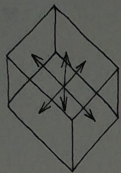
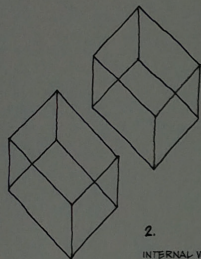


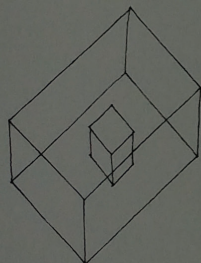
THE ARGUMENT SO FAR HAS POSTULATED A HIERARCHY OF ARCHITECTURAL ELEMENTS WITH 'FORM' AT ITS APEX. SOME SORT OF DEFINITION OF THE WORD 'FORM' AS RELEVANT TO ARCHITECTURE HAS TENDED TO EMERGE BUT NO ATTEMPT HAS BEEN MADE TO DETERMINE ITS PRECISE MEANING. THE DICTIONARY IS NOT MUCH HELP, SINCE IT IS OBLIGED TO DEFINE WORDS IN TERMS OF OTHER WORDS WHICH ARE NEARLY, BUT NOT QUITE, SYNONYMOUS. THUS, IN THE CASE OF 'FORM' WE SHALL FIND, AMONG OTHER DEFINITIONS, 'SHAPE', AND UNDER 'SHAPE THIS IS ONLY REVERSED. SUCH DESCRIPTIONS AS 'CONFIGURATION' OR 'RELATION OF PARTS TO A WHOLE' HOWEVER, DO PROVIDE A VALUABLE INDICATION BY EVOKING THE STANDARD DEFINITION OF A 'GESTALT' AS PROPOSED BY THE THEORISTS OF THAT SCHOOL OF PSYCHOLOGICAL THOUGHT, NAMELY 'THAT WHICH AT ANY GIVEN MOMENT IS SEEN AS A SEPARATE WHOLE IN THE TOTAL PERCEPTUAL FIELD', AND THAT WHOLE BEING DERIVED FROM A PROCESS OF ORGANIZATION WHICH IS 'DIAMETRICALLY OPPOSED TO MERE JUXTAPOSITION OR RANDOM DISTRIBUTION'. THIS HOWEVER WOULD BE INADEQUATE BY ITSELF TO DESCRIBE WHAT IS MEANT BY FORM IN ARCHITECTURE, SINCE IT IS SOMEWHAT VISUAL OR PICTORIAL IN ITS SUGGESTED EMPHASIS - AND IT IS PRECISELY THE VISUAL OR PICTORIAL CONCEPT OF FORM WHICH IN THE CONTEXT OF THIS THESIS WILL BE ARGUED AGAINST. TO UNDERSTAND THE CONCEPTUAL BASIS OF ARCHITECTURAL FORM, IT IS NECESSARY TO ISOLATE THOSE PROPERTIES WHICH RELATE TO GENERIC FORM IN ITS ARCHITECTURAL CONTEXT. THESE WOULD BE VOLUME, MASS, SURFACE, AND MOVEMENT: MOVEMENT BEING CONSIDERED AS A PROPERTY OF GENERIC FORM, ESSENTIAL TO THE EXPERIENCE AND THEREFORE THE COMPREHENSION OF ANY ARCHITECTURAL SITUATION. THESE PROPERTIES WILL PROVIDE THE BASIC VOCABULARY FOR A FORMAL LANGUAGE, THAT WILL CLARIFY THE CONCEPTUAL, AS WELL AS THE PICTORIAL ASPECTS OF A SPECIFIC SITUATION. TERMS



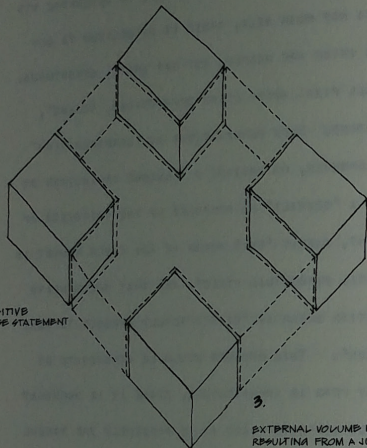
1. VOLUME IS DEFINED AND CONTAINED SPACE.



2. INTERNAL VOLUME IS POSITIVE RESULTING FROM A PURPOSEFUL STATEMENT OF ENCLOSURE.



4. ANOTHER INTERPRETATION POSITS ALL VOLUME AS NEGATIVE RELATIVE TO ANY OBJECT PLACED WITHIN IT.



3. EXTERNAL VOLUME IS NEGATIVE RESULTING FROM A JUXTAPOSITION OF TWO OR MORE POSITIVE VOLUMES.

SUCH AS LIGHT, BALANCE, PROPORTION, SCALE, AND SHAPE WILL BE DISCUSSED LATER BUT ONLY AS CONSIDERED IN RELATION TO A SPECIFIC FORM IN A SPECIFIC CONTEXT.⁴ THE GENERATING PROPERTY OF ALL ARCHITECTURAL FORM IS VOLUME, SINCE ARCHITECTURE ALONE AMONG THE PLASTIC MEANS OF EXPRESSION DEMANDS COMPREHENSION BOTH INTERNALLY AND EXTERNALLY.⁵ IT IS NECESSARY TO THE DEVELOPMENT OF THIS THESIS TO CONSIDER ARCHITECTURE IN TERMS OF VOLUME RATHER THAN SPACE - A DISTINCTION WHICH IS NOT MERELY ACADEMIC AND PHILOLOGICAL.⁶ IN MODERN CRITICISM THE TERMS VOLUME AND SPACE HAVE OFTEN BEEN USED LOOSELY AND INTERCHANGEABLY SO THAT NEITHER IS ANY LONGER A USEFUL INSTRUMENT OF RATIONAL DISCOURSE. THE ESSENTIAL DIFFERENCE BETWEEN THE TERMS IS THAT VOLUME CAN BE THOUGHT OF IN A DYNAMIC SENSE: IT IS PARTICULARIZED, DEFINED AND CONTAINED SPACE.¹ IT CAN BE THOUGHT OF AS BOTH EXERTING A PRESSURE AND CAPABLE OF RESISTING PRESSURES EXERTED UPON IT. THUS, 'SPACE', CONSIDERED AS A CONTINUOUS, UNBOUND CONDITION BECOMES A REDUNDANT TERM, EVEN THOUGH IT MUST BE CONCEDED THAT ALL FORMS EXIST IN THIS STATE. SPACE⁷ CANNOT ACT, FLOW, OR INTERPENETRATE IN ITS OWN RIGHT. ARCHITECTURAL FORM CAN BE THOUGHT OF AS 'VOLUME' THAT EXISTS IN 'SPACE'. VOLUME IS THE DYNAMIC CONDITION OF SPACE, BROUGHT ABOUT BY ITS LIMITATION AND CONTAINMENT: IT CANNOT BE THOUGHT OF IN AN UNSTRESSED CONDITION SINCE BY DEFINITION IT IS ACTIVATED SPACE. IT IS FURTHER NECESSARY TO DIFFERENTIATE BETWEEN INTERNAL AND EXTERNAL VOLUME.² IT WILL BE ASSUMED THAT ALL INTERNAL VOLUME IS POSITIVE; RESULTING FROM A PURPOSEFUL STATEMENT OF ENCLOSURE AND CONTAINMENT, AND THAT ALL EXTERNAL VOLUME IS NEGATIVE;³ THE RESULTANT OF A JUXTAPOSITION OF TWO OR MORE POSITIVE VOLUMES WHICH CREATE AN ACTIVATED SPACE BETWEEN THEM. THIS ASSUMPTION PARTIALLY DENIES TWO POSSIBLE INTERPRETATIONS WHICH DO NOT SEEM RELEVANT OR PRECISE ENOUGH FOR THIS ARGUMENT. THE ONE POSITS ALL VOLUME AS NEGATIVE RELATIVE TO THE INDIVIDUAL PERSON TO ANY POSITIVE OBJECT PLACED WITHIN IT. THIS

4: c.f. Bruno Zevi - 'Architecture as space' see footnote above Chapter 1 note.

5: see Luigi Moretti. 'Struttura e sequenze di spazi' 'Spazio' 7. Dec. 1952. He posits architecture as being read through chiaroscuro, plastic values, inside space and quality of material used; the most representative term of these being 'space'.

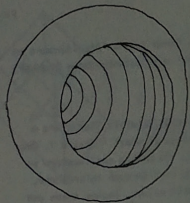
6: In 'The Earth, the Temple and the Gods' Yale 1962, Vincent Scully talks loosely of positive and negative space implying that negative space has no inherent forces: here the term 'volume' implies an initial conditioning of neutral space.

7: The word 'space' is here used as defined by Newton 'Absolute space in its own nature, without relation to anything external, remains always similar and immovable. Relative space is some movable dimension or measure of the absolute spaces'. 'Principia mathematica'

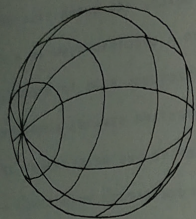
8: Thus Panofsky, 'Meaning in the Visual Arts', p.21. - the 'one basic anti-thesis, differentiation versus continuity - volumetric limits versus illimited expanse (space)'

9: see above note 6.

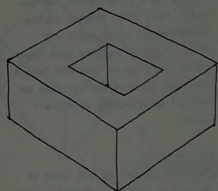
10: For the first see Arnheim 'Art and Visual Perception' London, 1955. The second interpretation is put forward by Erno Goldfinger, 'The Sensation of Space' Architectural review. VAG. 1941. and also by



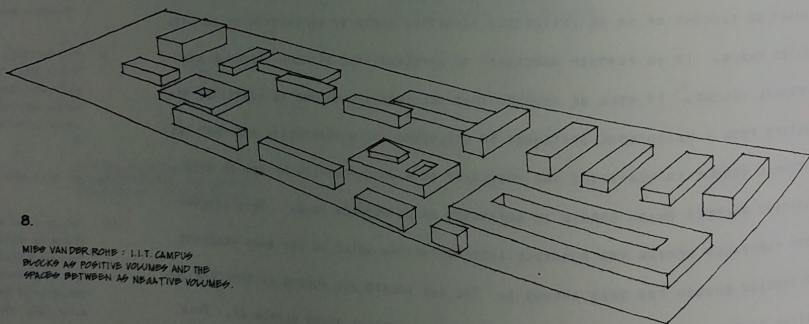
5.
A SECOND INTERPRETATION
OF THE INTERNAL VOLUME AS
CONCAVE.



6.
- AND EXTERNAL VOLUME
IS CONVEX.



7.
CONVEX QUALITIES OF EXTERNAL
VOLUME ARE HERE REGARDED AS
'MASS'



8.
MIES VAN DER ROHE: I.I.T. CAMPUS
BLOCKS AS POSITIVE VOLUMES AND THE
SPACES BETWEEN AS NEGATIVE VOLUMES.

ESTABLISHES THE INDIVIDUAL AS A UNITY BUT FAILS TO DISTINGUISH BETWEEN ENCLOSURE AND INTERVAL BOTH OF WHICH ARE TREATED AS NEGATIVE IN RELATION TO A HUMAN POSITIVE. THE SECOND INTERPRETATION WOULD ATTRIBUTE TO INTERNAL VOLUME THE QUALITIES OF CONCAVITY AND TO EXTERNAL VOLUME THE QUALITIES OF CONVEXITY WHICH ARE HERE CONSIDERED TO BE THOSE OF 'MASS', OR POSITIVE VOLUME; NEITHER OF THESE ASSUMPTIONS ASSIST IN ESTABLISHING THE CONCEPT OF TOTAL ENVIRONMENT PRODUCED FROM THE CONTROL OF BOTH POSITIVE AND NEGATIVE VOLUME. IT IS RATHER THE NOTION OF VOLUME AS THE BASIC UNITY THAT ALLOWS ALL CONDITIONS OF ENCLOSURE TO BE CONSIDERED AS POSITIVE AND ALL CONDITIONS OF INTERVAL AS NEGATIVE. THUS AT THE I.I.T. CAMPUS OF MIES VAN DER ROHE THE INDIVIDUAL BLOCKS BECOME THE POSITIVE VOLUMES, AND THE SPACES BETWEEN THEM THE NEGATIVE ONES. BOTH POSITIVE AND NEGATIVE ARE OF THE SAME SCALE AND CONFIGURATION AND BEGIN TO PRODUCE AN INTERWEAVING OR, IN GESTALT PSYCHOLOGICAL TERMS, A FIGURE-GROUND RELATIONSHIP, WHICH GIVES AN INITIAL ORDER TO THE TOTAL COMPOSITION.

INITIALLY, THE DYNAMIC STATE OF VOLUME RESULTS FROM THE NECESSITY TO RESIST THE CONTAINING FORCES ACTING UPON IT; THESE FORCES RESULTING FROM ANY DISTURBANCE, PHYSICAL OR ABSTRACT, THAT AFFECT THE NEUTRAL CONDITION OF SPACE. THE INTERNAL PRESSURE MAY BE THOUGHT OF AS A RESISTANCE TO THE LIMITING CONDITIONS; CONTAINING SURFACES, MOVEMENT OR CIRCULATION, AND OBJECTS (THOUGHT OF AS MASS) PLACED WITHIN THE VOLUME. FURTHERMORE ANY VOLUME CAN BE THOUGHT OF AS BOTH GIVING OR RECEIVING FORM, AGAIN ACCORDING TO THE SPECIFIC CONDITION OF BOTH INTERNAL AND EXTERNAL FORCES.

IT WILL BE NECESSARY TO DISCUSS IN DETAIL THE TWO BASIC CATEGORIES OF LIMITING

10: contin.

61

Stein Eiler Rasmussen. 'Experiencing Architecture' London. Goldfinger defines sculpture as 'Convex' and Architecture as 'Concave'.

11: c.f. Vincent Scully. *Perspecta 4*. 'Modern Architecture: toward a re-definition of style.' 'mass and void are defined by a single module'. Aldo G. Kepes op.cit. 'No fundamental exists in an optical sense between figure and background, between positive and negative space'.

12: Moretti (op.cit. note 5 above) lists the properties of internal space as: geometric form; quantity of volume; density of light; pressure or energetic charge in relation to its limits (wall masses) and the energies these release. and again Kepes 'The vitality of any equilibrium depends upon the strength of the opposing forces which are in balance.' (p.121 op.cit.) See also Geoffrey Scott 'The Architecture of Humanism', page 210: 'these masses are capable like ourselves of pressure and resistance.'

CONDITIONS: THE ONE, THE REMAINING PROPERTIES OF GENERIC FORM (MASS, SURFACE, AND MOVEMENT); THE OTHER, AN IMPLIED OR ACTUAL CARTESIAN GRID. IT IS THIS LATTER CONCEPT THAT PROVIDES THE MATRIX FOR ORDERING ANY VOLUMETRIC ENTITY. THIS GRID IS OF SUCH PERTINENCE TO THE CONTROL OF GENERIC FORM THAT IT MUST BE CONSIDERED IN A SEPARATE CONTEXT.

THE CONCEPT OF A SPATIAL, THREE-DIMENSIONAL, OR 'CARTESIAN' GRID THOUGHT OF AS A CONTINUUM PROVIDES THE ABSOLUTE REFERENCE FOR ARCHITECTURAL FORM, WHETHER
^{13.}
GENERIC OR SPECIFIC.

IN RELATION TO ANY FORM THIS GRID MUST BE THOUGHT OF AS AN ABSTRACT ENTITY. IT IS THE FRAME OF REFERENCE FOR ALL PERCEPTION: DERIVING, PRIMARILY FROM OUR PHYSICAL SENSE OF THE FORCES OF GRAVITY. WHEN SOMETHING DROPS IT DOES SO IN A STRAIGHT LINE THROUGH A VERTICAL PLANE (THE PLUMB-BOB IS THE MOST OBVIOUS EXAMPLE OF THIS). AGAIN WHEN A RECTILINEAR OBJECT IS PLACED ON END IT MUST STAND VERTICALLY OR IT TOPPLES OVER. IT IS SEEN TO STAND VERTICALLY IN RELATION TO ITS ANGLE OF INTERSECTION WITH THE HORIZONTAL PLANE, THE OTHER ASPECT OF THE GRID. THESE TWO COORDINATES CROSS REFER BECAUSE OF THEIR CRITICAL AN-
^{14.}
GLE OF INTERSECTION, THE RIGHT ANGLE. IT IS EVIDENT THAT THESE COMPONENTS ULTIMATELY REFER TO THE FORCES OF GRAVITY, FOR IF THE HORIZONTAL PLANE IS CANTED THE VERTICAL ELEMENT WILL TOPPLE. THE HORIZONTAL PLANE MOREOVER RELATES VISUALLY TO THE HORIZON OR TO ANY WATER LEVEL, NEITHER OF WHICH THOUGH IS STRICTLY PLANAR: YET THEY BOTH MUST BE CONSIDERED AS PERCEPTUAL ABSOLUTES IN THIS CONTEXT. THE HORIZONTAL PLANE MAY BE CONCEIVED OF AS A PROJECTION OF ANY TANGENT TO THE EARTH'S SURFACE. IN ITS ARCHITECTURAL REFERENCE THE HORI-

13: See Max Jammer 'Concepts of Space' N.Y. 1960. 'The use of a Three-dimensional co-ordinate system, and in particular of a rectangular spatial co-ordinate system was not thought reasonable until the 17th century (Descartes, Frans van Schooten etc.)'

14: See Le Corbusier 'City of Tomorrow' 'The right angle is the essential and sufficient implement of action because it enables us to determine space with an absolute exactness.' 'There is only one right angle'. He also relates this to a condition of culture (rather as the later proponents of standardisation - Prof. Clibbin; etc.) 'Culture is an orthogonal state of mind'.

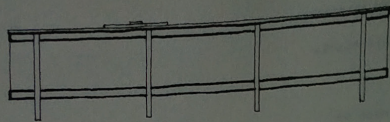
HORIZONTAL SHOULD BE THOUGHT OF AS NON-DIRECTIONAL SINCE CRITICAL POINTS OF INTERSECTION COULD ARISE FROM A DIRECTIONAL QUALITY BEING ATTRIBUTED TO THIS PLANE.

EVERYTHING IS SEEN IN SOME RELATION TO THIS GRID WHETHER IT BE MAN MADE OR NATURAL. WHEN WE SEE A TREE, WE DESCRIBE IT AS BEING DEFORMED FROM A GENERIC ANTECEDENT - ITS VERTICAL AXIS. WHEN WE PERCEIVE A LANDSCAPE, WE NOTICE ITS DEFORMATIONS - ITS ROLLING QUALITIES, ITS HARSH OR GENTLE NATURE ALWAYS RELATIVE TO A HORIZONTAL ABSOLUTE. IN THE SAME WAY ALL MAN-MADE OBJECTS ARE PERCEPTUALLY REFERRED TO A GENERIC ABSOLUTE, THE PLATONIC SOLIDS: CONES, SPHERES, CUBES, ETC., EACH HAVING AN AXIAL REFERENCE AS THEIR BASIS. THEREFORE ANY LINEAR OR CENTROIDAL FORM CAN BE COMPREHENDED WITH REFERENCE TO THE SPATIAL GRID. A LINEAR FORM IS PERCEIVED THROUGH A WEIGHTING OF ONE AXIS, EITHER THE HORIZONTAL OR THE VERTICAL. THUS A CYLINDER REFERS TO EITHER A VERTICAL OR A HORIZONTAL AXIS, WHILE A CENTROIDAL FORM SUCH AS A CUBE HAS NO DOMINANT REFERENCE EVEN THOUGH THE GENERATION OF THE FORM IS IMPLIED FROM THE EQUALITY OF ALL THREE AXES.

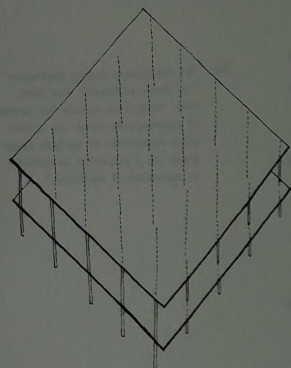
15: See for example George Santayana 'The Sense of Beauty' New York, 1955. 'organised nature the source of apperceptive forms...by a constant repetition of certain sequences and a recurring exactitude of mathematical relations.'

IN ITS SPECIFIC SENSE THE SPATIAL GRID HAS PARTICULAR SIGNIFICANCE TO MODERN ARCHITECTURE. THE DEVELOPMENT OF THE POINT-SUPPORT AND THE NON-LOADBEARING WALL HAS ALLOWED CERTAIN SPECIFIC QUALITIES TO ACCRUE TO THE GRID.

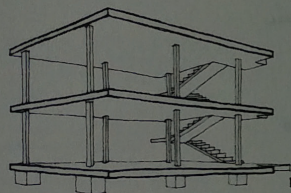
IT CAN BE POSTULATED THAT THE GRID PROVIDES THREE COORDINATES: ONE HORIZONTAL AND TWO VERTICAL, AND THAT THESE MAY BE GIVEN DIFFERENT VALUES DEPENDING ON THE SPECIFIC SITUATION; BECAUSE OF ITS ASSOCIATIONS WITH THE FORCES OF GRAVITY THE HORIZONTAL REFERENCE OFTEN PREDOMINATES. THIS REFERENCE CAN BE SEEN IN MOST OF MIES' PLANNING.



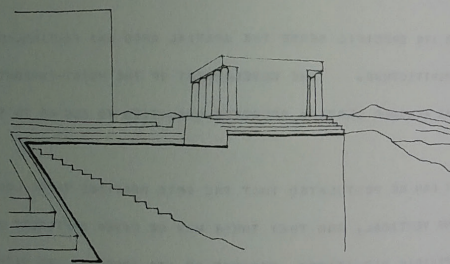
9.
MIES VAN DER ROHE: PARKNORTH HOUSE
ABSOLUTE QUALITY OF THE HORIZONTALS.



10.
LE CORBUSIER: POISSY
A HORIZONTAL CONTINUUM.



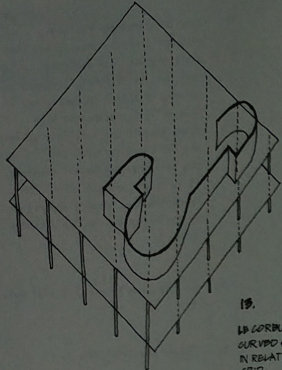
11.
LE CORBUSIER: MAISON DOMINO:
HORIZONTAL ABSOLUTE RELATIVE
TO A VERTICAL GRID.



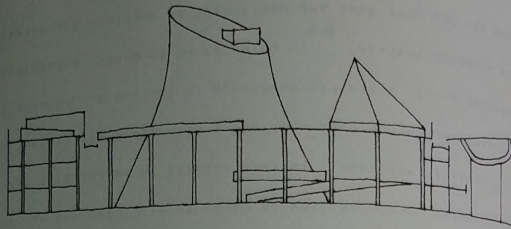
12.
THE VERTICAL AND HORIZONTAL PLANES OF
THE ACROPOLIS ACT AS THE ABSOLUTE
REFERENCES FOR THE MOUNTAINS BEYOND.

MIES VAN DER ROHE USES THE HORIZONTAL IN SPECIFIC SITUATIONS TO STATE CLEARLY ITS ABSOLUTE QUALITY.^{16,9} IN DOING SO HE IS MERELY PRESENTING A FRAGMENT OF AN INFINITE GRID: A SIMILAR CONDITION IS IMPLIED BY MONDRIAN IN HIS PAINTING. FOR MIES THE COLUMN ONLY PROVIDES A VOLUMETRIC DEFINITION, AND NOT A REFERENCE TO A VERTICAL ABSOLUTE. IN THIS CONTEXT AN INTERESTING STUDY COULD BE MADE OF THE CHANGING COLUMN SECTION IN MIES' ARCHITECTURE AND ITS IMPLICATIONS BOTH TO THE PARTICULAR AND ABSOLUTE SITUATIONS. IT WILL SUFFICE TO NOTE HERE THAT HE USES DIFFERENT COLUMN SECTIONS TO IMPLY DIRECTIONAL MOVEMENT AS WELL AS STATIC AND CONTINUOUS VOLUMETRIC ORDER. THIS EMPHASIS ON THE HORIZONTAL IS CLEARLY SHOWN IN LE CORBUSIER'S HOUSE AT POISSY, WHERE HE ALSO PROPOSES A HORIZONTAL CONTINUUM.^{17,10} LE CORBUSIER'S EARLY DIAGRAM FOR THE 'MAISON DOMINO' ALSO POSTULATES A HORIZONTAL ABSOLUTE USING HORIZONTAL VOLUMETRIC SLICES RELATIVE TO A VERTICAL GRID.^{18,11} IN EACH CASE THE PLAN BECOMES FREE TO TAKE ANY SPECIFIC FORM IN RELATION TO THIS ABSOLUTE. INDEED, IN ALL OF LE CORBUSIER'S WORK THE CONCEPT OF THE GRID AS AN ABSOLUTE REFERENCE CAN BE NOTED. THIS REFERENCE HAS ITS BASIS IN LE CORBUSIER'S ANALYSIS OF THE ACROPOLIS IN 'VERS UNE ARCHITECTURE'.^{19,12} HERE THE ACROPOLIS CAN BE CONSIDERED AS THE HORIZONTAL PLANE AND THE COLUMNAR GRID OF THE PARTHENON AS THE VERTICAL PLANE. THESE THEN ACT AS THE ABSOLUTE REFERENCES AND PROVIDE THE PERCEPTUAL TENSION TO THE MOUNTAINS BEYOND WHICH MAY BE THOUGHT OF AS 'MASS' AS THE SPECIFIC CONDITION. THIS JUXTAPOSITION OF THE SPECIFIC FORM - MOUNTAINS, AND THE GENERIC FORM - THE COLUMNAR GRID CREATES A DIALECTIC SITUATION.²⁰ THIS IMPLICATION IS INHERENT IN ALL OF LE CORBUSIER'S ARCHITECTURE, AND IT IS FROM THIS DIALECTIC BASIS THAT THE SYSTEMIC DEVELOPMENT OF HIS WORK CAN BE TRACED AND ANALYSED. IT IS EVIDENT THAT THE COLUMNAR ORDER NECESSARY TO THE VOLUMETRIC DEFINITION AND TO THE ORGANIS-

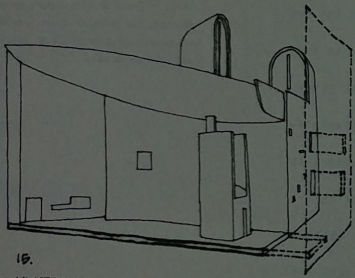
- 16: Thus the Barcelona Pavilion: 'its horizontal planes... and its scattered vertical surfaces ... mark out one of Moholy's (Nagy) "pieces of space" in such a way that a 'full penetration with outer space' is effectively achieved. 'If there is a building in which the horizontal slabs are absolute, it is Mies's Barcelona Pavilion'. Reyner Banham, 'Theory and Design in the First Machine Age'. London 1960.
- 17: Le Corbusier 'Œuvre Complète' Vol. 1.
- 18: 'Œuvre Complète' Vol. 1.
- 19: 'Vers une Architecture' (English Edition pp. 43, 50 and chapter III
- 20: This relationship is also hinted at by Vincent Scully in 'The Earth, the Temple, and the Gods'. The value of the horizontal absolute in unifying the Greek temenos is also pointed out by Dr. Martensson, 'The Idea of Space in Greek Architecture'; he also stresses the columnar order providing volumetric cohesion relating exterior and interior space.



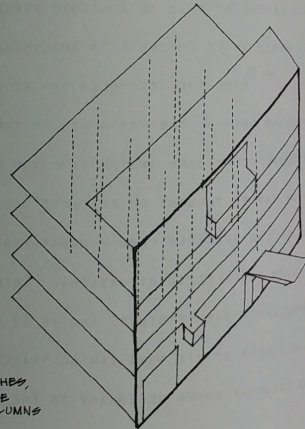
19.
LE CORBUSIER: POISSY:
CURVED SURFACES TENSIONED
IN RELATION TO AN ABSOLUTE
GRID.



14.
LE CORBUSIER: ASSEMBLY PALACE, CHANDIGARH
MATURE STATEMENT OF MASS-GRID RELATIONSHIP.



15.
LE CORBUSIER: RONCHAMP, STRIPPING OF CURVED SURFACES SHOWN AS MASS
IN RELATION TO A PICTURE PLANE OR ABSOLUTE GRID



16.
LE CORBUSIER: GARCHES,
FRONTALS AS SURFACE
ORTHOGONALS AS COLUMNS

...ATION OF THE SPECIFIC CURVED SURFACES AT GARCHES AND POISSY IS DERIVED FROM THIS REFERENCE TO GEOMETRIC ABSOLUTES. THE CURVED SURFACES, AS CAN BE SEEN IN LATER PROJECTS, ARE MERELY INCIPENT 'MASS' WHICH RECEIVE THEIR PRECISE LOCATION IN SOME REFERENCE TO THE GRID. THE 'MASS-GRID' RELATIONSHIP REACHES MATURITY IN THE ASSEMBLY PALACE AT CHANDIGARH AND AT LA TOURETTE WHERE THE CURVED SURFACES ARE REPLACED BY FULLY STATED 'MASS'.¹⁴ MOREOVER AT LA TOURETTE THE IMPLICATIONS OF THE SYSTEMIC DEVELOPMENT CAN ONLY BE COMPREHENDED IN RELATION TO THE SPATIAL GRID. PERHAPS THE MOST MATURE STATEMENT OF THE 'MASS - GRID' RELATIONSHIP APPEARS AT RONCHAMP.¹⁵ THE ESSENCE OF THE BUILDING IS A COMPLEX 'MASS-SURFACE' DIALECTIC WHICH BECOMES FULLY STRESSED ONLY IN RELATION TO THE ORTHOGONAL GRID. HERE THE GRID IS AN IMPLIED, CONCEPTUAL REFERENCE. THE ONLY PHYSICAL ACKNOWLEDGEMENT TO IT CAN BE SEEN IN THE RECTILINEAR CUTS IN THE WARPED SURFACES AND IN THE ALTARS ON THE EXTERNAL PODIUM. THE OPENINGS AND THE ALTARS SEEM TO HAVE BEEN PULLED FROM THE WALL BY AN EXTERNAL FORCE: FROM THE SPATIAL GRID WHICH ACTS TO HOLD THE TOTAL COMPLEX IN A RIGID, TENSIONED STATE. THE EXTERIOR PODIUM, WHICH BEARS NO ACTUAL RELATION TO THE INTERNAL FLOOR LEVEL, PROVIDES A FURTHER REFERENCE, BY STATING A HORIZONTAL ABSOLUTE, TO THE ORTHOGONAL GRID. IT IS ALSO POSSIBLE IN CERTAIN SITUATIONS TO DISCRIMINATE BETWEEN THE TWO VERTICAL COORDINATES: THE FRONTAL AND THE ORTHOGONAL. LE CORBUSIER MAKES THIS DISTINCTION AT GARCHES WHERE THE FRONTAL IS READ AS A SURFACE WHILE THE ORTHOGONALS ARE EXPRESSED BY A COLUMNAR ORGANISATION. THUS THE HORIZONTAL AND FRONTALS WHICH ARE BOTH TREATED AS 'PLANES' ARE GIVEN THE SAME RELATIVE QUALITY AND THEREBY AN INVERSE OR ANTI-GRAVITATIONAL READING IS INFERRED FROM THEM. IN MOST CASES WHEN THE HORIZONTAL IS NOT DISCRIMINATED THE VERTICAL COLUMNAR ORDER MUST PROVIDE THE ABSOLUTE GRID REF-

21: Oeuvre Complete Vol. II. 1929-34

22: Oeuvre Complete Vol. II.

23: Oeuvre Complete Vol VI. 1952-7

24: Oeuvre Complete Vol VI. See also Colin Rowe, Arch. Review June 1961

25: Oeuvre Complete Vol. VI.

ERENCE AND THIS CONSEQUENTLY RESTRICTS THE DEVELOPMENT OF THE PLAN WITHIN IT. NO CONDITION OF TOTAL ORDER IS POSSIBLE IF NEITHER THE HORIZONTAL NOR THE VERTICAL IS TREATED AS AN ABSOLUTE SINCE ANY RESULTANT FORM WILL HAVE NO FRAMEWORK OF REFERENCE.

TO UNDERSTAND VOLUME WE MUST INTRODUCE THE NOTION OF MOVEMENT, AND POSTULATE THAT AN EXPERIENCE OF ARCHITECTURE IS THE SUM OF A LARGE NUMBER OF EXPERIENCES - EACH ONE OF THEM APPREHENDED VISUALLY, IT IS TRUE AS WELL AS THROUGH OTHER SENSES; BUT ACCUMULATED OVER A MUCH LONGER TIME SPAN THAN IS REQUIRED FOR THE INITIAL APPRECIATION OF A PICTORIAL WORK; AND BUILDING UP INTO A CONCEPTUAL, NOT A PERCEPTUAL, WHOLE.²⁶ AND SINCE THIS WHOLE IS CONCEPTUAL IT MUST HAVE A CLARITY OF CONCEPT: ITS ARGUMENT MUST BE INTELLECTUALLY AS WELL AS VISUALLY COMPREHENSIBLE. THE GESTALT PSYCHOLOGISTS HAVE CONCLUSIVELY DEMONSTRATED THAT COMPREHENSIBILITY DEPENDS ON ESSENTIALLY SIMPLE CONFIGURATIONS, OF WHICH THE SQUARE, THE RECTANGLE, AND THE CIRCLE ARE EXAMPLES. WHEN THESE ARE PROJECTED INTO THE THIRD DIMENSIONS THEY BECOME THE CUBE, THE RECTANGULAR BLOCK, AND THE SPHERE, IN SHORT, THE GENERIC FORMS AND BASIC SOLIDS THAT HAVE BEEN DISCUSSED ABOVE. EQUALLY, ONCE THEY TAKE THE FORM OF AN ARCHITECTURAL ENTITY WHICH MUST BE EXPERIENCED FROM WITHIN AND WITHOUT, AND IN MOST CASES FROM A VARIETY OF LEVELS, THE TOTAL OF APPERCEPTION IS BUILT UP THROUGH THE PROCESS OF MOVEMENT OR CIRCULATION. IN THIS SENSE MOVEMENT IS CONSIDERED TO BE A FACTOR THAT IS EXTERNAL TO THE FABRIC OF THE BUILDING; IT IS NOT A QUALITY OF THE WORK ITSELF²⁷ BUT RATHER A PATTERN OF BEHAVIOUR WHICH THE BUILDING ENFORCES ON THE INDIVIDUAL. MOVEMENT CAN THEN BE DEFINED AS THE CIRCULATION OF PEOPLE IN ANY ARCHITECTURAL ENVIRONMENT. MOVEMENT CAN BE THOUGHT OF AS EITHER A GEOMETRIC VECTOR OR AN EX-

26: c.f. Geoffrey Scott : p. 227.
'Space in fact is liberty of movement. That is its value to us and as such it enters our physical consciousness...the space has suggested a movement (the nave of a church) A symmetrical space, on the other hand, duly proportioned to the body invites no movement in any one direction more than another'. Also see G. Kepes p.59 op.cit.

27: H. Woefflin and others tended to regard movement as a quality of the specific work of art itself. James Adam praised Vanbrugh for his 'quality of movement as picturesque'

-TERNAL FORCE AND EVEN AS A NEGATIVE VOLUME, WHICH CAN THEN BE GIVEN AN APPROXIMATE VALUE FROM ITS SIZE, INTENSITY AND DIRECTION. THUS A SINGLE DOOR WITH AN INFREQUENT PASSAGE OF PEOPLE THROUGH IT WOULD NOT PRODUCE A VECTOR OF EQUAL MAGNITUDE TO A SERIES OF DOORS SERVING CONSTANT TRAFFIC. THE NEED FOR FORMAL CLARITY AND UNMISTAKEABLE REFERENCE TO SOME WELL-UNDERSTOOD ARCHETYPAL SOLID THEREBY BECOMES STILL MORE URGENT, SINCE THE PERSON EXPERIENCING ANY ORGANISATION MUST BE ABLE TO HOLD IN HIS VISUAL AND SOMATIC MEMORY AT THE END OF THE PROCESS EVERYTHING WHICH HAS IMPINGED UPON IT SINCE THE BEGINNING. MOREOVER IT IS NOT ONLY THIS CLARITY OF EXPRESSION WHICH GIVES MEANING TO OUR MOVEMENT, BUT IT IS THE MOVEMENT ITSELF WHICH GIVES MEANING AND COMPREHENSIBILITY TO THE TOTAL ORGANISATION. ^{28.} THUS THE TERM MOVEMENT IS USED HERE IN THE SENSE THAT MANY CRITICS HAVE USED THE WORD TIME. HOWEVER 'MOVEMENT' SEEMS TO BE A MORE PRECISE DEFINITION OF THE ARCHITECTURAL EXPERIENCE THAN 'TIME', SINCE 'TIME' COULD IMPLY A STATIC INTERPRETATION WHEREAS 'MOVEMENT' ENCOMPASSES 'TIME', 'INTERVAL', AND 'CIRCULATION'. IT IS IN THIS CONTEXT THAT THE TERM 'MOVEMENT' MUST BE THOUGHT OF AS A PROPERTY OF GENERIC FORM. VOLUME CANNOT BE THOUGHT OF WITHOUT MOVEMENT INTO IT, SINCE BY ITS NATURE IT EXISTS TO ACCOMMODATE MOVEMENT. THEREFORE THE NEUTRAL STATE OF VOLUME CAN ONLY BE CONSIDERED IN THE ABSTRACT, SINCE ALL PHYSICAL MANIFESTATIONS OF VOLUME ARE AFFECTED BY MOVEMENT. THIS MOVEMENT AFFECTS AND MODIFIES THE EQUILIBRIUM OF GENERIC FORM, AND THEREBY PLAYS AN INTEGRAL PART IN THE GIVING OF FORM AND THE RESULTING MANIFESTATION OF THIS PROCESS. IT WILL BE SEEN THAT THIS PROPERTY OF MOVEMENT IS ONE OF THE GENERATING ELEMENTS IN THE DEVELOPMENT OF ANY ARCHITECTURAL SYSTEM.

IT IS NOT POSSIBLE TO CONSIDER THE NOTIONS OF 'MASS' AND 'SURFACE' IN ISOLATION

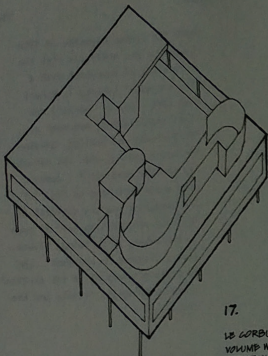
27: contin.

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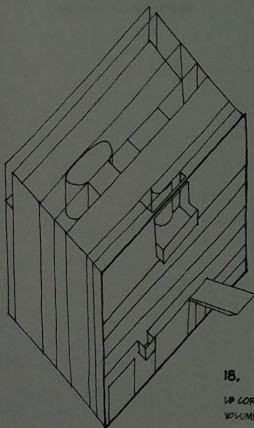
(both Sir Joshua Reynolds in 13th Discourse and Wolfflin link the 'principle of movement' with a 'picturesque' quality). Robert Adam (1st Vol. of 'works') defines architectural movement as 'that rising and falling, advancing and receding, with the convexity and the concavity'. James Adam wrote from Rome in 1762 'of the elevation and its movement': 'nothing contributing half so much to the beauty of buildings viewed from a distance as movement', and he talks of 'movement in the section' contributed by the 'vaults and the domes'.

28: See for example Martionssen's analysis of Greek Lenene, and the inherent movement patterns. Souilly also talks of the 'informing principle of movement'.

PLAYS



17.
LE CORBUSIER: POISSY
VOLUME WITH A SURFACE MEMBRANE
STRETCHED AROUND IT.



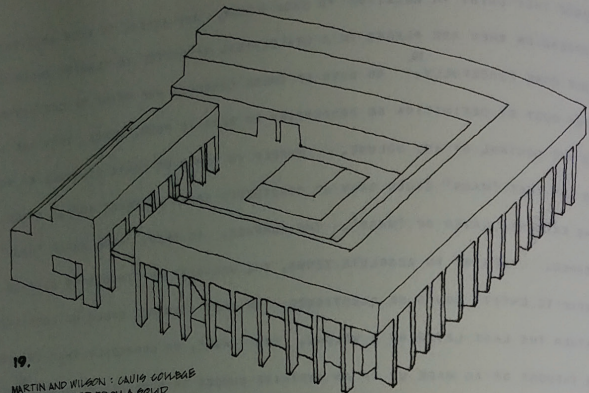
18.
LE CORBUSIER: GARCHES
VOLUME AS A SERIES OF VERTICAL PLANES

SINCE THEY EXIST IN RELATION TO EACH OTHER, AND INDEED TO MOST ARCHITECTURAL EXPRESSION THEY ARE PLACED IN A DIALECTICAL SITUATION TO CLARIFY THEIR EXISTENCE MORE FORCEFULLY.²⁹ AS BOTH OF THESE CONCEPTS ARE MEANS OF CONTAINING SPACE THEY MUST BY DEFINITION BE PROPERTIES OF GENERIC FORM, SINCE THEY ARE INHERENT TO THE CONTROL OF ANY VOLUME. PURELY IN TERMS OF LOGIC IT WOULD BE POSSIBLE TO SAY THAT 'MASS' COULD ONLY BE CONSIDERED AS AN ABSTRACT IDEA, SINCE ONLY THE EXTERNAL LAYER OF 'MASS', THE SURFACE, IS SEEN, FROM WHICH 'MASS' IS INFERRED. AGAIN, IN ABSOLUTE TERMS, THE VALIDITY OF DISCUSSING SURFACE AS A SEPARATE ENTITY COULD BE QUESTIONED, IN THAT SURFACE COULD BE CONSIDERED AS EITHER THE LAST LAYER OF A VOLUME, ITS 'SKIN', OR CONVERSLEY THAT VOLUME COULD BE THOUGHT OF AS MADE UP OF AN INFINITE NUMBER OF SURFACES, OR PLANES.³⁰ EXAMPLES OF BOTH THESE INTERPRETATIONS OF SURFACE CAN BE SEEN IN LE CORBUSIER'S HOUSES AT POISSY AND GARCHES. THE FORMER CAN BE CITED AS AN EXAMPLE OF A VOLUME WITH A SURFACE MEMBRANE STRETCHED TIGHTLY ABOUT IT, WHILE THE LATTER IS A VOLUME EXPRESSED BY A SERIES OF VERTICAL SURFACES;^{17,18} THE VOLUME ITSELF BEING CONSIDERED AS A SERIES OF VOLUMETRIC SLICES OR THICKENED PLANES MUCH AS AN IMAGINARY SOLID THAT COULD BE FORMED FROM A PACK OF CARDS. HOWEVER THESE DEFINITIONS DO NOT HELP IN ESTABLISHING THESE TWO PROPERTIES IN RELATION TO EACH OTHER. IT IS NECESSARY TO MAKE A DISTINCTION BETWEEN THE TWO IN ORDER TO RELATE THEM AS PROPERTIES OF GENERIC FORM.

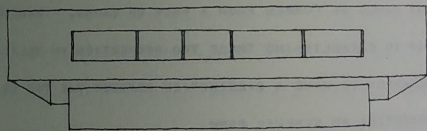
MASS IN SCIENTIFIC TERMS IS THE QUANTITY OF MATTER THAT A BODY CONTAINS, A DENSE AGGREGATION, - IN OTHER WORDS, A SOLID. IT IS THIS CONCEPT OF MASS THOUGHT OF AS A SOLID THAT CAN BE USED IN A METAPHORICAL SENSE, TO PROVIDE A DEFINITION THAT IS ANTI-THETICAL TO SURFACE. IT CAN NOW BE SAID THAT MASS IS

29: See Giulio Carlo Argan. Vol. IX. 'Journal of the Warburg and Courtauld Institutes'. 1946. 'The Architecture of Brunelleschi and the Origins of Perspective Theory.' 'The plane, as a complete representation of space; and the surface.. is..still matter..The outer skin of things, although it is the extreme limit of matter, its suture with space. The plane is.. a geometric entity, the 'intersection'- a pure mental abstraction'.

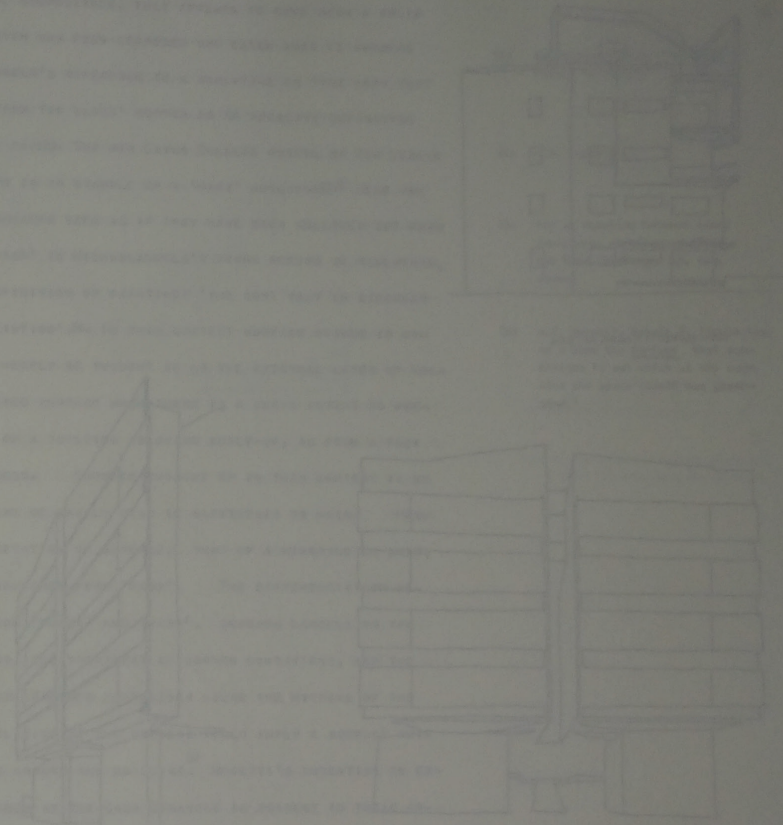
30: Argan, (op.cit. above nota 29) 'But the principle of the homogeneity of space destroys that of the homogeneity of matter: for in order to think of space as homogenous, that is, as uninterrupted by the presence of bodies, it is necessary to think of those bodies as composed of space, that is as broken up into a succession of planes.'

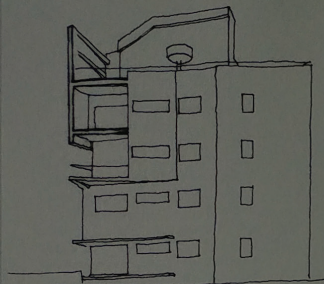


19.
MARTIN AND WILSON : GAU'S CONCRETE
FORM HOLLOWED FROM A SOLID
BLOCK, MASS

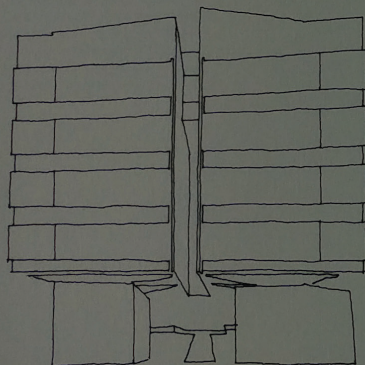


20.
MARCEL BREUER : CANTILEVERED HOUSE
MITRE OF WOOD AT CORNER TO EXPRESS
SURFACE SKIN.



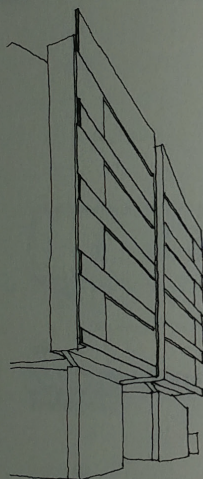


LUIGI MORBITI: CASA ACTREA



21.

LUIGI MORBITI: CASA GIRASOLE
EVIDENT INTENTION TO EXPRESS SURFACE PLANES



LUIGI MORBITI: CASA GIRASOLE

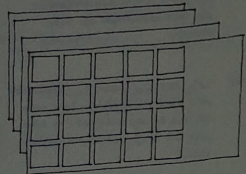
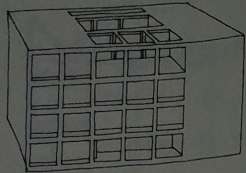
THAT STATE OF AN ARCHITECTURAL COMPOSITION, THAT APPEARS TO HAVE BEEN A SOLID IN ITS ORIGINAL STATE, BUT WHICH HAS BEEN CORRODED AND EATEN AWAY TO PRODUCE ITS RESULTANT FORM. MICHELANGELO'S REFERENCE TO A SCULPTURE AS 'THE SORT THAT IS EXECUTED BY CUTTING AWAY FROM THE BLOCK' SERVES AS AN ADEQUATE DEFINITION OF 'MASS' IN TERMS OF GENERIC FORM³¹. THE NEW CAIUS COLLEGE HOSTEL BY SIR LESLIE MARTIN AND COLIN ST. J. WILSON IS AN EXAMPLE OF A 'MASS' BUILDING³². HERE THE COURTYARD AND THE PERIMETER ARCADES SEEM AS IF THEY HAVE BEEN HOLLOWED OUT FROM A SOLID BRICK 'MASS'. AS 'MASS' IN MICHAELANGELO'S TERMS REFERS TO SCULPTURE, SO 'SURFACE' REFERS TO HIS DEFINITION OF PAINTING: 'THE SORT THAT IS EXECUTED BY BUILDING UP RESEMBLES A PAINTING'³³. IN THIS CONTEXT SURFACE STANDS IN OPPOSITION TO MASS; IT CAN NOT MERELY BE THOUGHT OF AS THE EXTERNAL LAYER OF VOLUME. IT MUST NOW BE CONSIDERED SURFACE WHEN THERE IS A CLEAR INTENT TO PRESENT THE EXTERNAL APPEARANCE OF A BUILDING AS BEING BUILT-UP, AS FROM A PACK OF CARDS, IN AN ADDITIVE PROCESS. SURFACE THOUGHT OF IN THIS CONTEXT IS BY NATURE PLANAR AND THEREFORE CAN BE EASILY READ IN ANTITHESIS TO MASS. HOWEVER, THERE IS ANOTHER INTERPRETATION OF SURFACE, THAT OF A MEMBRANE OR SKIN, WHICH IS NOT AS EASILY DISTINGUISHED FROM 'MASS'. THE DIFFERENTIATION BETWEEN SURFACE 'SKIN' OR SURFACE 'PLANE' AND 'MASS'. DEPENDS LARGELY ON THE PLACEMENT AND SIZE OF OPENINGS, THE TREATMENT OF CORNER CONDITIONS, AND THE MATERIAL USED. THUS IN MARCEL BREUER'S CANTILEVER HOUSE THE MITRING OF THE WOOD AND THE BUTTING OF THE GLAZING AT THE CORNERS WOULD IMPLY A SURFACE SKIN OR MEMBRANE STRETCHED TIGHTLY AROUND THE BUILDING.³⁴ MORETTI'S INTENTION TO EXPRESS A SERIES OF SURFACE PLANES AT THE CASA GIRASOLE IS EVIDENT IN THEIR ARTICULATION FROM THE BODY OF THE BUILDING.^{34, 21, 22}

31: See Anthony Blunt, 'Artistic Theory in Italy'.

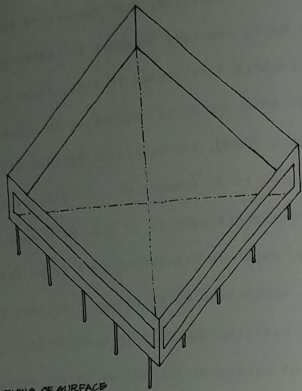
32: c.f. Casabella.

33: For an equation between mass: sculpture; painting: surface see Erno Goldfinger op. cit. above.

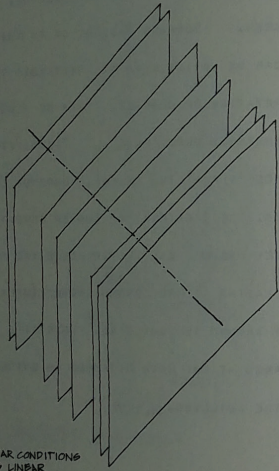
34: c.f. Moretti, Spazio 7, 'Space has as a kind the surface that conditions it and which at the same time the space itself has generated.'



22.
GIUSEPPE TERRAGNI: CASA DEL FASCIO
SOLID-CUT-AWAY OR ADDITIVE PLANES



23.
ALL CONDITIONS OF SURFACE
SKIN SEEN AS CENTROIDAL.



24.
ALL PLANAR CONDITIONS
SEEN AS LINEAR.

THE CONCEPT OF AN ADDITIVE AS OPPOSED TO A CUTAWAY BUILDING CAN BE USED IN A DIALECTICAL SITUATION TO PRODUCE A PURPOSEFUL AMBIGUITY AND A RESULTANT TENSION IN THE EXTERNAL FORM. THIS AMBIGUITY MAY PERCEPTUALLY DENOTE A CONCEPTUAL OPPOSITION INHERENT IN THE INTERNAL AND EXTERNAL REQUIREMENTS. A GOOD EXAMPLE OF THIS IS TERRAGNI'S CASA DEL FASCIO WHERE A SUBTLE PLACING OF VOIDS WITH RESPECT TO SOLIDS CAN BE READ IN ONE INSTANCE AS SOLID-CUT-AWAY AND ANOTHER AS ADDITIVE PLANES. INITIALLY IT WOULD SEEM THAT ALL CONDITIONS OF SURFACE 'SKIN' COULD BE CATEGORIZED AS CENTROIDAL, SINCE THE WRAPPING QUALITY OF A SKIN PRE-²²SUPPOSES SOME CENTRAL ELEMENT WHICH IS TO BE CONTAINED.²³ ON THE OTHER HAND ALL CONDITIONS REQUIRING A 'PLANAR' EXPRESSION COULD BE THOUGHT OF AS LINEAR SINCE²⁴ THEY USUALLY EVOLVE FROM A DIRECTIONAL VECTOR. IN THIS SENSE, GARCHES, EVEN THOUGH IT IS CUBIC IN VOLUME MIGHT BE CONSIDERED AS 'LINEAR' BECAUSE OF THE DIRECTIONAL PLANAR DEVELOPMENT FROM THE FRONT FACADE, WHEREAS POISSY WHICH IS ENCLOSED BY A SURFACE 'SKIN' CAN BE THOUGHT OF AS 'CENTROIDAL'. IT IS THE INTENT TO PRODUCE A BUILDING AS EITHER 'MASS', 'SURFACE', OR A DIALECTIC INVOLVING BOTH THAT MUST BE CLEARLY STATED; AND THAT THIS STATEMENT MUST PROVIDE A PERCEPTUAL CLARIFICATION AND ORDER FOR THE CONCEPTUAL BASIS OF ANY SYSTEM. THE IMPORTANCE OF THE DISTINCTION BETWEEN MASS AND SURFACE TO THE EXPRESSION AND CLARITY OF A COMPLEX VOLUMETRIC SYSTEM RELATIVE TO ITS GENERIC ORIGIN, WILL BE AMPLIFIED IN THE ANALYSES OF FORMAL SYSTEMS.

IT HAS BEEN DEMONSTRATED THAT ALL SPECIFIC ARCHITECTURAL FORM CAN BE RELATED TO A GENERIC ANTECEDENT AND THAT THE PROPERTIES OF THIS GENERIC ROOT CANNOT BE CONSIDERED SUBJECTIVELY. THE COMPREHENSIBILITY OF THE GENERIC ANTECEDENT IS THE NECESSARY PRECONDITION FOR THE CLARITY OF THE INTENT AND FUNCTION OF THE SPECIFIC FORM. FROM THE FUNDAMENTAL STATE OF GENERIC FORM, ITS FORMAL CON-

...DITION, WHICH SUGGESTS ITS OWN INHERENT ORDER A FORMAL LANGUAGE CAN BE DEVELOPED THAT ORDERS THE EVOLUTION OF SPECIFIC FORMS IN A PARTICULAR ARCHITECTURAL SITUATION. MOREOVER IT IS THE ABSOLUTE AND THEREBY DEFINITIVE NATURE OF THESE GENERIC PROPERTIES THAT ALONE CAN PROVIDE THE RATIONAL BASIS FOR THIS FORMAL LANGUAGE.

35: Thus Luigi Moretti in 'Elettismo e Unità di Linguaggio', Spazio 1, July 1950. 'Ogni desiderio e spinta espressivi trovano perciò in un linguaggio raggiunto, lo schema, la matrice (la forma?) per distendere i loro andamenti - esigenze - essenziali; i residui espressivi - i minori rapporti - sono lasciati alla piena libertà di risoluzione contingente che non scalfisce l'ordine generale'. And Bruno Zevi in 'Poetica dell'architettura Neoplasticista', p.9. - 'Della sintassi e della grammatica tuttavia, è più facile dire male che farne a meno'.