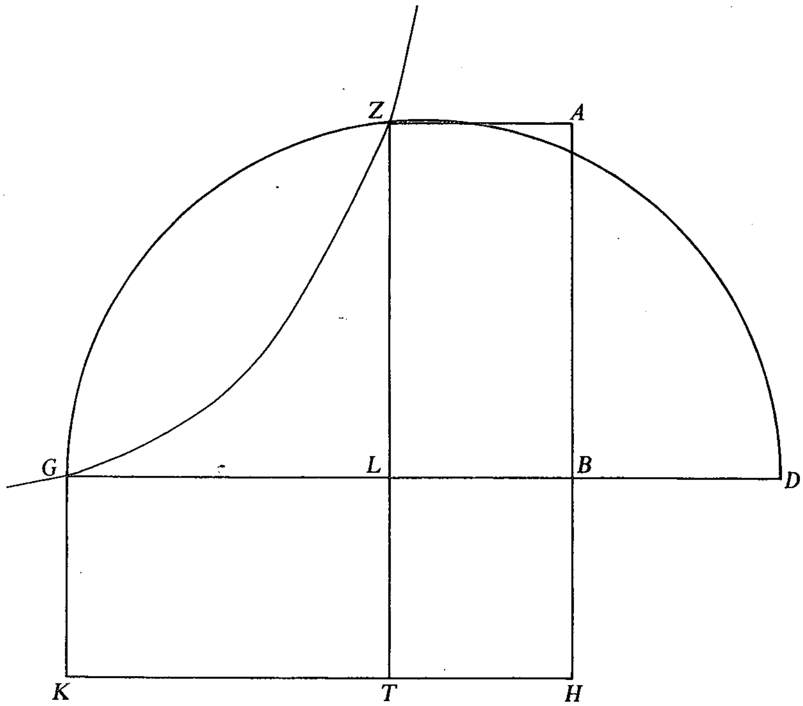
A solid cube plus squares plus edges equal to a number.

We draw BH to represent the side of a square equal to the given sum of the edges, and construct a solid whose base is the square of BH, and which equals the given



number. Let its height BG be perpendicular to BH. We draw BD equal to the given sum of the squares and along BG produced, and draw on DG as diameter a semicircle DZG, and complete the area BK, and draw through the point G a hyperbola with the lines BH and HK as asymptotes. It will intersect the circle at the point G because it intersects the line tangential to it [the circle], i.e., GK. It must therefore intersect it [the circle] at another point. Let it intersect it [the circle] at Z whose position would then be known, because the positions of the circle and the conic are known. From Z we draw perpendiculars ZT and ZA to HK and HA. Therefore the area ZH equals the area BK. Now make HL common. There remains [after subtraction of HL] the area ZB equal to the area LK. Thus the proportion of ZL to LG equals the proportion of HB to BL, because HB equals TL; and their squares are also proportional. But the proportion of the square of ZL to the square of LG is equal to the proportion of DL to LG, because of the circle. Therefore the proportion of the square of HB to the square of BL would be equal to the proportion of DL to LG. Therefore the solid whose base is the square of HB and whose height is LG would equal the solid whose base is the square of BL and whose height is DL. But this latter solid is equal to the cube of BL plus the solid whose base is the square of BL and whose height is BD, which is equal to the given sum of the squares. Now we make common [we add] the solid whose base is the square of HB and whose height is BL, which is equal to the sum of the roots. Therefore the solid whose base is the square of HB and whose height is BG, which we drew equal to the given number, is equal to the solid cube of BL plus [a sum] equal to the given sum of its edges plus [a sum] equal to the given sum of its squares; and that is what we wished to demonstrate.

Thus this class has no variations, and none of its problems is impossible, and it has been solved by the properties of the hyperbola together with the properties of the circle.