who cultivate that science desire to understand them, and when they are told of things celestial and Divine their desire increases. . . The science of knowledges is only as something instrumental for the sake of use, viz: that knowledges may serve as vessels for the reception of things celestial and spiritual; and when they are thus serviceable, they then first begin to be of use, and receive their delight from use. It may appear to every attentive observer, that the science of knowledges is designed in itself for no other end, than that man may become rational, and thereby spiritual, and at length celestial, and that by means of knowledges the external man may be adjoined to the internal; when this is the case, then man is principled in use, for the internal man regards nothing but use. It is with a view to this end that the Lord insinuates also the delight which is perceived by children and young persons in learning the sciences. But when man begins to place his delight in mere science or knowledge, he is then influenced by corporeal lust, and in proportion as he is so influenced, or places his delight in mere science, he removes himself from what is celestial, and his scientifics become closed toward the Lord, and are rendered material; but in proportion as scientifics are acquired with a view to use, whether for the sake of human society, or the Lord's Church on earth, or His kingdom in heaven, and, more especially, for the Lord's sake, they are more opened toward the Lord, and become spiritual; wherefore also the angels, who are principled in the science of all knowledges, and that in such a manner, that scarce a thousandth part can be unfolded to man's apprehension, yet esteem knowledges as nothing in comparison with use."—A. C., 1472

"In this chapter are also contained these arcana, viz: how the Lord was instructed by his Father according to all order, and thus how his external man was conjoined to the internal; that is, how his external man in like manuer as the internal, was made divine, by which, as to each essence, he was Jehovah. This was effected by knowledges, as by means or mediums. Without knowledges, as means or mediums, the external man cannot even become man."—A. C., 1475.

"Everyone should prepare the way for God, that is, should prepare himself for reception, and this should be done by means of knowledges. . . . Knowledges are the means by which man may ascend and know the Divine Esse. . . . Man has free will, and the faculty of procuring for himself knowledges, and as he procures them for himself from the Word, by means of the understanding, he thus prepares a way by which God may descend, and elevate him."—T. C. R., 24.

In order to develop the mind in any direction, knowledges are necessary, and these in infancy and childhood come only by an external way, and chiefly through instruction. Thence it may appear that spiritual development can take place only in proportion as suitable knowledges are acquired. In former times it was believed that God, in some miraculous manner, made man new in an instant of time, without any effort on his part; but in the light of the philosophy revealed through Swedenborg, this notion is seen to be erroneous, and that God works on the spiritual plane in a manner corresponding with that on the natural, and that order, harmony, and connected sequence is necessary to any spiritual progress. This being the case, and the acquisition of knowledge being the means, it may be seen that the work of implanting this knowledge from the Word is an essential element in any true educational system. That system which provides for its most perfect communication, in harmony with other needful and essential subjects of study, in the end, will be the most successful, because it will be in the fullest co-operation with the Lord's end in creating man, namely in forming a heaven from the human race.

JOHN WHITEHEAD.

THE LESSER PRINCIPIA.

Contents.*

1. A philosophical argument concerning the first principles of natural things.

2. That the infinite, as also the finite motion of the first natural point, produces a line, a surface and a body.

3. That the motion of the first natural point is through circles.

4. That the motion of the natural point is through a circular spire, that is through a spiral line, whence arises a figure or the first particle.

5. When the natural point flows spirally through a sphere, a space arises around the poles, into which this point does not enter.

6. That an equator may also come into consideration around this fluxion of the natural point.

7. The line which cuts at right angles all these spiral lines, forms a certain ratio of an ecliptic, and this ecliptic has a certain fixed node or conjunction with the equator.

8. That the transference of the point through

the ecliptic takes place at equal distances, but that those distances may be greater or less according to the velocity of the motion.

9. That this natural point does not return to the same place in the ecliptic, except after infinite circumvolutions; that the reason of this is that a perpetual and as it were continual surface may be formed.

10. That the fluxion of this natural point is perpetual and everywhere equal.

11. That this fluxion of the point can be called neither motion nor rest, but that it has something common from both.

12. That one point can separately form a surface, and also many points together if they flow in the same circle and in the same manner.

13. If many points flow in divers circles of the same sphere so that they nevertheless cross the ecliptic at the same time, but not in the same degree of the same, they may be contiguous in the polar circle, especially if one point be near another.

14. Concentric points do not easily run harmoniously, but flow interruptedly in the same surface; but if they do not meet while making their first circuit or circle, they will never meet afterwards.

15. If all the circles consisted of infinite points, those circles with their points could not be brought into that gyre or spire, unless one point moved another from its place; hence they cannot act harmoniously unless the points in each circle be separated from each other.

16. If the points are eccentric, and the distance of the centres equal to or less than the diameter of the sphere which is described, it may happen that one point will come more or less into contact with another; it may also happen that they never come into contact.

17. That points so constituted come into contact sometimes more swiftly and sometimes more slowly.

18. The various consequences arising from the colliding of the points.

19. If the centres be gradually advanced toward one another, it then follows that all the points become disturbed, and the figures otherwise transposed.

20. If the points collide directly at the equator of each, there arises thence no change of figure, but as it were a sudden inversion of the same figure.

21. If the points come into contact they recede from one another according to the obliquity of their conjuction, namely: in that direction in which a line be drawn which is mediate between the line of the centres and its tangent.

22 That intermediate line, by which the point recedes from its prior place, is the tangent of another circle; if from this tangent a perpendicular be dropped we will straightway leave the centre of the new circle which the same point forms. By such collisions the circles can be removed no further than the distance of the semi-diameter, neither more nor less, except they be advanced beyond by the point of another circle.

23. That the first motion is pure motion, and that it is spiral derived from the centre itself toward the periphery; wherefore in that motion the positions of the poles are infinite and the gyration infinite and the motion of most perfect gyration, from whence that other spiral motion must arise, the description of which has already been given in the foregoing articles.

24. The fluent natural points in their first state cannot be said to be transferred from place to place.

25. If there were a certain sphere of activity and these fluent points enclosed in that sphere; or if there was a particle in which these said points were enclosed, then in certain ways might they be at rest, while in others to be transferred from place to place.

26. *The first particle.* The point quiescent as to its centre we will call a particle of the first kind or the first particle.

27. *The second particle.* The particle of the second kind is a point flowing together with its centre through spiral circles.

28. *The third particle.* The third particle is composed of a surface consisting of points or particles of the first kind, and within of enclosed fluent points or particles of the second kind.

29. That the fluent points by means of their motion, at length surround themselves with a surface consisting of points of the first kind.

30. That the surface of the third particle having thus arisen, arrives at length at the same degree of velocity as the enclosed fluent points; and that the motion of this surface can no longer be arrested.

31. That the motion of the surface or of the third particle is the same as the motion of the enclosed point, namely: spiral.

32. That in the surface of this particle there arises by motion the position of the poles, an equator, an ecliptic, an equal progression according to the ecliptic, etc.

33. That the enclosed fluent points or particles of the second kind follow the motion of the surface and gyrate together spirally even to the centre.

34. That the enclosed points, even to the centre, are drawn together into a spiral gyre, but that the points more remote from the surface do not thus follow and obey this motion, but gradually withdraw themselves; also that the point located

in the centre itself simply turns according to the equator.

35. That the fluid matter which enters, goes in through the polar cores even to the centre, and remains in the centre.

36. That there is a certain centripetence in this particle, and the nature of a certain vortex.

37. That in this particle there is a perpendicular from the centre to every part of the periphery, and a horizontal line whithersoever any part is borne by any circle parallel to the circle of the centre or of the surface ; also that the progression of any part, according to the said perpendicular, or a progression toward a given circle parallel to the surface, and greater or less than the spiral motion, is a motion from place to place, but is otherwise rest.

38. That the first or superficial particles also betake themselves into the surface of the polar cones.

39. That the superficial matter next the walls of the polar cones, even to the centre, that is from each part, can be twisted round.

40. That the centre may increase in some measure from the superficial matter and the particle be thus compressed as to its surface.

41. If the globule of the centre be less, it is moved by the equator as it were around its own axis, but if it be greater and the fluid matter very near, it is indeed turned according to the circle of the equator ; still there is some tension of the motion toward the polar segment.

42. So long as the effort toward the poles continues, the central globule cannot be exactly round but ecliptic.

43. When the superficial matter flows into the centre, then the figure of the polar cones changes to some extent.

44. In the same manner the circumambient or inclosed matter is able to flow through the walls of the polar cones, at the centre or at some distance from the centre.

45. The heavier matter seeks the centre, and the lighter the surface ; whence the sphere is so distinguished that the heavier parts settle in the centre, and the lighter parts separate themselves by degrees from the centre.

46. That the polar cones can also be replenished by the fluid matter.

47. That the motion of the matter in the polar cones is spiral, around the axis toward the centre, where it terminates in a circle whose diameter is perpendicular to the axis of the poles.

48. That in the polar cones the axis through its whole length is the seat of centripetency.

49. In the polar cones the circulation near the centre is swifter than at a distance thence, but still the motion is slower.

50. There is also a certain centripetence according to the axis even to the centre, but it is less than in the sphere itself.

51. The line parallel to the axis is triangular at the centre.

52. That in the polar cone a heavy body falls toward the centre in a parabolic line, and that a light body ascends through the same line.

53. The lighter material separated from the central globe, may be carried toward the surface of the sphere, but not outside of it except through the polar cones.

54. The light and fluid matter, enclosed between the surface and the central globe, goes in and out through the poles and not otherwise.

55. These third particles can be most easily contracted and dilated, and this indeed by the mere contact of the surfaces which are adjacent, for nothing impedes the compression and dilatation, neither the surface or its structure, nor the enclosed points.

56. Although the particle be smaller, still the pressure in the surface remains the same ; and in regard to the circulations of the surface, they are more numerous in the lesser particle than in the greater.

57. If the particle be less it possesses a stronger influence on the central globule than if it were greater.

58. The whole surface can be brought together into a certain globule.

59. The central globule without a surface and inclosed mobile matter, loses its own mobility ; neither does it have any other except what it receives from the motion of the adjacent particles.

60. It has been shown that the mobile matter or particles of the second kind flow within the particles of the third kind ; in like manner also the particles of the second kind flow outside of the particles of the third kind.

61. If the particles of the third kind be compressed or dilated, the same amount of fluid matter is still required within and at the same time without.

62. The fluent points or particles of the second kind, on account of various causes, can bring themselves together into one, and separately join a certain volume, which volume can also be greatly increased.

63. That the sun and stars derive their origin from this cause

64. That such a sun or star may perish or disappear.

65. That the said solar fount propels into a certain gyre all the surrounding matter, consisting

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of particles of third kind; which gyre becomes greater and greater according to the increase of the fount. This spiral motion however is near the fount, at a distance thence it terminates in a motion almost circular, according to a certain ecliptic.

66 Around all the particles of the third kind there is a sphere consisting of points of the second kind.

67. However many particles of the third kind there are conjoined with their spheres, or in whatever manner this takes place, they still always observe their polar position, and cannot in any manner be bent thence, except they fall back again into the same position.

68. Pole cannot be conjoined to pole, except at a distance about the pole of the sphere.

69. The particles of the third kind cannot be conjoined except about their ecliptics.

70. The motion of the great vortex or universe is according to the ecliptic.

71. The position of the particles varies according to the distance from their source (fons); if the ecliptic change, it changes the position of its pole and consequently its nodes, not only with regard to the equator, but also with regard to the ecliptics of the particles at a distance more remote thence. The like happens in the motion of a greater vortex.

72. In the motion of a great vortex there exists a certain pressure amongst the particles, which is less at a greater distance from the sun and greater at a less distance; and that (the particles) are very sensitive to pressure.

73. *Fourth kind of particle.* From the said pressure the particles of the third kind are diminished, the surface relapsing into a certain central globe, whence is produced a particle of another kind, here called a particle of the Fourth Kind.

74. The further it is from the sun or source, in that degree is the central globe less and the superficies greater; and the reverse.

75. The smaller a particle of the fourth kind is, the more revolutions it makes in the same time, that is, its surface.

76. The smaller the surface of the particle of the fourth kind is, the greater is the motion of the central globe, this motion being according to the circle of the equator.

77. All motion in the surface of the particle of the fourth kind, proceeds toward the centre and tends into the surface of the central globe.

78. The sphere around the compressed or smaller particle of the fourth kind is greater than that around the uncompressed particle of the third kind, hence it can with difficulty be bent from its polar to its ecliptic position.

79. The central globule lies in its equilibrium, and it cannot be said otherwise, than that it is without motion, although it is turned according to the equator.

80. *Fifth kind of particle.* Near the source of motion or the sun the compression is still greater, and the whole superficies passes away into a globule, so that it is a simple globule (*nudus globulus*) without a superficies separately surrounding it. This is the particle of the fifth kind.

81. That the globule or particle of the fifth kind is so small, that matter of the second kind cannot exercise any force upon it; but that the spiral gyration perishes together with other qualities which came into consideration in connection with the particles of the third and fourth kind.

82. This globule of the fifth kind is so small that the circumfluent points cannot force it into a spiral motion.

83. There is the same weight in this globule, as there is in the whole third particle, and a volume consisting of fifth particles is very heavy.

84. That this great pressure existed at the very beginning of things before the solar vortex was duly formed.

85. That the fifth particle could have no equalibrium with the third and fourth particles.

86. That the sun at the beginning of things was covered over by a crust consisting of such particles, and consequently it was obscured. Thus the origin of the solar spots.

87. That the sun was meanwhile increased by the subtle matter of the third kind, even while that broken crust was withdrawing.

88. That in the forementioned crust or in the volume of fifth particles, there flows a great abundance of subtle matter, or of particles of the second kind. REGNALD W. BROWN, Translator.

[TO BE CONTINUED.]

* Dr. Tafel, in the "Documents Concerning Swedenborg," says of this work, that "It was never published by Swedenborg, but it may be fairly considered the first cast of the larger work; and it is an indispensable help to the proper understanding of it. For while in the latter work the results at which the author arrived are presented in strictly synthetical order, in the former these results may be studied genetically or in successive order. Instead of the finites, actives, and elements of the larger work, we find here 'particles' from the first to the tenth order, and their genesis is described with all the necessary mathematical formulae and diagrams, so that this work serves to explain several of the diagrams and demonstrations which have remained unintelligible in the larger work."—Vol. II, p. 89).