exprcffed his gratitude by dedicating his *Corona Tragica* (a long poem on the fate of Mary Queen of Scots) to that liberal pontiff. In his 73d year he felt the approaches of death, and prepared himſelf for it with the utmost composure and devotion. His last hours were attended by many of his intimate friends, and particularly his chief patron the Duke of Sessa, whom he had made his executor ; leaving him the care of his daughter Feliciana, and of his various manuscripts. The manner in which he took leave of thoſe he loved was most tender and affecting. He said to his diſciple and biographer Montalvan, That true fame consisted in being good ; and that he would willingly exchange all the applauſes he had received to add a single deed of virtue to the actions of his life. Having given his dying benediction to his daughter, and performed the last ceremonies of his reli­gion, he expired on the 25th of August 1635.

VEGETATION, in physiology, the act whereby plants receive nourishment and growth.

The process of nature in the vegetation of plants is very accurately delivered by Malpighi : The *egg* or seed of the plant being excluded out of the ovary, called *pod* or *husk,* and requiring ſurther fostering and brooding, is committed to the earth ; which having received it into her fertile bosom, not only does the office of incubation by her own warm vapours and exhalation, joined with the heat of the sun, but by degrees ſupplies what the seed requires for its further growth ; as abounding everywhere with canals and ſinuses, wherein the dew and rain water, impregnated with fertile salts, glide, like the chyle and blood in the arteries, &c. of animals. This moisture meeting with a new-depoſited seed, is percolated, or strained through the pores or pipes of the outer rind or husk, correſponding to the ſecundines of the foetuses, on the inside whereof lies one or more, commonly two, thick feminal leaves, anſwering to the pla­centa in women, and the cotyledons in brutes.

Theſe seed-leaves consist of a great number of little vesiculæ, or bladders, with a tube correſponding to the navel­firing in animals. In theſe vesiculæ is received the moisture of the earth, strained through the rind of the seed ; which makes a slight fermentation with the proper juice before contained therein. This fermented liquor is conveyed by the umbilical vessel to the trunk of the little plant ; and to the germ or bud which is contiguous thereto : upon which a vegetation and increaſe of the parts succeed.

Such is the procedure in the vegetation of plants: which the illustrious author exemplifies in a grain of wheat, as fol­lows : The first day the grain is sown it grows a little tur­bid ; and the ſecundine, or husk, gapes a little in ſeveral places : and the body of the plant, being continued by the umbilical vessel to a conglobated leaf (which is called the *pulp* or *fleſh* of the seed, and is what constitutes the flower) swells ; by which means, not only the germ or ſprout (which is to be the future stem) opens, and waxes green, but the roots begin to bunch out ; whence the placenta, or seed-leaf, becoming looſe, gapes. The second day, the ſe­cundine or huſk, being broke through, the stem, or top of the future straw, appears on the outside thereof, and grows upward by degrees ; in the mean time, the seed-leaf guard­ing the roots becomes turgid with its vesiculæ, and puts forth a white down. And the leaf being pulled away, you see the roots of the plants bare ; the future buds, leaves, and rest of the stalk, lying hid. Between the roots and the aſcending stem the trunk of the plant is knit by the navel­-knot to the flower-leaf, which is very moist, though it still retains its white colour and its natural taste. The third day, the pulp of the conglobated, or round leaf, becomes turgid with the juice which it received from the earth fermenting with its own.

Thus the plant increasing in bigneſs, and its bud or stem becoming taller, from whitish turns greenish ; the lateral roots alſo break forth greenish and pyramidal from the ga­ping ſheath, which adheres chiefly to the plant ; and the lower root grows longer and hairy, with many fibres shoot­ing out of the same.

Indeed there are hairy fibres hanging all along on all the roots, except on their tips ; and theſe fibres are ſeen to wind about the saline particles of the soil, little lumps of earth, &c. like ivy ; whence they grow curled. Above the lateral roots there now break out two other little ones.

The fourth day, the stem mounting upwards, makes a right angle with the seminal leaf : the last roots put forth more ; and the other three growing larger, are clothed with more hairs, which straitly embrace the lumps of earth ; and where they meet with any vacuity, unite into a kind of net­work.

From this time forward the root pushes with more regu­larity downward, and the stalk upward, than before. There is, however, this great difference in their growth, that the stalk and branches find no resistance to their shooting up, while the roots find a great deal to their shooting down­ward, by means of the solidity of the earth ; whence the branches advance much faster and farther in their growth than the roots ; and theſe last often finding the resistance of a tough earth unsurmountable, turn their course, and shoot almost horizontally.

From a number of experiments made by Mr Gough, and related by him in the fourth volume of the Manchester Tranſactions, it appears, that seeds will not vegetate with­out air ; and that during their vegetation, they abſorb oxy­gen, part of which they retain, and that carbonic acid is formed with the rest. Theſe facts were aſcertained in the following manner : He put ſeveral parcels of steeped peas and barley, at different times, into phials, which were left to ſtand for three or four minutes in ſpring water, of the heat of 46, 5⁰, to reduce them to a known temperature. They were then ſecurely corked, and removed into a room, the temperature of which was never leſs than 53⁰. After remaining from four to six days in this situation, they were again placed in the same ſpring water, and opened in an in­verted position, care being taken that the barometer stood at the time nearly where it did at first. When a cork was thus drawn, a quantity of water rushed in immediately, more than was ſufficient to fill the neck. The air being passed through lime water, contracted very ſensibly, and precipitated the lime. The residuum, freed in this manner from carbonic acid, extinguished a lighted taper like water; and this it did repeatedly. He made one of theſe experi­ments with more attention than the rest, from which it ap­peared, that four ounces, one dram, forty grains, by meaſure, of atmoſpheric air, lost one-sixth of its original bulk, by being confined five days with one ounce of steeped barley. It is plain, from this experiment, that seeds in the aft of vegetation take oxygen from the atmoſphere, part of which they retain, and reject the rest charged with car­bon. The ſubstance of the seed-lobes is hereby changed, an additional quantity of oxygen being introduced into their composition ; and a part of their carbon lost. This change, in the proportion of their alimentary principles, generates ſugar, as is evident from the proceſs of malting. But ſugar and carbonic acid are more ſoluble in water than the farinaceous oxyd. They therefore combine with the humidity in the capillary tubes of the seed, and find a rea­dy passage to the germ, the vegetative principle of which they call into action by a stimulus ſuited to its nature. A nutritious liquor being thus prepared by the decomposition of the seed-lobes, and distributed through the infant plant,