminates in the canted glazing of the telescope enclosure. The purpose of this is to formally express the telescope as part of the observatory - a part which has been dislocated and placed at the centre of the crater. As well as objectifying the act of 'seeing', the separation of the telescope from

the observatory encourages exploration of the site as well as sets a precedent that further expansion in the form of new telescopes could occur throughout the site

### **The Kinetic Telescope**

An optical telescope, in tracking a celestial object as the earth's rotation moves it across the sky, must be able to rotate about a horizontal axis and a vertical axis. Such a system is referred to as altazimuth mounting. In the case of the kinetic telescope, the horizontal rotation has been replaced with a track which carries the telescope around the southern rim of the crater. All objects in the sky would be able to be tracked using this method with the exception of objects immediately behind the observatory.

The structural frame of the telescope is encased in a metal panel system. The south facing panels are replaced by solar panels so that, during solar observations, the telescope would use the energy from the sun to move the telescope along the track. At the eastern terminus of the track the telescope locks into the observatory. The paneled fin, which stretches down the north side of the kinetic telescope enclosure, eclipses the static telescope at this point (as viewed from the entry gallery in the observatory). During this 'eclipse', one is able to move into the fin from the main level of the observatory and up stairs to a viewing platform. One can then disembark at any point along the telescopes journey onto a walkway which runs alongside the track. The very slow speed of the telescope allows this to be done safely. Also within the telescope is a small secondary control room (most of the functions of the telescope can be carried out at the main control room).

## CONCLUSION: THE ARCHITECTURE OF ANTI-REALISM

"The list of all the things the sea does is not what the sea is. Today, the sea has jewelled its surface, and silvered its fish under a band of beaten gold. Those who know it well will admit that they hardly know it at all. No-one has been to the very bottom. Except by inference we do not know that there is a very bottom."<sup>27</sup>

The sea and space are very similar characters in the drama of the imagination. Although the former has become increasingly familiar to us over the centuries, it still encompasses our passions of hope, fear, mystery and freedom. So too, space is the object of the romantic imagination, conjuring up a multitude of strange and wonderful fictions. The extraterrestrial lifeform is the modern-day mermaid (fig. 18). What our collective imagination informs us of the universe beyond speaks as much about ourselves as it does about space. Astronomy is as much about imagining as it is about recording. When we peer into the immensity of the universe what do we actually see? What



FIGURE 18

we begin to understand is the fact that the universe is not 'immense' - it merely *is*. 'Immensity' is a human construct of relativity which adopts the universe through perception. Immensity is not inherent in the universe, it is inherent in us. Through the telescope we peer into the immensity of ourselves. Through the telescope we dream.

Astronomy provokes. Our experience of the sky is of a celestial dome stippled with discrete points of light and bounded by the horizon. Astronomy tells the story of a different sky - unbounded, essentially limitless. As the existence of the body is finite, the mind has a difficult time dealing with the idea of infinity. The typical understanding of scale is exploded when one deals with concepts such as distances between stars, masses of galaxies and forces within a black hole. Astronomy provokes and so too the observatory must provoke and disturb the calm waters of that which is familiar to us.

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<sup>27</sup>Winterson, p.32.

The current Realist paradigm in Science neglects much of what astronomy is about. What I propose in the design of the observatory is an experiment in acknowledgement and exploration. The proposed observatory is not a reaction against the current state of science and architecture, which I do not see as problematic, merely unrecognized, but a reaction against the current typology of the observatory in that the design seeks to acknowledge what *is* rather than ignoring it. It is expressive of the paradox and an exploration of the tension inherent within it. In order to move ahead (in science and architecture and thought in general) one must first understand one's own position.

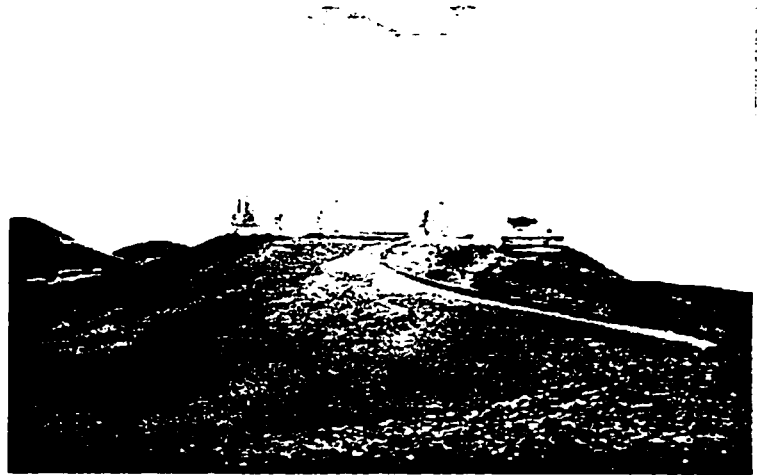


FIGURE 19

The existing observatories on Mauna Kea are marvelous examples of reserved, Platonic geometry (fig.19). These enormous, bold gestures of geometric purity and restraint, however incidental to an economically determined process, reveal nothing of the complex nature of astronomy. I seek to externalize meaning. This move is more than a reaction against the exclusivity of the existing observatories, it is a response to the current political climate which surrounds the presence of observatories on Mauna Kea. I see much of the resistance to the observatories stemming from a perceived elitism on the part of Astronomy on the island. After all, the residents of the Big Island justifiably see the mountain as theirs, and the fact that this mountain, which can be seen from most places on the island, is visually and politically dominated by these observatories runs contrary to this sense of ownership. The only way to fight this aversion is to perceptually and experientially give the mountain back to the people. True, a small interpretive centre does exist at the halfway point up the mountain, but essentially exploration of the summit is discouraged. The manner in which the observatories disguise themselves in their white masks further turns their backs to the residents, let alone society. This is yet another example of the denial of subject by science.

We look up into the darkness so that we may see ourselves - but do we see ourselves seeing? All available resources, in the existing observatories, are

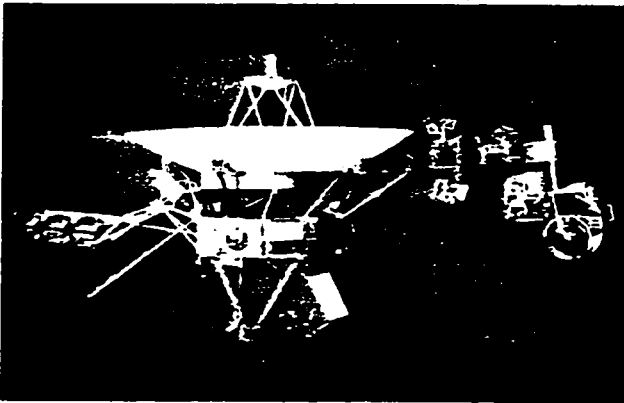
directed towards the optimization of the quantity and quality of the observed information. What is ignored is the fact *that* we see is as important as *what* we see. One of the most distinctive and important qualities of the human species is the fact that we seek to understand our world - that we look up. Failing to express this in the design of an observatory is denying who we are and what astronomy is all about. The same is true for architecture - we are obsessed with what *is* built, but what is equally important is the fact *that* we build. The observatory as a kinetic instrument of measurement tries to address this both by explicitly revealing itself as instrument as well as in the externalization of the telescope and the manner in which its movement and purpose may be followed and understood by the participant. It is important that the observatory and telescope are separated - the detachment allows one to stand apart from the 'seeing'. With respect to the kinetic telescope, objectification is achieved through motion, whereas the static telescope achieves this in its siting at the centre of the crater bowl. The observatory sits on the crater rim and contemplates the telescope as an existential activity. It does more than contemplate the heavens - the observatory contemplates astronomy. In fact, the way in which the lower telescope becomes the receptor in the metaphorical eye of the crater is indicative of 'seeing' on a monumental scale. The telescope has been surgically removed - it is the observatory distilled.

At Kilauea crater, south of Mauna Loa, native Hawaiians stand at the crater rim and make sacrifices of fruit and gin to appease Pele - goddess of fire. Volcanic craters hold special spiritual significance for the Hawaiians. Not only does the kinetic telescope become a metaphor of this ritual, but it provides an opportunity for the Hawaiians to make the journey with the kinetic telescope, mirroring the motion of the celestial bodies across the sky, and then disembark at any point for spiritual contemplation or offerings. The kinetic telescope becomes a spiritual and meditative destination for the Hawaiian people - not only a mere scientific instrument. Through the kinetic telescope, the order of the heavens is imprinted on the rim of the crater (in a metaphorical way) much like the ancient stone cairns, oriented north-south near the summit, are a terrestrial acknowledgment of a higher order of nature. The observatory is a macro version of the stone cairn - the Hawaiian presence on the mountain is reasserted.

Externalizing meaning and encouraging society to come up the mountain (literally and figuratively) is an attempt at the reinvestment of subject in science. However, this only deals with one side of the paradox. Besides the celebration of subject, the observatory must also renounce the subject by becoming the epitome of the modern - it must become the machine. The

entire observatory is an instrument to measure the heavens. The kinetic telescope maps the change in position of the stars by tracing their relative movement on the rim of the crater - the telescope as mediator between heaven and earth. It emerges from the building at night like a nocturnal, steel beast and makes its way around the crater, slowly and deliberately, with one eye on the stars. This is not a machine for living in (in the Corbusian sense), rather it is a machine to engage with. Yet this is not a relationship of equals. The observatory as machine cares not for the participation of society - it continues its daily routine with utter disregard for human intervention.

In its externalization of the nature of astronomy as an axiomatic human endeavour, the observatory invites the subject, while abhorring it in its unapologetic embrace of technology and the machine. The extremely inhospitable conditions of the mountain themselves repel human visitation. It is ironic that the more divorced the object (machine) becomes from the subject the more it becomes like the subject. *Voyager* is a good example of this (fig.20). Conceived of as a robotic explorer of space, it begins to take on a different different character when one begins to think of what will happen if it manages to completely escape the matter surrounding our solar system. If this happens, it could conceivably travel on, uninterrupted, for millions of



years - well beyond the lifespan of our species - maintaining its calculated exploration and sending back information to its home planet. The machine takes on an animate nature independent of its makers, yet by nature it remains inexplicably bound to society.

FIGURE 20

My observatory is technological in that its language is that of the machine, yet in the way that it responds and adapts to its landscape and environment it is animate. Where the other observatories on the mountain appear as objects on the landscape, I want to ground the observatory in the land - playing on the ambiguity of whether or not the building is a prosthetic to the land or to society. It is sited so that it attempts to complete the crater wall at a place where the wall's geometry is interrupted. It acts as a poultice on this breach. The building also responds to the climatic peculiarities of the site. Wind is deflected by the outer skin and channeled through generators to provide

energy. Geothermal energy is tapped from beneath the skin of the earth and solar energy feeds the kinetic telescope, when used to observe solar phenomena, in its path around the crater wall. The observatory attempts to take on architecture, science and humanity and weld them together in a unified whole.

Economic determinism is partially rejected in this manifestation of the machine - the observatory is treated as an object of abundance in counterpoint to the stoicism of its neighbours. After all, this is more than a mere outpost for scientific research, it is a monument to science. The observatory is all about us and at the same time does not need us - simultaneous celebration and rejection of subject. It is the typical observatory exploded, turned inside-out - its guts and detritus remade into a working whole. It draws energy from the sun and wind, follows the motion of the stars and records its information in binary code. It has become a hybrid of machine and humanity. It invites us up to see it in order to make us aware that we are not needed. It is descriptive of a current relationship with the world, not definitive of the human condition. It is an experiment, and, like all experiments, conjures up more questions than it answers.

“Already we are boldly launched upon the deep; but soon we shall be lost in its unshored, harborless immensities.”<sup>28</sup>

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<sup>28</sup>Herman Melville, Moby Dick (New York: Penguin Books, 1992), p.145.

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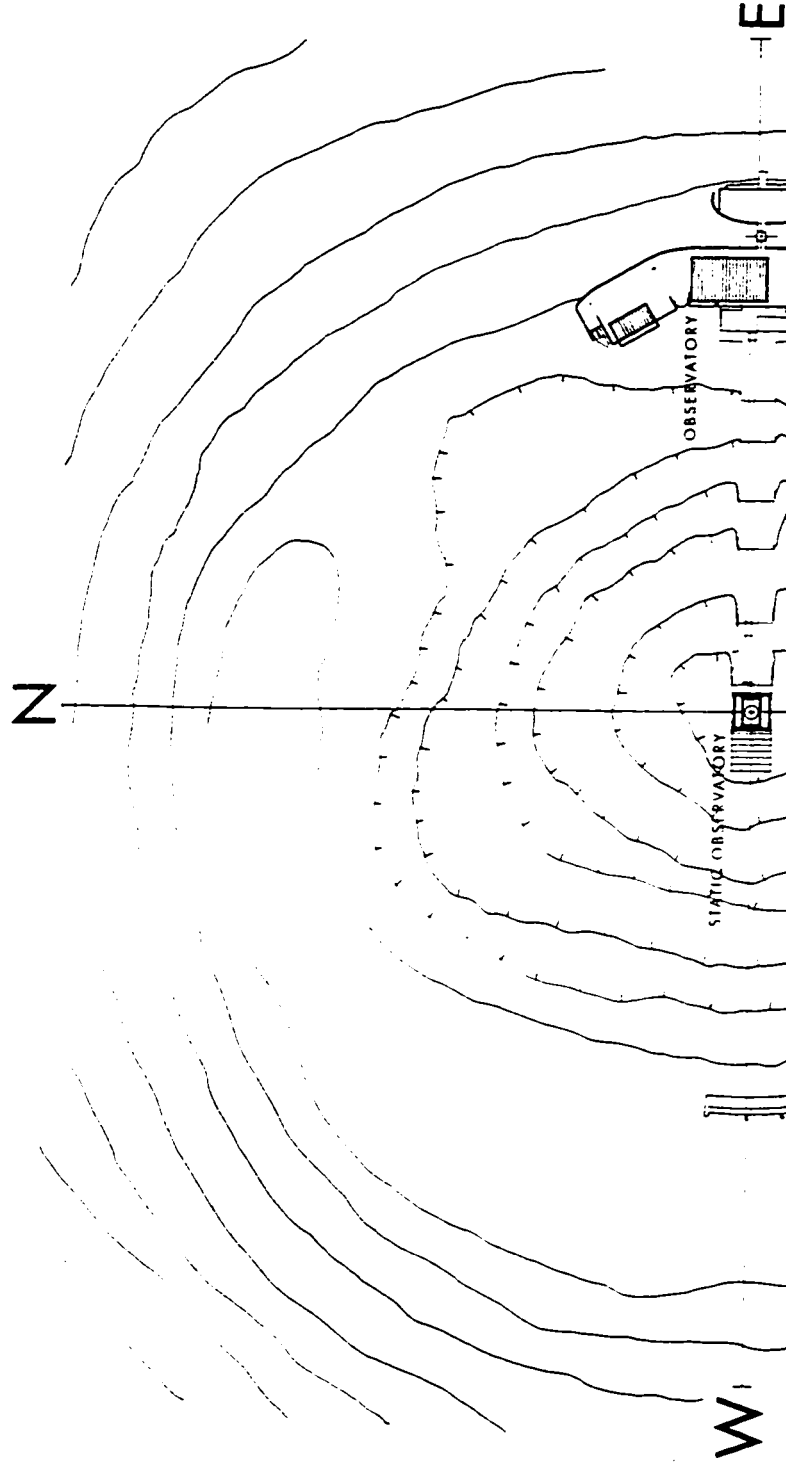
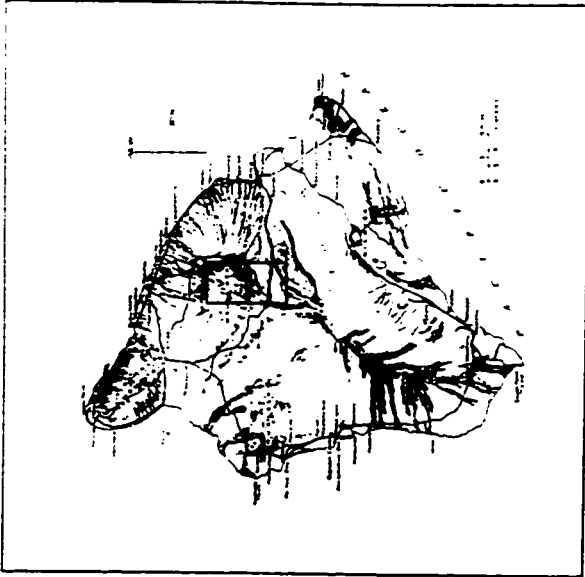
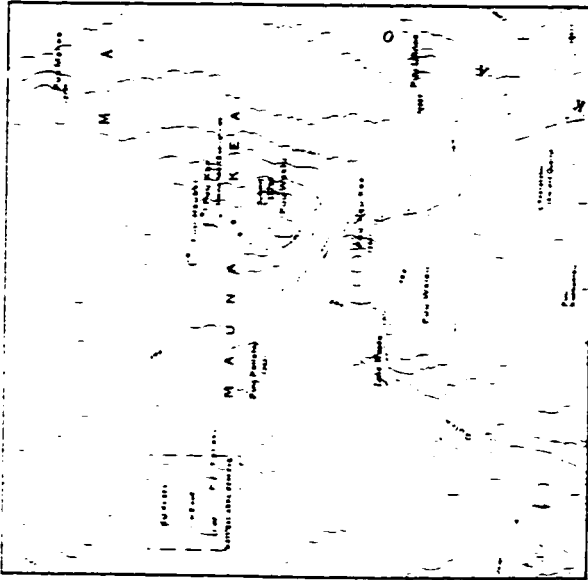
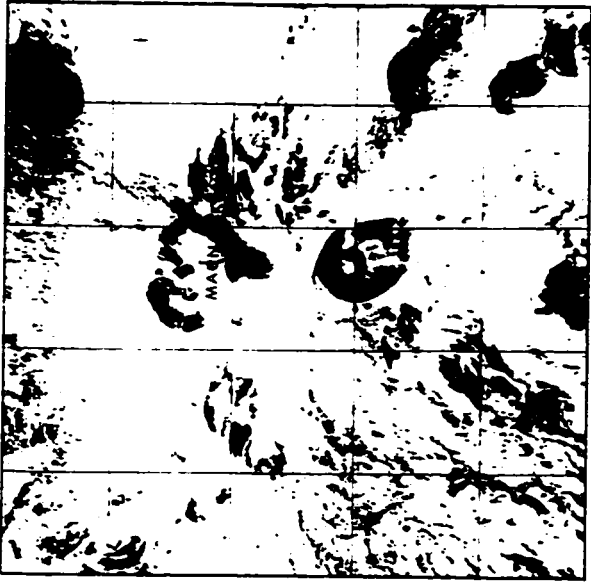
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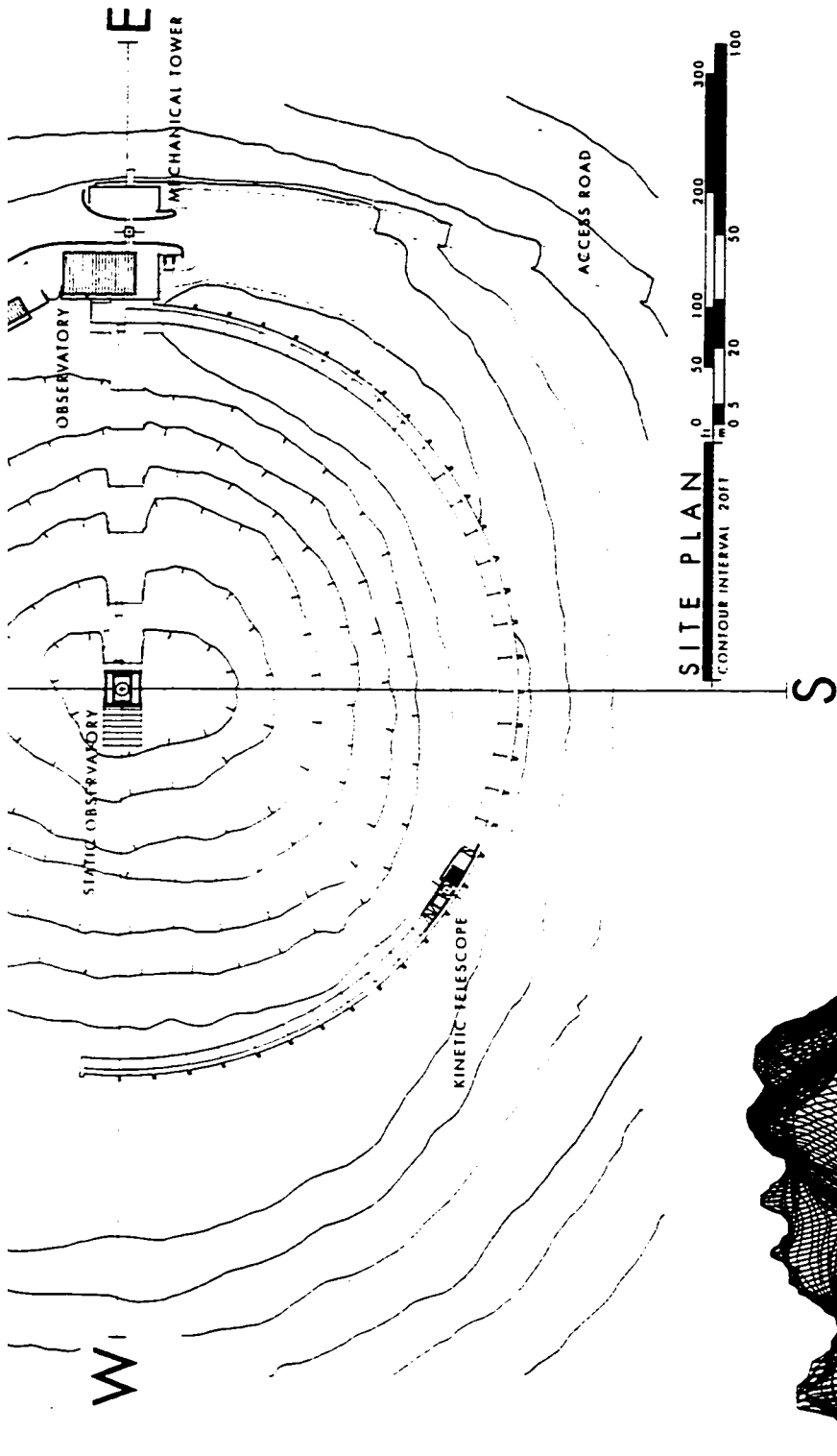
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## **APPENDIX**







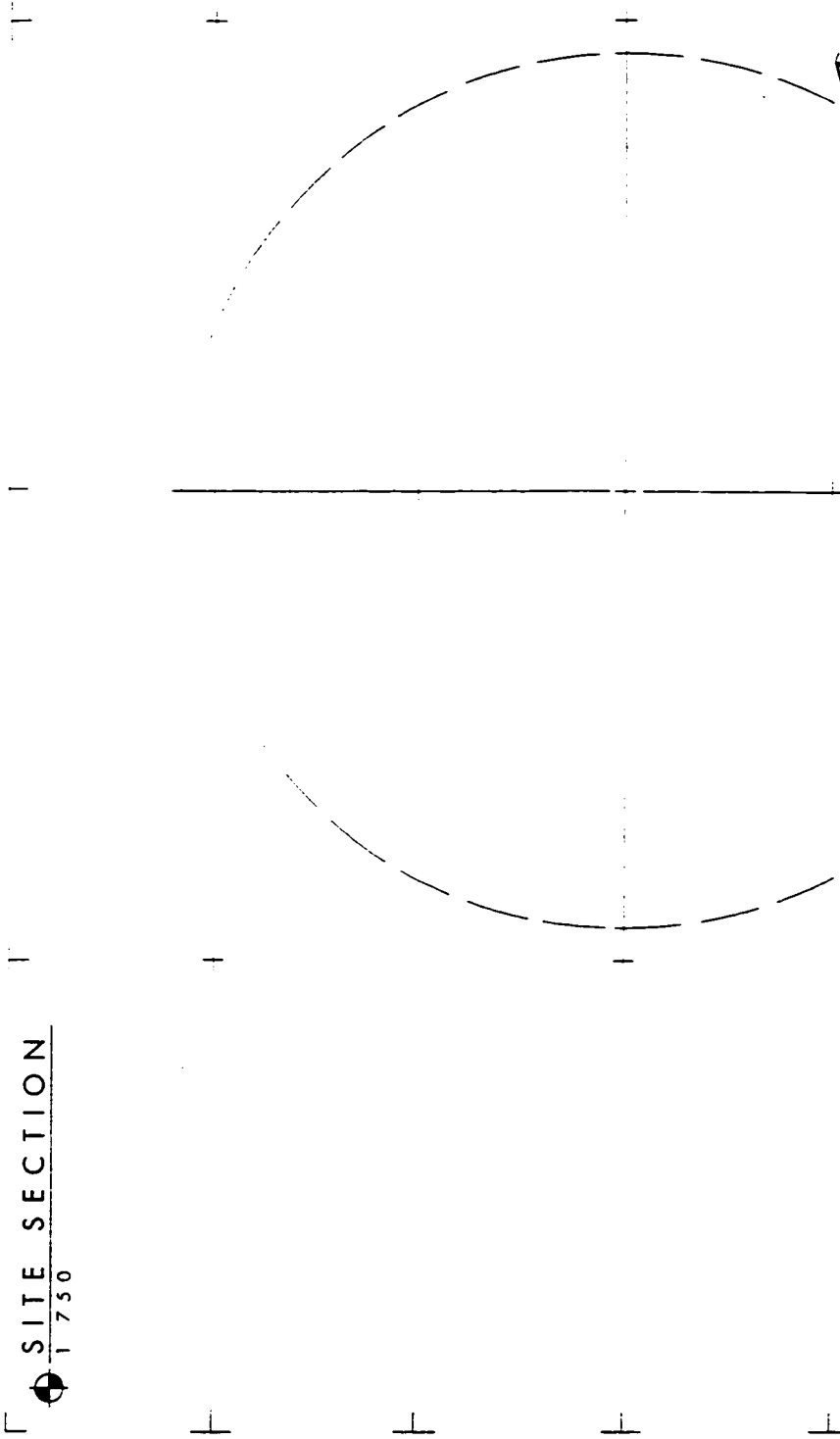
CAUTION! CAUTION! CAUTION!  
 THE SUMMIT ELEVATION IS 13,765 FT. (4200 M). WHERE THE ATMOSPHERE IS 60% LESS  
 THAN AT SEA LEVEL, LESS OXYGEN IS AVAILABLE TO THE LUNGS, AND ACUTE MOUNTAIN  
 SICKNESS IS COMMON. SYMPTOMS INCLUDE HEADACHE, DIZZINESS, NAUSEA,  
 SHORTNESS OF BREATH, AND POOR JUDGMENT. USUALLY, CONDITIONS ON MAUNA  
 KEA CAN BE SEVERE, INCLUDING HIGH WINDS, FREEZING FOG AND SNOW. WARM  
 CLOTHING IS ESSENTIAL. THE AIR AT THE SUMMIT IS VERY THIN SO CHILDREN UNDER 16  
 AND PEOPLE WITH RESPIRATORY, HEART, SEVERE OVERWIGHT CONDITIONS AND  
 PREGNANT WOMEN ARE ADVISED NOT TO GO HIGHER THAN THE VISITOR'S INFORMATION  
 CENTRE (9,350 FT. ABOVE SEA LEVEL). EXTENDED EXPOSURE TO HIGH ALTITUDE CAN  
 CAUSE PERMANENT DAMAGE TO YOUNG PERSONS WHOSE BODIES ARE STILL  
 DEVELOPING. HIGH ALTITUDES CAN CAUSE THE LIFE-THREATENING CONDITIONS  
 PULMONARY OEDEMA (FLUID IN THE LUNGS) AND CEREBRAL OEDEMA (FLUID ON THE BRAIN).  
 SYMPTOMS INCLUDE SEVERE HEADACHE, VOMITING, BREATHING DIFFICULTIES,  
 COUGHING, BLUE LIPS OR FINGERNAILS, DISORIENTATION, AND EXTREME DROWSINESS  
 THAT MAY LEAD TO COMA. IMMEDIATE DESCENT IS ESSENTIAL IF ANY OF THESE  
 SYMPTOMS APPEAR.





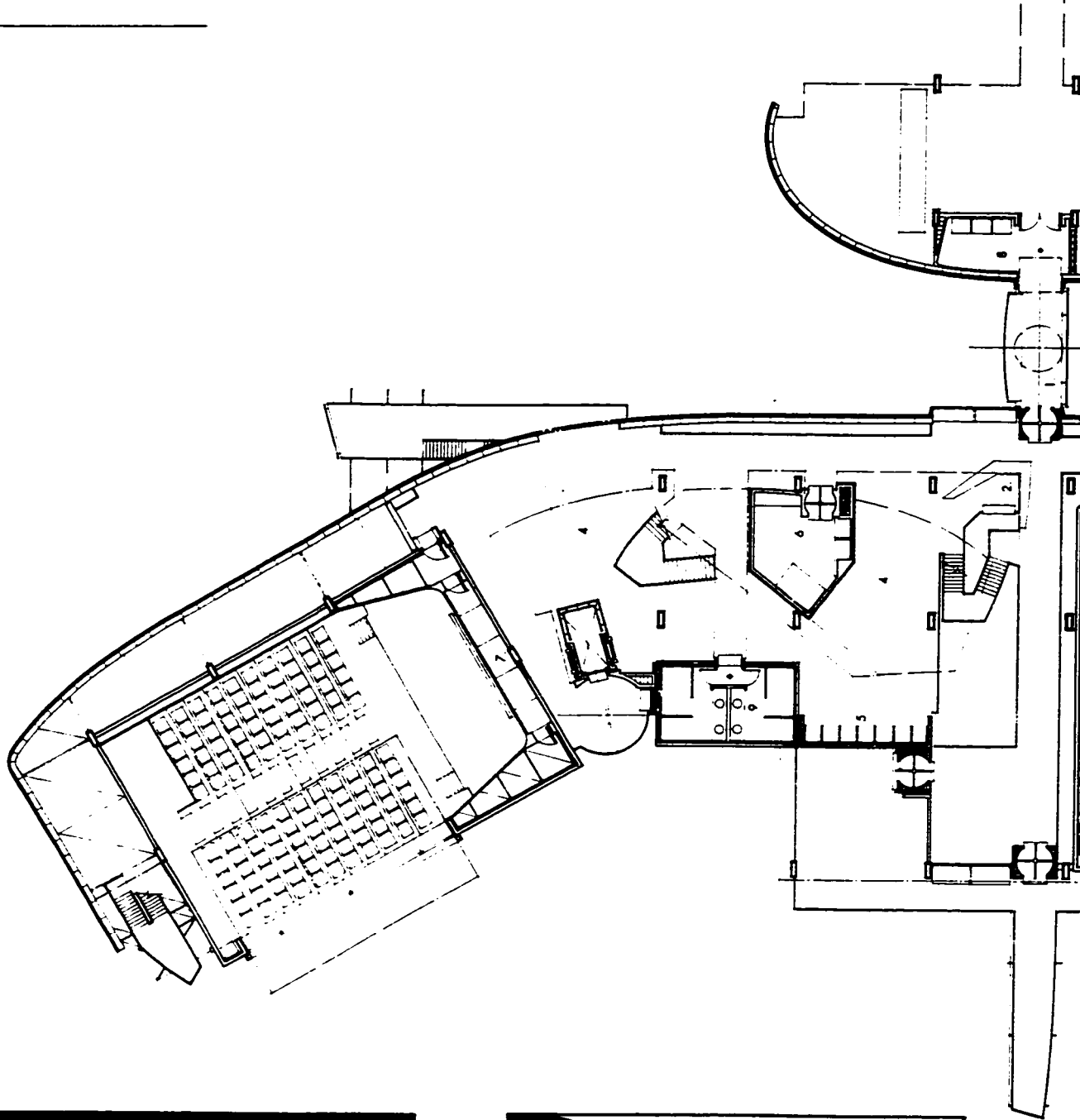
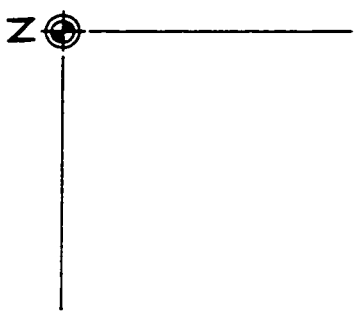
SITE SECTION

1750



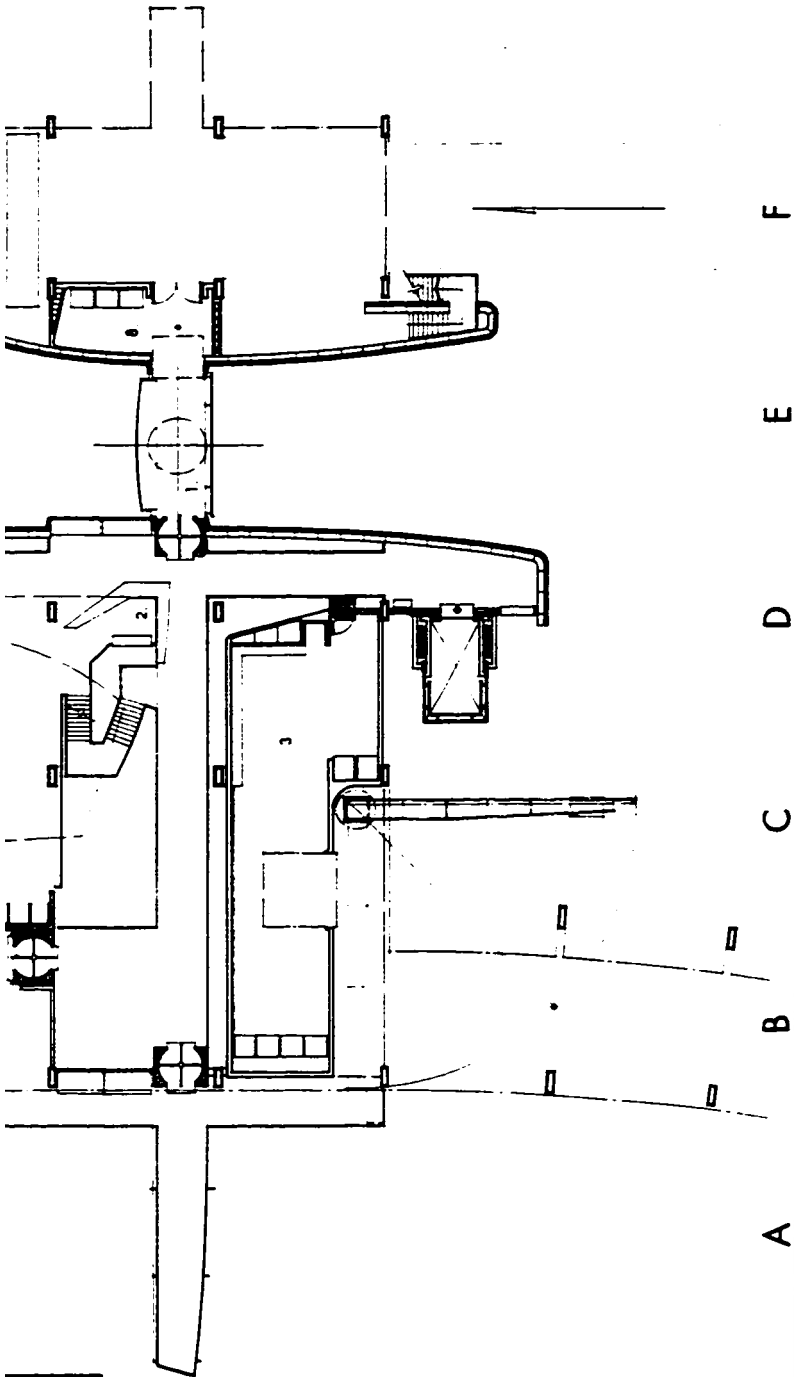






LEVEL 1



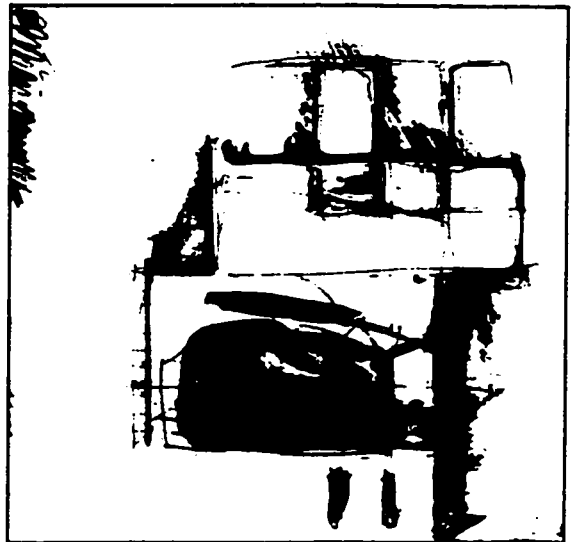
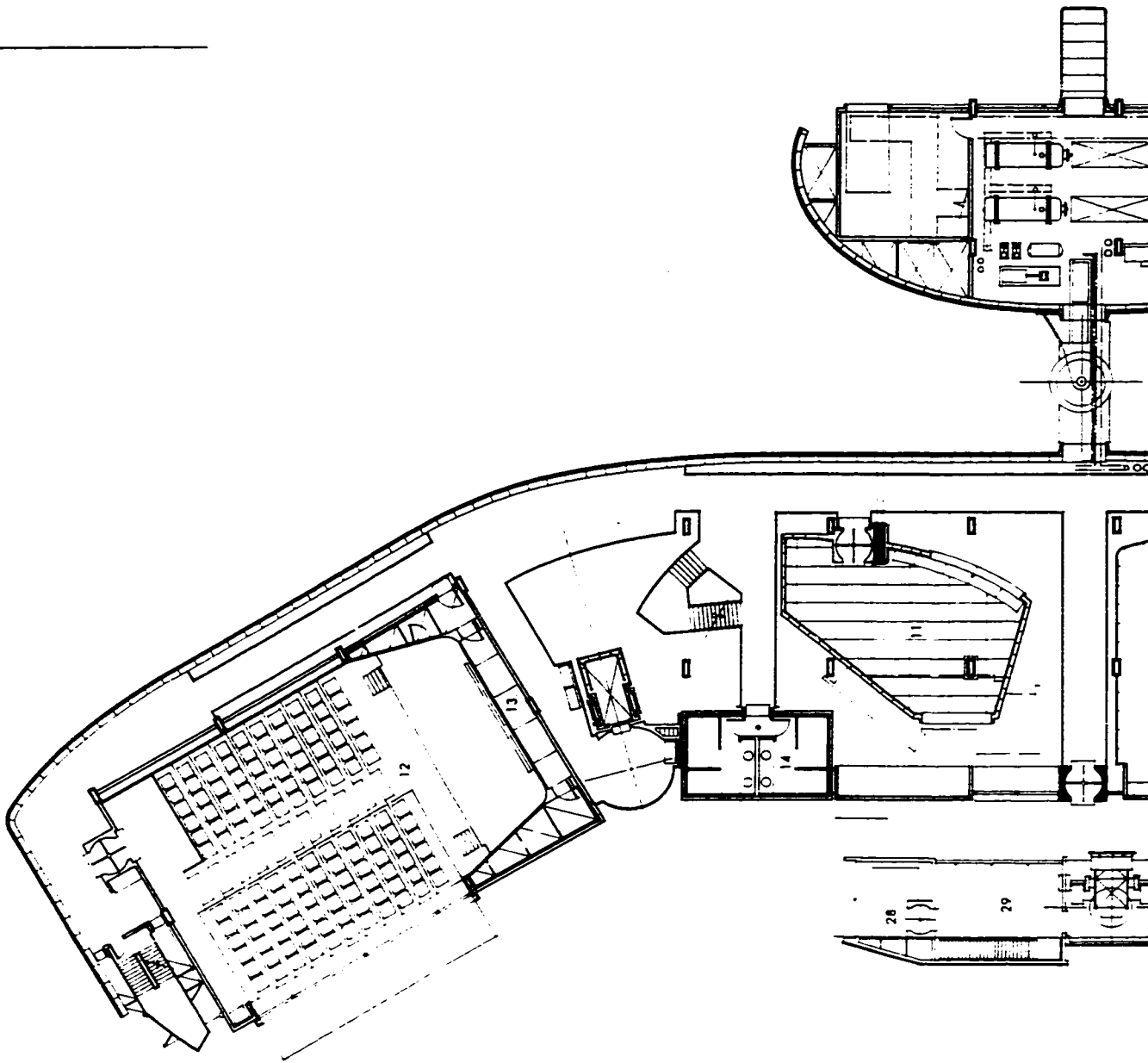
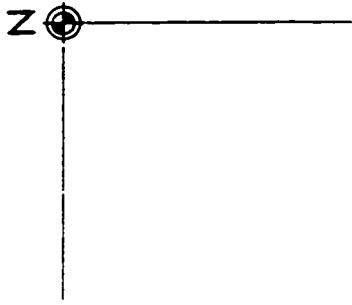


LEVEL 1  
3/32" = 1'0"

- 1 ENTRY
- 2 RECEPTION/INFORMATION DESK
- 3 MAINTENANCE
- 4 GALLERY
- 5 STORE
- 6 FIRST-AID
- 7 STORAGE
- 8 VESTIBULE
- 9 WASHROOMS

A B C D E F





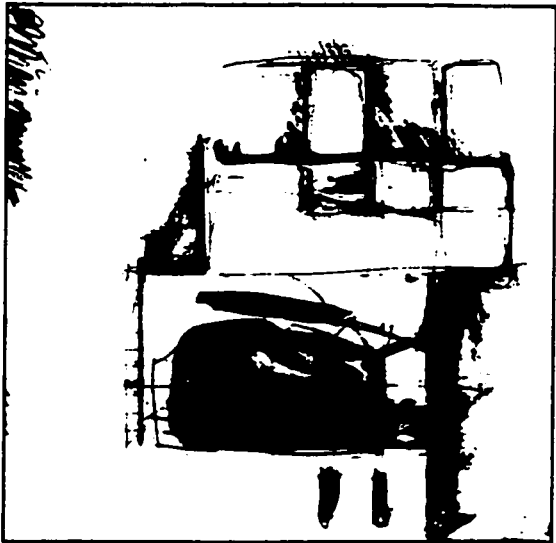
LEVEL 2

3/32" = 1'0"





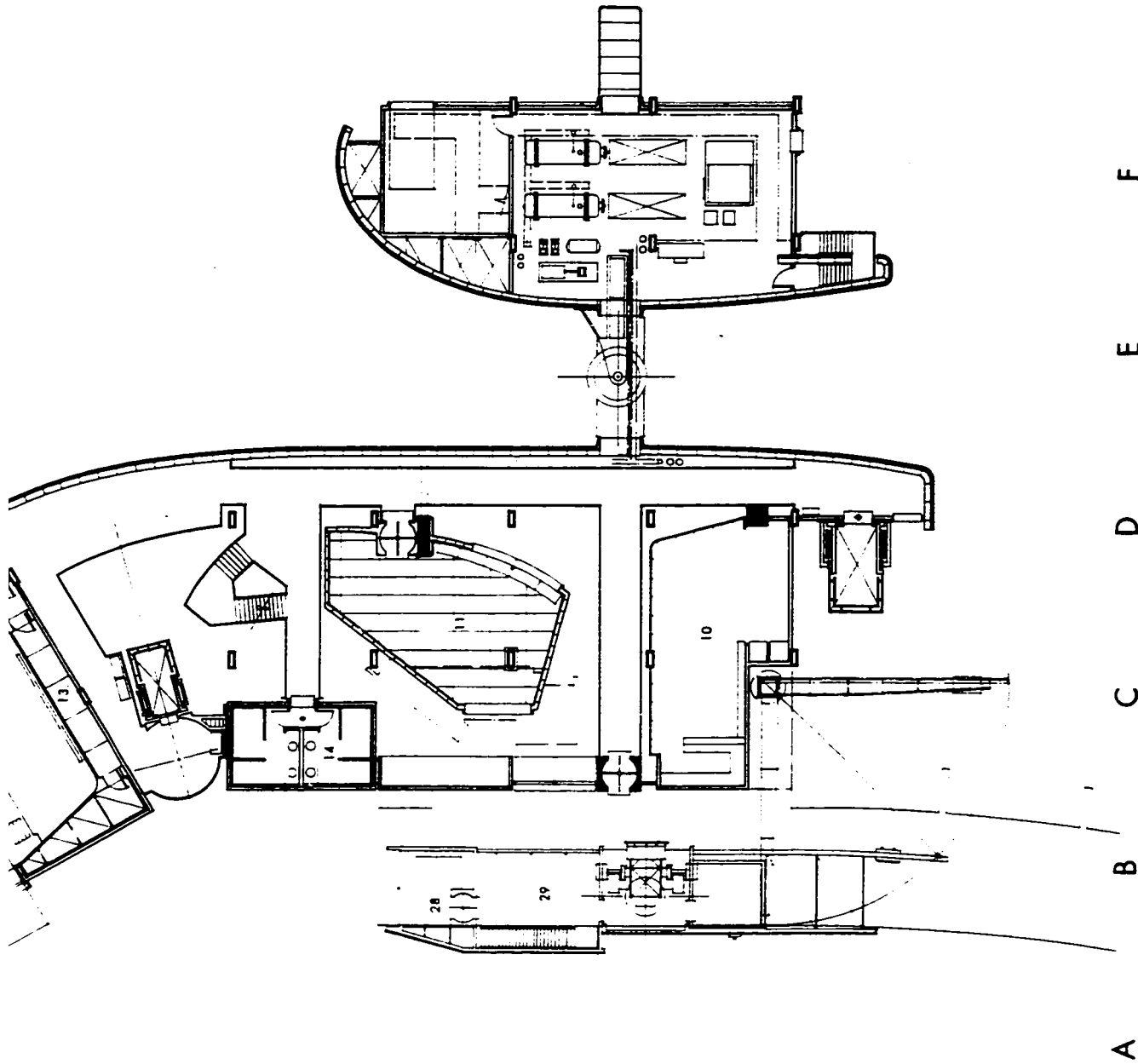




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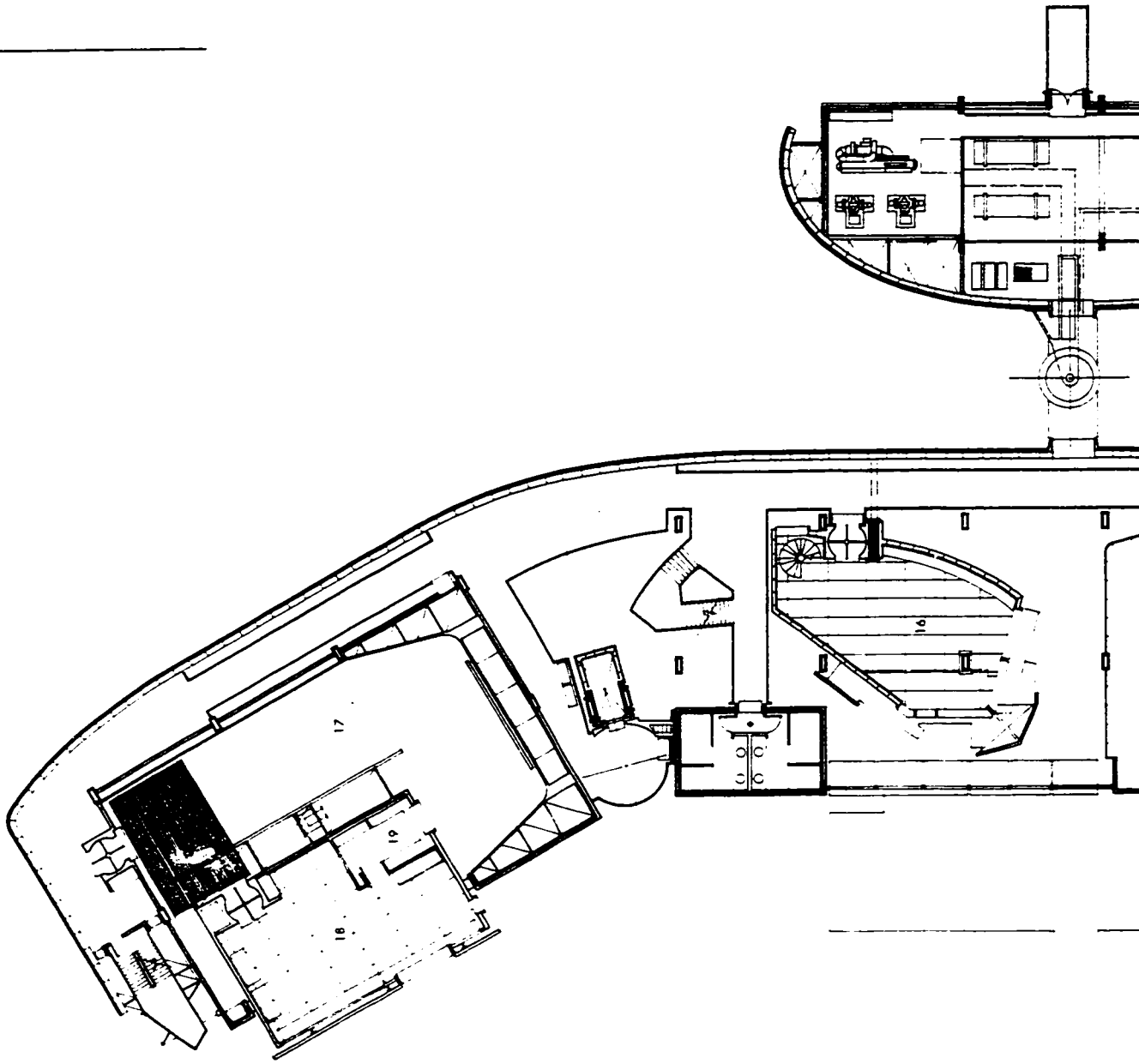
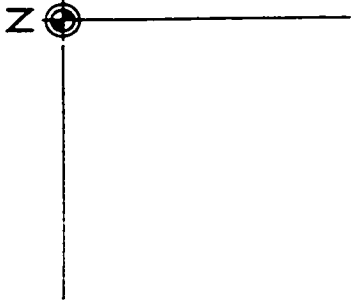
3/32" = 1'0"

- 10 CAFETERIA/LUNCH AREA
- 11 ASTRONAUT'S LOUNGE/LUNCH AREA
- 12 THEATRE
- 13 STORAGE
- 14 WASHROOMS
- 28 CONTROL ROOM
- 29 VIEWING DECK



A B C D E F



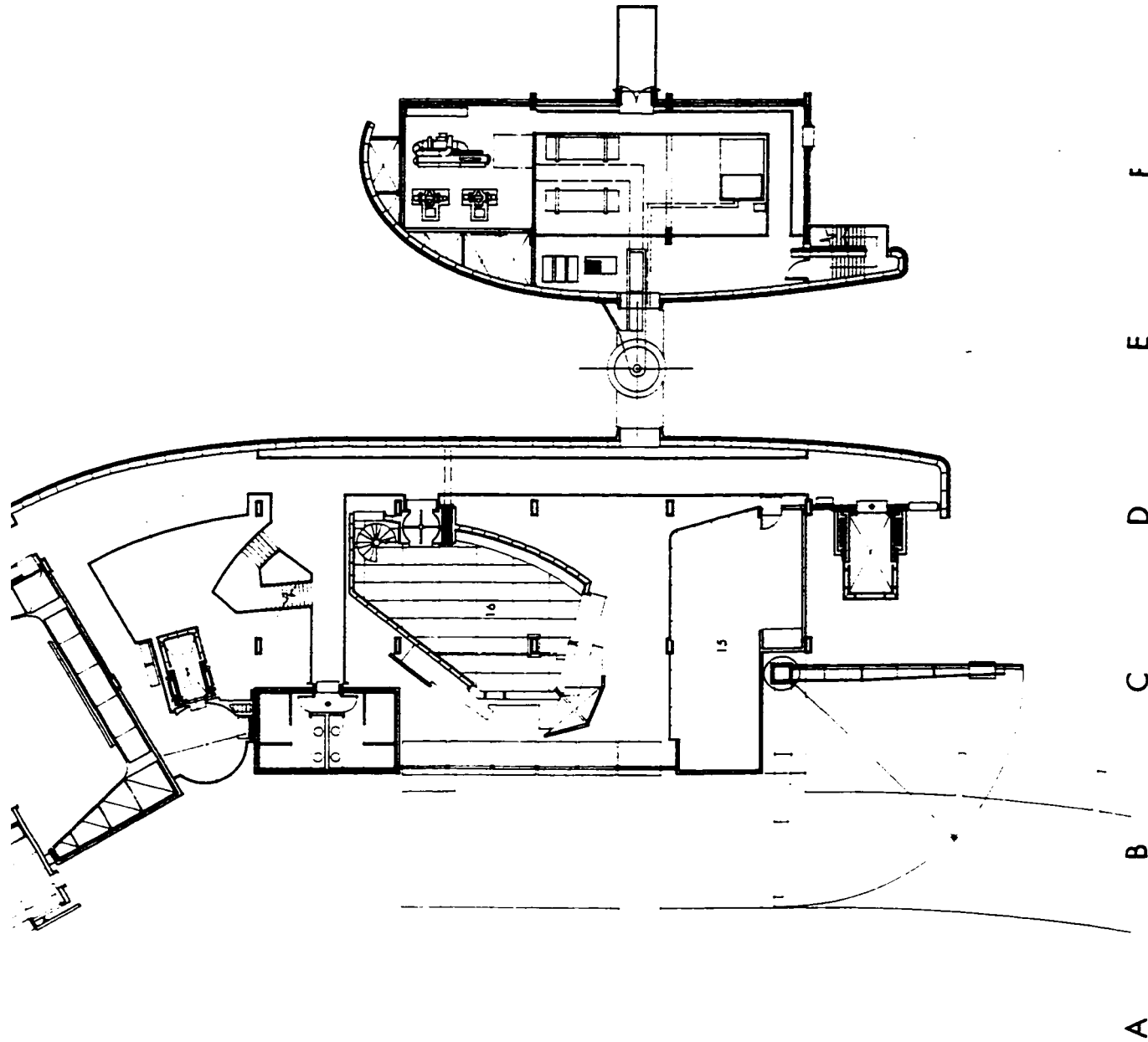






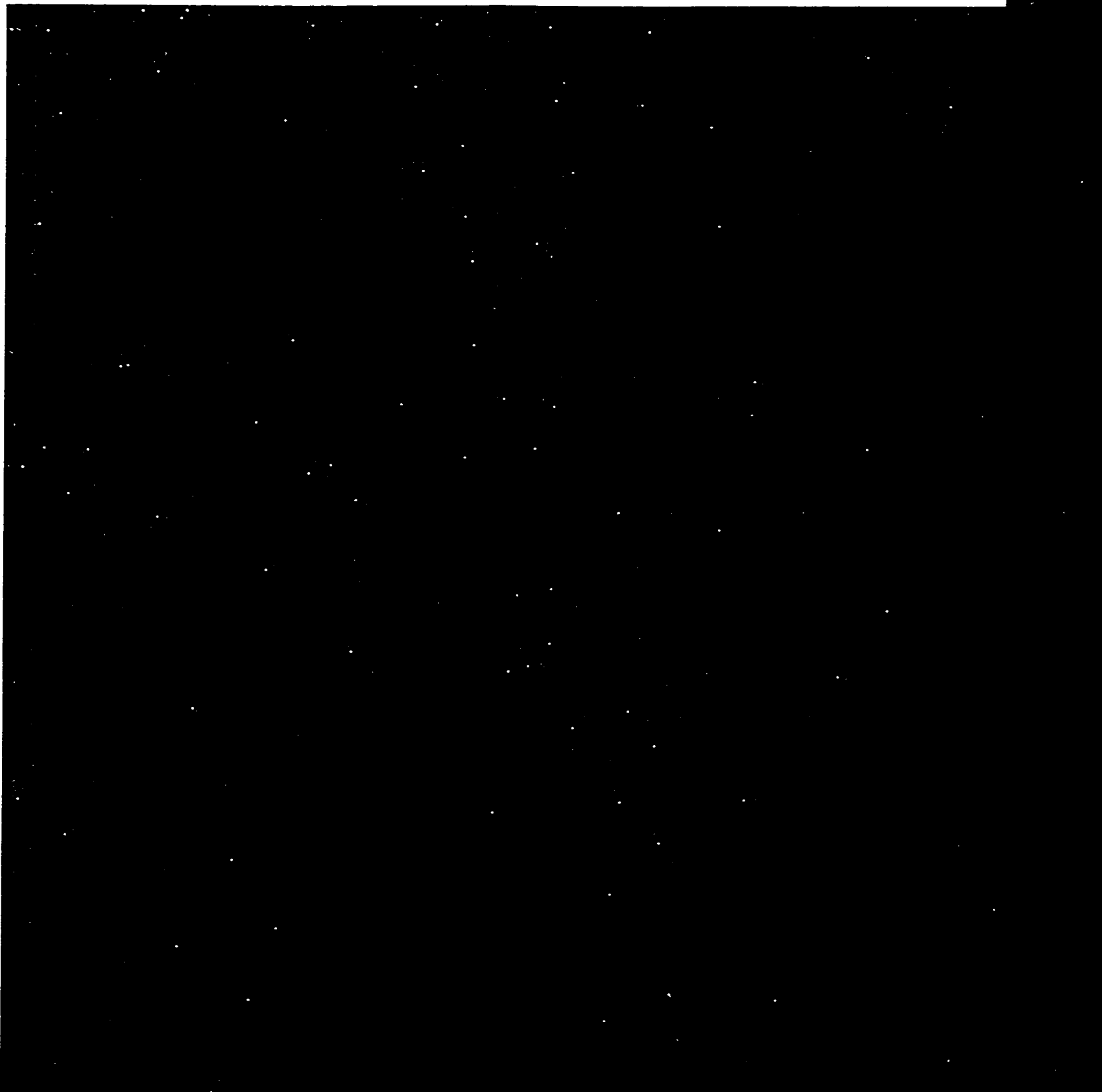
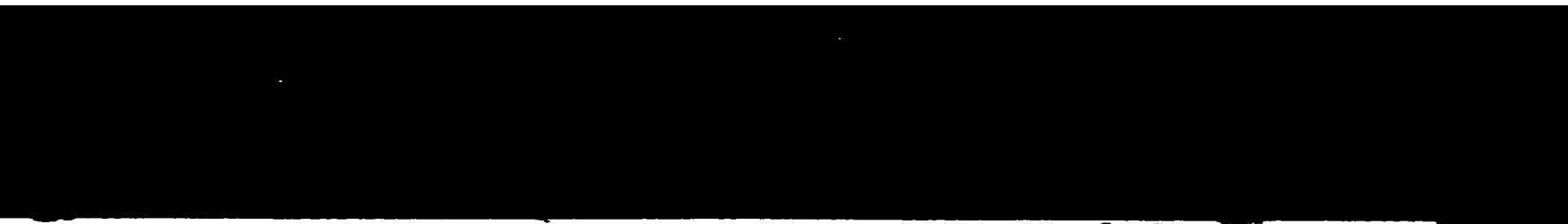
LEVEL 3  
3/32" = 1'0"

- 15 ADMINISTRATIVE OFFICES
- 16 LOUNGE
- 17 THEATRE
- 18 CONTROL ROOM
- 19 PROJECTION ROOM
- 20 WASHROOMS



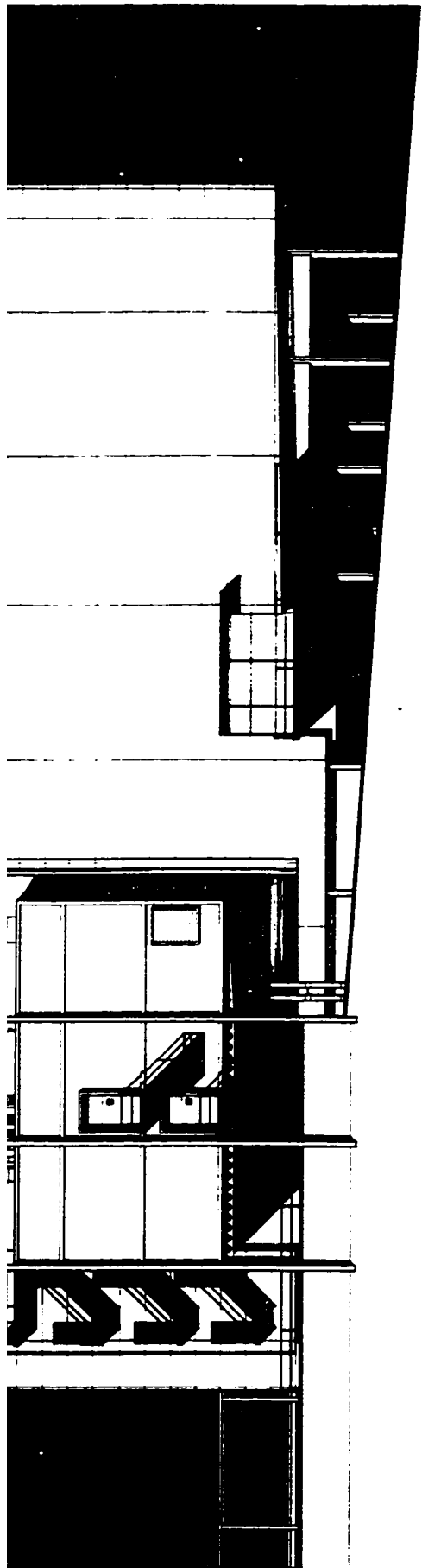
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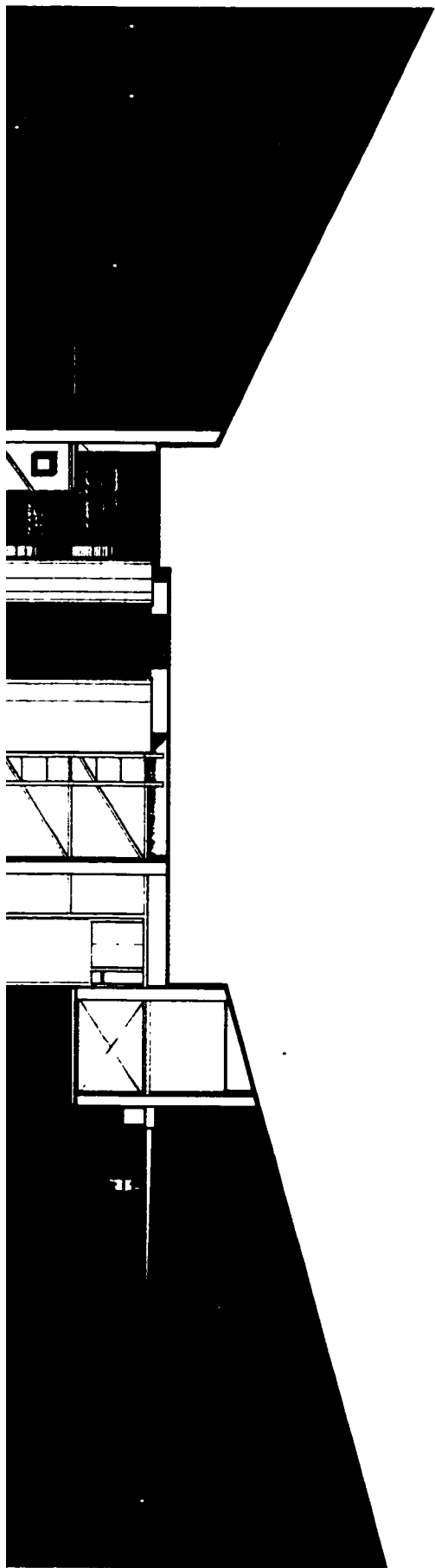










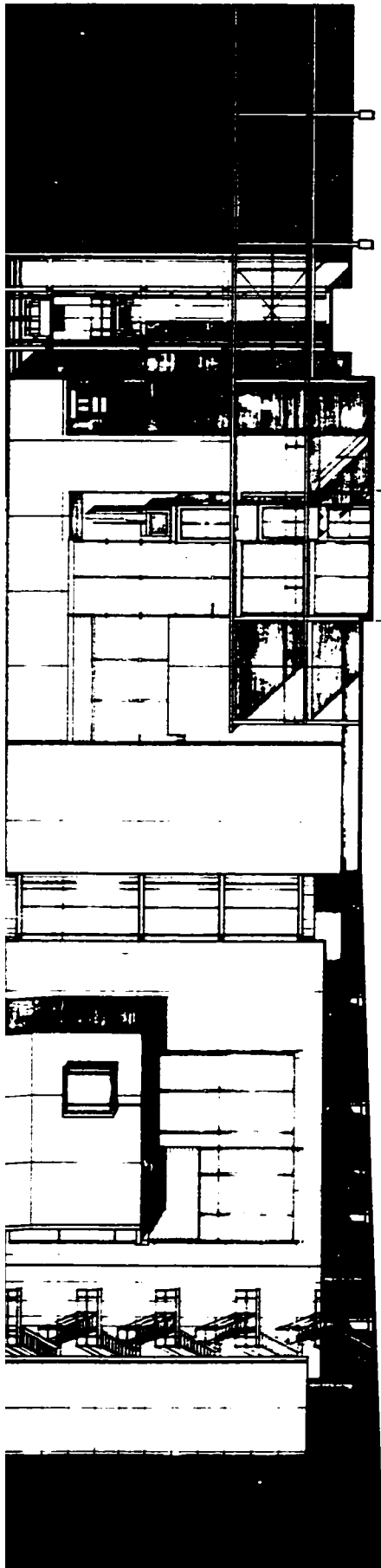








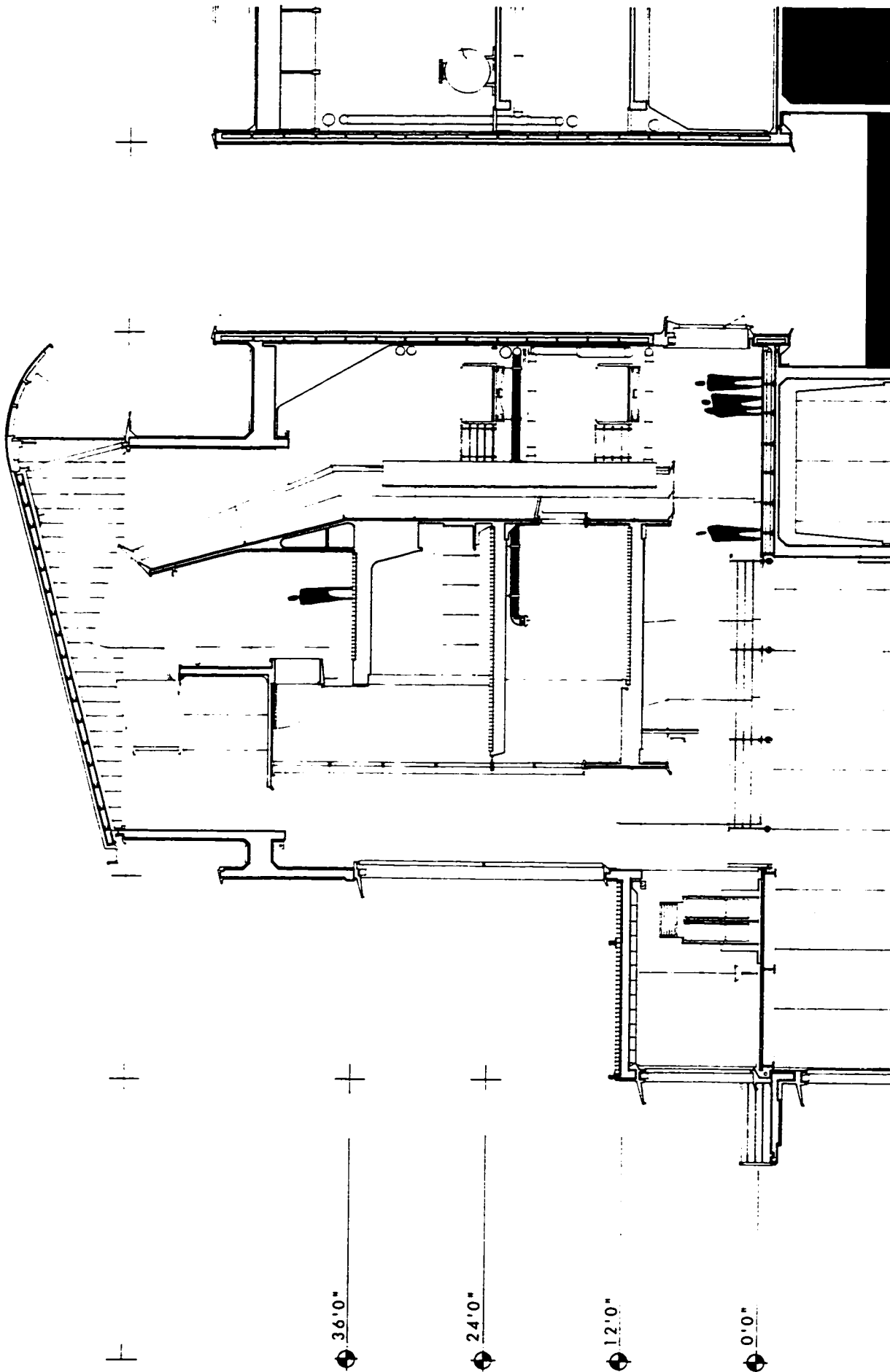




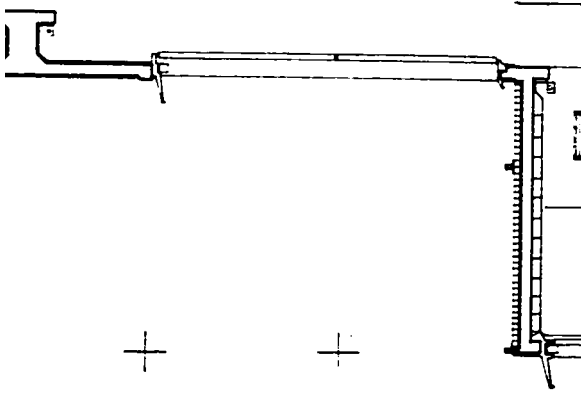
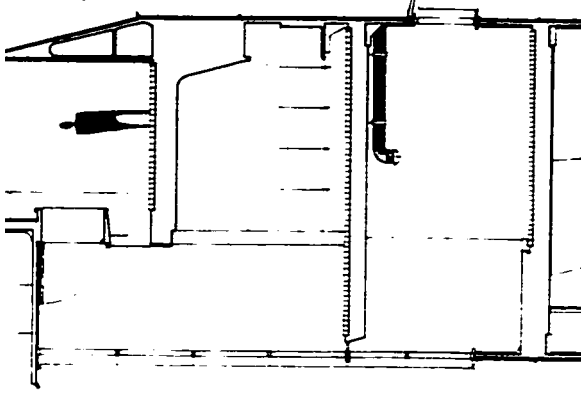
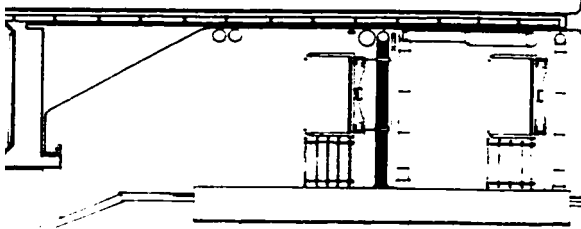
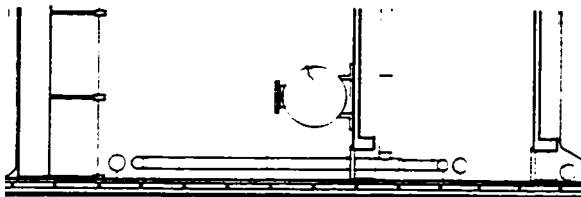
WEST ELEVATION



SECTION A  
3/16" = 1'0"







3'6"0"

2'4"0"

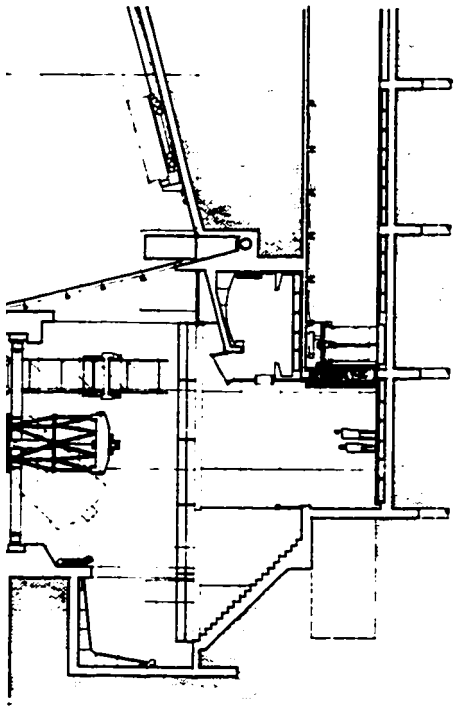
1'2"0"











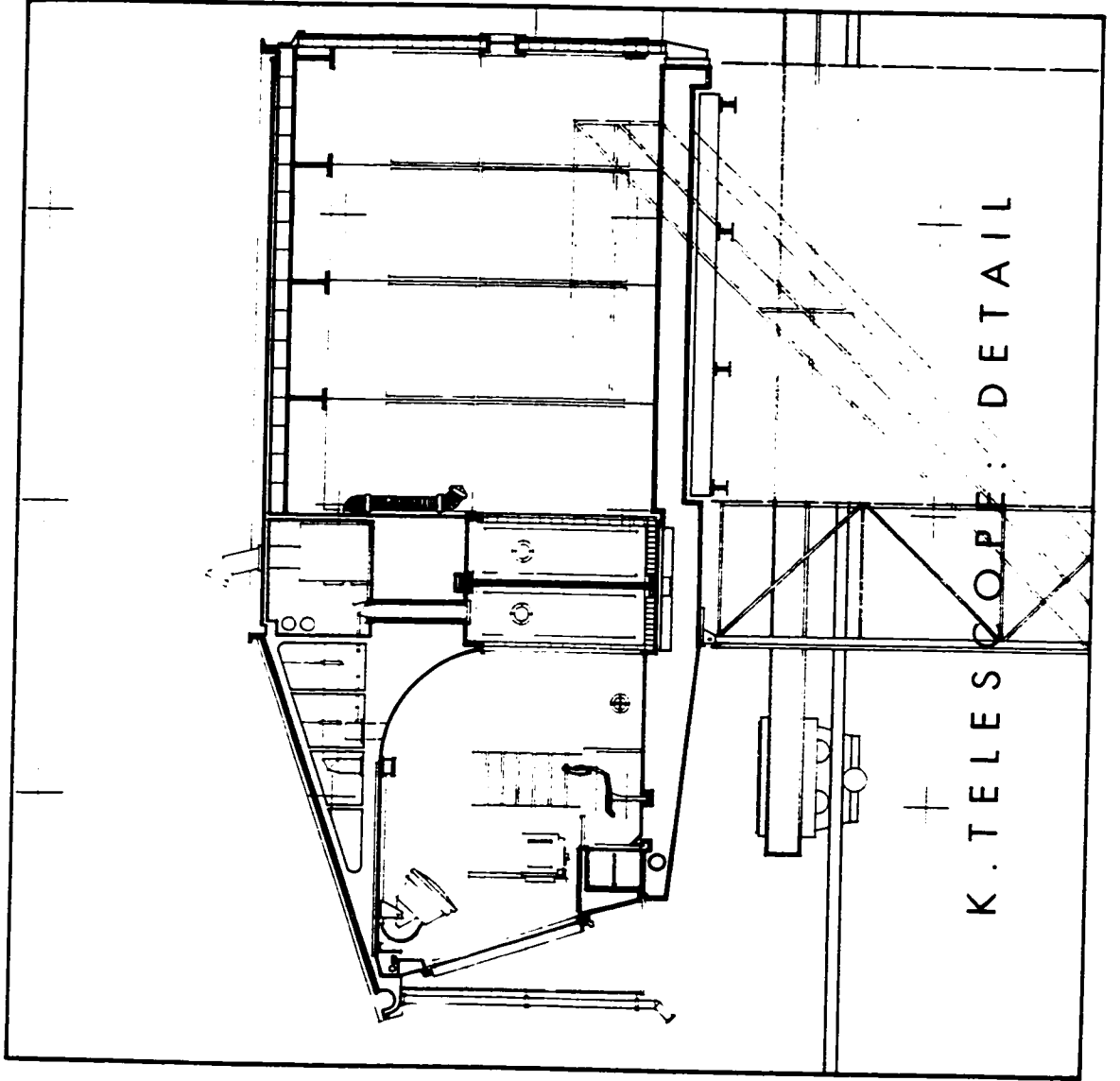


*Inferno, I, 32*

From each day's dawn to dusk each night a leopard, during the final years of the twelfth century, beheld a few boards, some vertical iron bars, shifting men and women, a thick wall, and perhaps a stone gutter stopped with dry leaves. He did not know, he could not know, that what he longed for was love and cruelty and the hot pleasure of tearing things apart and the wind carrying the scent of a deer. But something in him was smothering and rebelling, and God spoke to him in a dream: "You live and will die in this cage so that a man known to me may look at you a predetermined number of times, and may not forget you, and may put your shape and your symbol in a poem which has its necessary place in the scheme of the universe. You suffer captivity, but you will have given a word to the poem." God, in the dream, illumined the animal's brutishness and he understood the reasons, and accepted his destiny; but when he awoke there was only a dark resignation in him, a valiant ignorance, for the machinery of the world is far too complex for the simplicity of a wild beast.

Years later Dante lay dying in Ravenna, as unjustified and as alone as any other man. In a dream God declared to him the secret purpose of his life and his work; Dante, filled with wonder, knew at last who he was and what he was, and he blessed his bitter sufferings. Tradition has it that, on waking, he felt he had been given—and then had lost—something infinite, something he would not be able to recover, or even to glimpse, for the machinery of the world is far too complex for the simplicity of men.





K. TELES CO. PZ: DETAIL



### *Martin Fierro*

Out of this city marched armies that seemed to be great, and afterwards were, when glory had magnified them. As the years went by, an occasional soldier returned and, with a foreign trace in his speech, told tales of what had happened to him in places called Ituzaingó or Ayacucho. These things, now, are as if they had never been.

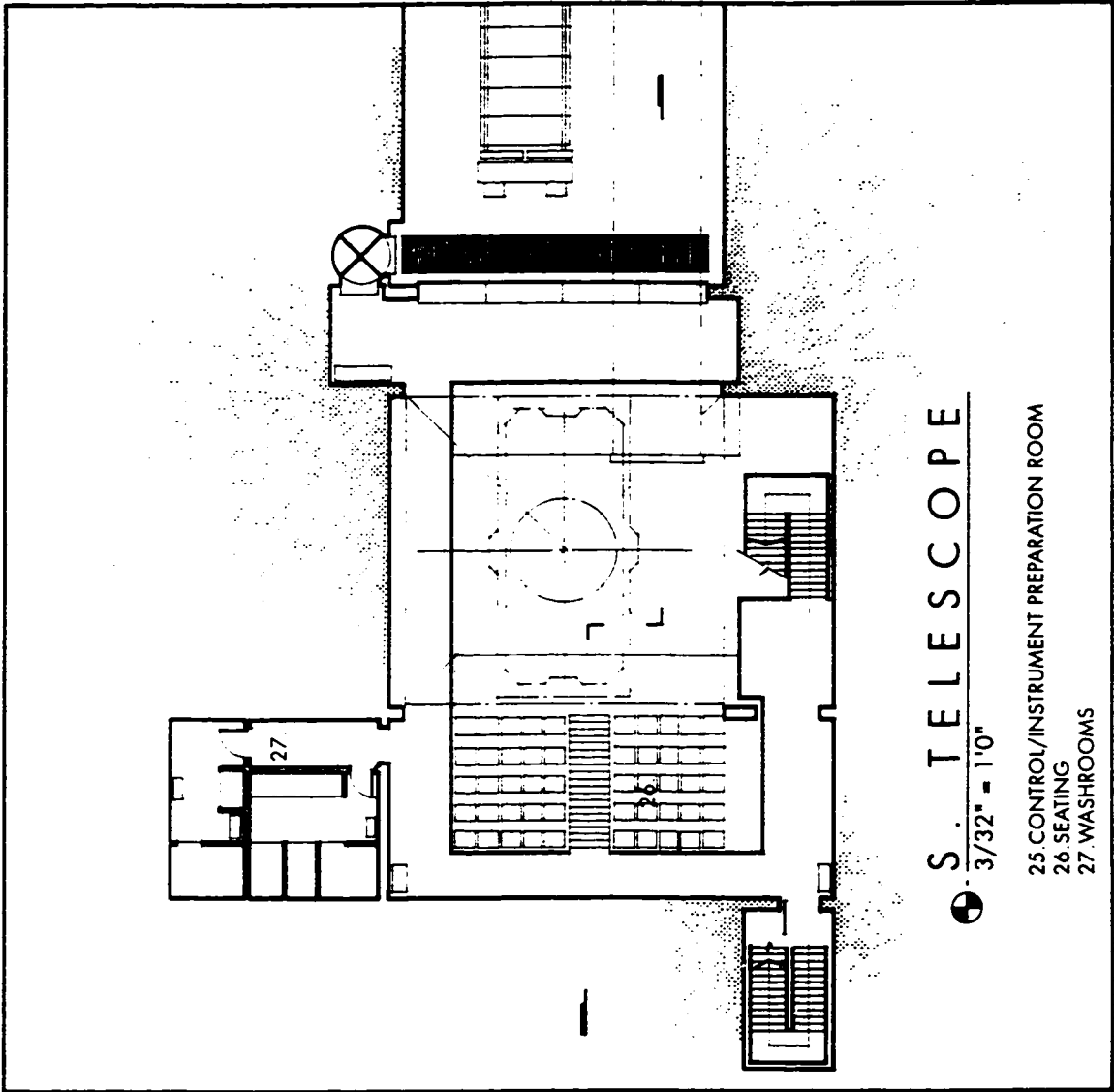
Two tyrannies had their day here. During the first some men coming from the Plata market hawked white and yellow peaches from the seat of a cart. A child lifted a corner of the canvas that covered them and saw *unitario* heads with bloody beards. The second, for many, meant imprisonment and death; for all it meant discomfort, a taste of disgrace in everyday acts, an incessant humiliation. These things, now, are as if they had never been.

A man who knew all words looked with minute love at the plants and birds of this land and described them, perhaps forever, and wrote in metaphors of metal the vast chronicle of the tumultuous sunsets and the shapes of the moon. These things, now, are as if they had never been.

Here too the generations have known those common and somehow eternal vicissitudes which are the stuff of art. These things, now, are as if they had never been. But in a hotel room in the 1860's, or thereabouts, a man dreamed about a fight. A gaucho lifts a Negro off his feet with his knife, throws him down like a sack of bones, sees him agonize and die, crouches down to clean his blade, unties his horse, and mounts slowly so he will not be thought to be running away. This, which once was, is again infinitely: the splendid armies are gone, and a lowly knife fight remains. The dream of one man is part of the memory of all.







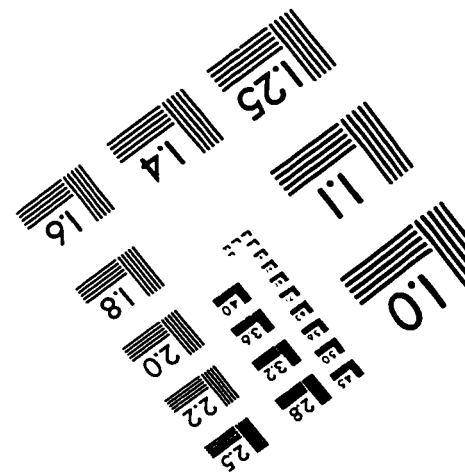
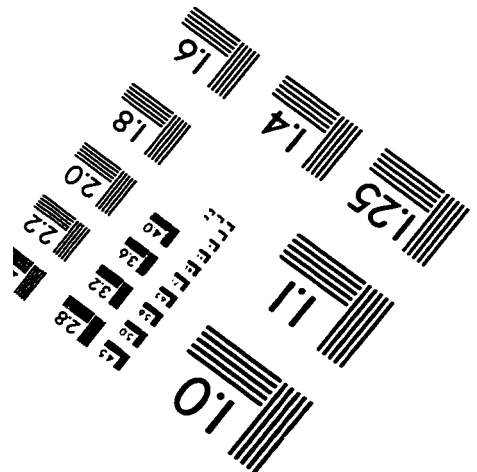
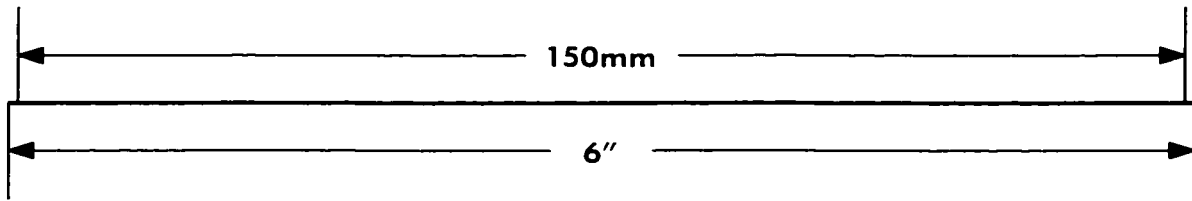
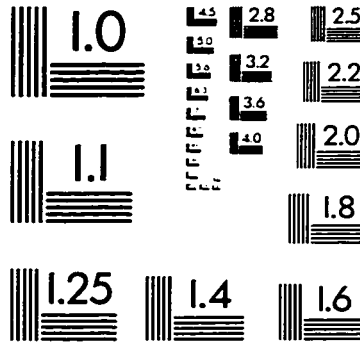
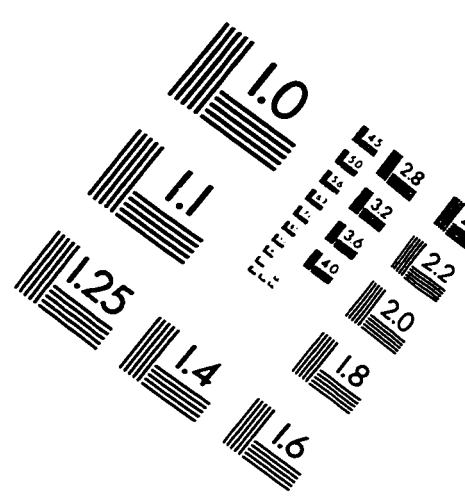
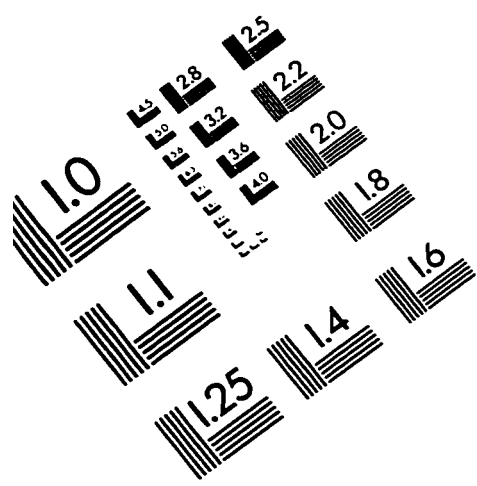
S. TELESCOPE

3/32" = 1'0"

- 25. CONTROL/INSTRUMENT PREPARATION ROOM
- 26. SEATING
- 27. WASHROOMS



# IMAGE EVALUATION TEST TARGET (QA-3)



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