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ALCHEMY.

Alchemy, however, found special protection at the court of Henry Sixth of England, in spite of the fact that the kings preceding him had to pay heavily for the favor they had shown the art, and that a stringent law had been promulgated against it by Henry Fourth. The consequence of the favor shown to it by these monarchs was the production of large quantities of counterfeit gold, which, in the form of coinage, flooded neighboring countries. Charles Seventh of France was also seduced by alchemists into making similar experiments to those of the English monarchs; but he, too, came to grief. The debt of his country was largely increased, we are told, by the putting into circulation of a great deal of counterfeit gold.

One great name with which the alchemy of the second half of the fifteenth century is associated in that of Basil Valentine, a benedictine monk of southern Germany. He is without doubt the greatest chemist of the alchemistic period. He devoted himself largely to the preparation of medicines, but he was none the less an ardent supporter of alchemy and gave expression to the most exaggerated views as to the power of the philosopher's stone. Geber's theory of the composition of the metals had been accepted up to this time, but now to mercury and sulphur as constituents of the metals, Valentine added a third constituent, namely, salt. He regarded none of these constituents, however, as identical with the common substances which bear these names. According to this new view, salt is the principle of solidification and power of withstanding fire, just as sulphur determined the combustibility, or change in the fire and also the color, and mercury the metallic character and volatility.

The acceptance of this theory again bears witness to the small amount of trouble men had yet given themselves to find out the real composition of substances. Scientific chemistry had not yet, therefore originated; for its origin must date from the time that earnest efforts were made to discover the true composition of bodies. It is out of the question to apply this to a period when it was considered as proved that the formation of chemical compound is identical with the annihilation of its original components, a new substance being created. Just here it may be stated that, according to all modern investigations, matter is indestructible and can be neither created nor destroyed by man. When a chemical change takes place, the amount of matter after the change is the same as before the change. There is no annihilation or creation of matter, but only a recombination and grouping of the different elements involved in the change.

At the time of the holding of such views, men were striving in every imaginable way to obtain the philosopher's stone. Those of them who claimed to be in the happy possession of the means of preparing it, attributed to it the most marvelous powers. Not only would it change base metals into precious gold, but it would preserve health and life, acting thus as a universal panacea. Statements as to its power of prolonging life were rife during the middle ages, and it was no unusual thing to hear that adepts had prolonged

their lives to four hundred years or more by the use of this elixir. The long lives of the ancient patriarchs were said to be due to the use of the same substance.

For the preparation of the philosopher's stone what was called the materia prima was needed, the obtaining of which, naturally, was the hardest task of all. The most incredible substances, natural products of every kind, were used as raw materials and were worked up in every imaginable way. Those who were reputed to be the fortunate possessors of the means of making the philosopher's stone took good care to keep secret their materia prima. They described all kinds of operations with it in the most enigmatical recipes, employing at the same time mystical drawings such as those of the dragon, the red and green lion, the lily, the swan, etc. The art of writing can be made to conceal ignorance, as well as to convey information.

The aberration of mind induced by the alchemistic problem reached its summit when the miraculous power of the philosopher's stone had become so great that even life could be created by it. Such ideas, an insult to the human understanding, were not only believed but actually taught by some at the close of the Middle ages.

The melancholy picture which the condition of alchemy presents to us at various periods becomes still more sombre and involved in deeper shadows from the fact that men did not hesitate to affirm the divine assistance, in order to explain the marvelous effects of the philosopher's stone. There were adepts who claimed to have received from heaven, through the grace of God, the knowledge of its preparation. Gross abuse was made in this way of the divine name, and by some of the very men, too, who claimed to be devoted most to divine service.

We have now reached the period, the end of the fifteenth century, when the alchemistic frenzy was at its highest. And yet just at this time there arose a man of such ability and power that he was able to give a new direction to chemistry. This was Paracelsus, a Swiss physician, who taught that the chief aim of chemistry was not to make gold but to prepare medicine. With him begins a new period in the history of chemistry, which was to last one hundred and fifty years, during which time chemistry was allied with medicine; and it was not until the middle of the seventeenth century, under the leadership of famous Robert Boyle, that chemistry arose as a young independent science, the chief aim of which was to find out the true composition of substances.

From the beginning of the noted career of Paracelsus, first part of the sixteenth century, there grew up a gradual separation of chemistry and alchemy. The latter, however, did not begin its actual decline until nearly two centuries later. The cause of the wonderful vitality of this mischievous subject was, undoubtedly, the support it received from the greatest chemists of the time, together with the favor shown it by many princes who were allured to it by the seductive prospects of easily acquired treasures. Though few of the eminent chemists of the sixteenth and seventeenth centuries were practical alchemists, still they all had implicit faith

in the possibility of the transmutation of metals. Remarkable as this is, considering the large increase in chemical knowledge, it must be due to the theoretical opinions which these men held respecting the composition of the metals. With Geber and Valentine, they regarded these as composite substances, instead of elements incapable of decomposition into simpler substances.

Among the many princes who gave support to the efforts of the alchemists during this time may be mentioned the Emperor Rudolf Second, the Elector Augustus of Saxony, and the Elector John George of Brandenburg. The courts of these princes were the field-grounds of adepts, who for long succeeded, by means of clever experiments, in working on the credulity of their rulers, until, as generally happened, they were unmasked as cheats and usually severely punished after having been the cause of excessive expenditures on the part of their patrons.

The actual decay of alchemy, for which the numberless disappointments of honest observers, and the exposure of numerous frauds paved the way, may be dated from the beginning of the eighteenth century, when the conviction in the practicability of the transmutation of metals began to die out among most chemists. This conviction made its way slowly, however, into outer circles and it was not until the middle of our century that the final echoes of the alchemistic problem died out.

Seeing the marvelous results which alchemy produced, it is natural to inquire more closely into the supposed evidence in favor of the transmutation of metals being regarded as a matter of fact. If the greatest weight is to be given to the statements of men who had established their claims as practical observers, then the first place belongs to the records of Van Helmont, the greatest physician and chemist of the middle of the seventeenth century, respecting transmutation as effected by himself. These records afford the most convincing testimony as to the power of the alchemistic illusions. Van Helmont had received from an unknown source a small quantity of substance, with one part of which he transmuted two thousand parts of mercury into pure gold. Later Helvetius, body physician to the Prince of Orange, published detailed accounts of how he was able, by means of a small quantity of a substance received from the hand of a stranger, to change lead into gold. Considering the character and eminence of these men it seems almost impossible to doubt their testimony.

More palpable proof, however, of the actual transmutation of metals was held to be furnished by the coins and ornaments prepared from alchemistic gold up to and including the eighteenth century. The evidence, which generally came too late, that these were worthless alloys, for example, bronze gilt over, were all too soon forgotten. Again the findings of courts of justice in favor of alchemistic operations were looked upon as proof that transmutation had actually been effected.

Notwithstanding all this evidence, scientific men of today do not hesitate to affirm that there never has been a case in which one metal has been transmuted into another by man; because metals are elements, and elements may combine to produce new compounds and