

4.4.4.5. The linear paper folding

It is well known, that to draw a straight line along a straight ruler on paper that lays flat on a table. How to verify that the ruler is straight linear? We aim with sight along the edge of the ruler and noted that the light tangent all the way. Another way to produce an intuition of a straight line is to fold a sheet of paper into a wedge. Find a place in the middle of the left edge and the middle of the right edge. Fold the half paper holding the two points on a plane table from 0° to 180° through the free space above the paper. Sharpen the folding edge by rubbing your fingernail along the fold.²⁰⁶ Lift the paper half out to a wedge of approximately 90° .

The paper wedge edge will now form an *object* that illustrates the Platonic idea 'straight line' for intuition as a subject for the substance of space which we call a **primary quality of first grade (pqg-1)**.

Here the intuition is depending on the solid form of the folded paper, observed by us from the outside of the folded paper. Thus, we consider the **primary qualities of higher grades (pqg-r)**.

pqg-2 for the paper plane concept and **pqg-3** for the folding.

²⁰⁶ This assumes a simple folding of the paper, to achieve the straight folding of free folding angle. Curved Folding the paper is possible but requires forced detailed management of the fold. Anyway, the paper is presumed straight flat from the beginning.

5. The Geometric Plane Concept

5.1. The Geometric plane \mathfrak{P}

Three points $A, B, C \in \mathcal{G}$, where we can pass judgment $A, B \in \ell_{AB} \wedge C \notin \ell_{AB}$ define a plane

(5.1) $\gamma_{ABC} \subset \mathcal{G}, \gamma_{ABC} \in \mathfrak{P}$, where we apply the a priori synthetic judgments:

(5.2) $A, B, C \in \mathcal{G} \Rightarrow \ell_{AB}, \ell_{BC}, \ell_{CA} \subset \gamma_{ABC}, AB, BC, CA \subset \gamma_{ABC}, \triangle ABC \subset \gamma_{ABC}, \odot ABC \subset \gamma_{ABC}$

The plane is a platonic idea and therefore transcendental for the recognition, but for the intuition, it is possible to construct a planar surface, wherein the planar figures can be drawn, e.g. $\triangle, \square, \odot$.

2 dimensions and the Concept of a plane (pqg-2)

Quote [12] : “ Euclid’s Elements:

E I.De.5. A *surface* is that which has length and breadth only.

E I.De.6. The edges of a surface are lines.

E I.De.7. A *plane surface* is a surface which lies evenly with the straight lines on itself.

E I.De.8. A *plane angle* is the inclination to one another of two lines in a plane which meet one another and do not lie in a straight line.

E I.De.9. And when the lines containing the angle are straight, the angle is called *rectilinear*.

E I.De.10. When a straight line standing on a straight line makes the adjacent angles equal to one another, each of the equal angles is *right*, and the straight line standing on the other is called a *perpendicular* to that on which it stands.

E I.De.11. An *obtuse angle* is an angle greater than a right angle.

E I.De.12. An *acute angle* is an angle less than a right angle.

E I.De.13. A *boundary* is that which is an extremity of anything.

E I.De.14. A *figure* is that which is contained by any boundary or boundaries.

E I.De.15. A *circle* is a plane figure contained by one line such that all the straight lines falling upon it from one point among those laying within the figure equal one another.

E I.De.16. And the point is called the *center* of the circle.

E I.De.17. A *diameter* of the circle is any straight line drawn through the center and terminated in both directions by the circumference of the circle, and such a straight line also bisects the circle.

E I.De.18. A *semicircle* is the figure contained by the diameter and the circumference cut off by it. And the center of the semicircle is the same as that of the circle.

E I.De.19. *Rectilinear figures* are those which are contained by straight lines, *trilateral* figures being those contained by three, *quadrilateral* those contained by four, and *multilateral* those contained by more than four straight lines.

E I.De.20. Of trilateral figures, an equilateral triangle is that which has its three sides equal, an isosceles triangle that which has two of its sides alone equal, and a scalene triangle that which has its three sides unequal.

E I.De.21. Further, of trilateral figures, a *right-angled triangle* is that which has a right angle, an *obtuse-angled triangle* that which has an obtuse angle, and an *acute-angled triangle* that which has its three angles acute.

E I.De.22. Of quadrilateral figures, a *square* is that which is both equilateral and right-angled; an *oblong* that which is right-angled but not equilateral; a *rhombus* that which is equilateral but not right-angled; and a *rhomboid* that which has its opposite sides and angles equal to one another but is neither equilateral nor right-angled. And let quadrilaterals other than these be called *trapezia*.

E I.De.23 *Parallel* straight lines are straight lines which, being in the same plane and being produced indefinitely in both directions, do not meet one another in either direction.