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wholly a quack," wrote at length on the macrocosm and microcosm, and it entered into the philosophies of the mystics Jacob Boehme and Emmanuel Swedenborg.

Allusion is made in the last paragraph of the quotation from the "Epistle of Isis" to the twelve signs of the zodiac and their supposed influence on the anatomy of man; this too is a very ancient feature of astrology and played an important rôle in the practice of Rudolph's fortune-tellers. Its foundations were laid by Chaldean astronomers, Hebrew sages and Greek philosophers; Christian mystics adopted it and mediaeval astrologers magnified it so that it became a persistent popular superstition. The first step in the evolution of this conception was taken more than four thousand years ago, when the star-gazers of Babylon observed the circular zone through which the sun appears to pass in the course of a year, and divided it into twelve constellations, creating what is known as the zodiac. To these twelve divisions symbols were given some of which are said to be Babylonian ideographs of the months. The astronomers of Egypt adopted this system and their lively imaginations peopled the constellations with genii; thus arose a symbolism in which each group of stars is likened to a given animal or human character. The twelve constellations and their anatomical associations are quaintly set forth in the following lines:

The Head and Face the Princely *Ram* doth rule,
The Neck and Throat falls to the sullen *Bull*.
The lovely *Twins* guide Shoulder, Arm and Head,
The slow pac'd *Crab* doth Breast and Spleen command.
The *Lion* bold governs the Heart of Man.
The modest *Maid* doth on the Bowels scan.
The Reins and Loins are in the *Ballance* try'd.
The *Scorpion* the Secret Parts doth guide.
The *Shooting Horse* lays claim to both the *Thighs*;
The *Knees* upon the Headstrong *Goat* relies.
The *Waterman*, he both the *Legs* doth claim,
The *Fishes* rule the Feet and meet the *Ram* again.

Moore's *Vox Stellarum*, 1721. X

The pictorial representation of the influence of the zodiac on human anatomy, well-known to every reader of modern patent medicine almanacs, was familiar to the astrologers and occultists of the Hradschin, having appeared as early as 1496 in the famous encyclopedia "Margarita Philosophica" of Gregor Reisch, and being frequently copied into works on medical astrology, and into almanacs.

Just two years before the death of the Emperor Rudolph, William Shakespeare was writing the play of Coriolanus; in this he alludes to the picture of a nude man surrounded by signs of the zodiac. Menenius says to Sicinius: "If you see this in the map of my microcosm, follow it that I am known well enough too?"

Tycho Brahe was of a singularly superstitious nature, producing timidity; if on leaving his house he met an old woman he was accustomed to return home at once, regarding the encounter as an evil omen; if he met a hare in the fields he thought it a dangerous sign; more unlucky still were swine, and on meeting them he used to spit, in the same way as did many superstitious Jews, to ward off evil influences. An inverted slipper, salt spilled at table, or three lighted candles on one table, caused him great anxiety, while to sit down thirteen at a meal was simply tempting Providence. He used to relate to those willing to listen, and this embraced every one, that if a twig was broken from a cherry-tree on Saint Barbara's day and watered daily, it would bear blossoms on the succeeding Christmas; to be lucky in gambling as well as in love he carried part of a hangman's halter and a *lapis alectorius*, a stone about the size of a bean sometimes found in the stomach of a fowl.

"For worthless matters some are wondrous sad,
Whome if I call not vaine I must terme mad.
If that their noses bleed some certain drops,
And then again upon the suddaine stops,





RUDOLPH WITH HIS ALCHEMIST.

THE FOLLIES OF SCIENCE

AT THE

COURT OF RUDOLPH II.

1576—1612.



...BY...

HENRY CARRINGTON BOLTON.



“QUICUNQUE VULT DECIPI, DECIPIATUR.”



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PREFACE.



IN THE massive granite building that houses the Lenox Library, New York City, there hangs an original oil painting by the Bohemian artist Vaczlav Brozik entitled: "Rodolphe chez son Alchimiste." The central figure in this interesting picture is that of the alchemist, portrayed as a tall old man with a bald head and a long, white, pointed beard, and wearing a flowing robe fastened with a girdle about his waist. He stands with his back to an alchemical furnace surmounted by a hood, which is built against one of the massive stone walls by the side of a deep-cut window, that dimly lights a sombre, grim-looking room. On his left is an anvil, on his right an alembic over a small furnace, near by stands chemical apparatus of several kinds, and a celestial globe while books and manuscripts lie in careless disorder on the floor. The alchemist's left arm hangs at his side, his hand holding a pair of tongs; he faces the Emperor and presents to him with his right hand a broken crucible containing in the bottom the ingot of gold that he has just obtained by transmutation.

Rudolph, arrayed in imperial garments, seated in an armchair with his knees crossed, looks at the crucible with a stolid face exhibiting neither curiosity nor astonishment. His Majesty forms the fore-centre of a group of ladies and gentlemen of the court; on his left sits a richly attired lady who leans forward with a movement of surprise; behind him stands a group of four courtiers and one lady; in a far corner are three more persons, one examining attentively a natural history specimen. In the rear of the room is

seen a servant holding a dog. The courtiers are dressed in doublet and hose with high-heeled, low-cut shoes, and carry swords; the ladies wear the feminine apparel of the sixteenth century.

In the following pages an attempt has been made to describe the circumstances that make this picture historically accurate, and to give some account of the character of the scientific atmosphere pervading the court of Rudolph II, Emperor of Germany.

Descriptions of persons, localities and events are true to history, but the author has allowed himself the liberty of the artist in using the imagination in a few instances to lighten up the dull background of hard facts, such for example as the scene in the cavern Chapter XVI.



...The...
Follies of Science
at the
Court of Rudolph II.
...by...

Henry Carrington Bolton

Milwaukee
1904





CHAPTER I. TWO ENGLISH ADVENTURERS.

"Learning, that cobweb of the brain,
Profane, erroneous and vain;
A trade of knowledge as replete,
As others are with fraud and cheat;
An art t'incumber gifts and wit
And render both for nothing fit."

—Butler.

IN THE reign of Queen Elizabeth there lived at Mortlake, on the banks of the river Thames, a very learned man named John Dee, popularly called Doctor Dee, who was at the time in which we first meet him about fifty-six years of age, and had a great reputation in England as a scholar, an astrologer, an alchemist and a necromancer. In his youth he had been a tremendously hard student, first at St. John's College, Cambridge, and then as a fellow of Trinity, devoting eighteen hours daily to study, four to sleep, and but two to refreshment and recreation, application which if not destructive to health could hardly fail to lay the foundations of great erudition. When twenty years old he visited the Low Countries, pursuing his favorite studies, mathematics and astronomy, at the University of Louvain, and buying newly devised astronomical instruments of superior make; later he read lectures on Euclid

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at the College of Rheims, Paris, to very large audiences with great éclat.

Returning to Mortlake, Dee applied himself zealously to science, organizing in his home an astronomical observatory, and a chemical laboratory; collecting a great variety of philosophical apparatus as well as a museum of curiosities in natural history; and forming a library of rare manuscripts and bound volumes relating to his pursuits. He made a name by an erudite preface to Sir Henry Billingsley's translation of Euclid, and proposed a plan for reforming the Gregorian Calendar, which later scholars have commended; thereby becoming so eminent in pure mathematics as to be called "Nobilis Mathematicus."

"He had been long t'wards mathematics,
Optics, philosophy, and statics,
Magick, horoscopy, astrology,
And was an old dog at physiology."

Unfortunately for his reputation with posterity this man of undoubted intellectual ability allowed his imagination to dominate his scientific knowledge, and he adopted the baseless superstitions of the day. He applied his astronomical learning to the fallacies of astrological divination; he worked with furnaces, alembics and chemicals in hopes of discovering the Universal Solvent and the Philosophers' Stone; his philosophy was imbued with the mysteries of the kabbala, with theosophy and with the iniquities of black magic; even his religion was contaminated by the doctrines of spiritualism and the practice of theurgy. When not absorbed in writing mathematical treatises in his library, or working with sextant and astrolabe in his observatory, or blowing the coals under cucurbits in his athanor, Dee was busy making amulets and talismans, and receiving clients of every station in life from peasantry to royalty, who flocked to him to learn their



QUEEN ELIZABETH.



fortunes, to have their horoscopes made, and to ascertain by magical arts lucky days as well as unlucky ones, for all undertakings great and small. In return for these services his credulous visitors seldom failed to leave in his hands silver and gold coins, of which, however, he saw fewer than his household and comfort required.

He was one of those who :

“Deal in Destiny’s dark counsels,
And sage opinions of the moon sell;
To whom all people, far and near,
On deep importances repair,
When brass and pewter hap to stray,
And linen slinks out of the way.”

Like many learned men in the Middle Ages Dr. Dee was supposed to be in league with evil spirits, and he was regarded by his neighbors and enemies as a dangerous man. His evil reputation for sorcery more than once brought him into conflict with the officers of the law; under Queen Mary he was accused of heresy and of attempting to injure the Princess Elizabeth by witchcraft; being cast into a dungeon he saw with horror his cell-mate dragged forth to perish at the stake, but he was leniently treated at his trial and escaped with a mild sentence. On the accession of Elizabeth to the throne Dee was consulted by the Earl of Leicester to secure a lucky day for her coronation, and the result of his prognostication seems to have won her good will: for she afterwards became an appreciative client; she invited him to court for consultations, and even visited Dee’s modest dwelling; though naturally penurious, her Majesty occasionally gave substantial proofs of her confidence, in pieces of gold. The Doctor was at this time a very handsome man, tall and slender, very fair, with a sanguine complexion and a long pointed beard, which, as he grew older, acquired a snow-white

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book

color and a silky texture; perhaps his attractive presence contributed to the pleasure that the Maiden Queen found in his society.

On one occasion Elizabeth invited Dee to Greenwich and condescended to become his pupil; shortly before, he had published a book entitled "Monas Hieroglyphica" (Antwerp, 1564), which he dedicated to Maximilian II, and he had made the long journey to Presburg in Hungary to present a copy in person to the Emperor; this extraordinary treatise was the subject of his conference, at the Queen's command he revealed to her some of its mysteries and hidden secrets during a three day's visit at the royal seat. If Elizabeth was able to comprehend anything whatever of this enigmatical, preposterous jargon, she must be credited with extraordinary intellectual penetration. At another time the Queen, accompanied by lords and ladies in waiting, visited Mortlake, with the intention of examining Dee's famous library, but on reaching the house she learned to her dismay that he had buried his wife only a few hours before, and she refused to enter, but desired Dee to show her his marvellous magic glass; this he did, and explained to her Majesty the manner of using it to read spirit-communications and to perceive apparitions.

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fact This visit was made on the 10th of March, 1574/5. Two years later the appearance of a brilliant comet in the starry heavens created consternation at the English court, and the Queen, then at Richmond, sent for Doctor Dee to divine the meaning of this portent, which he did to her satisfaction. Not long after, a small wax image of the Queen, having pins stuck into the breast, was found in Lincoln's Inn Fields, and Dee was hurriedly summoned to the palace to ward off by counter-spells the mischief that this was believed to work on the person of her Majesty.

"The slie inchanter, when to work his will
And secret wrong on some forspoken wight,
Frames waxe, in form to represent aright
The poore unwitting wretch he meanes to kill;
And prickes the image, fram'd by magick's skill,
Whereby to vex the partie day and night."

The learned Doctor's profound studies of the Kabbala, divinations and occult sciences seem to have disordered his intellect; for one day while engaged in earnest prayer he imagined that the angel Uriel appeared to him and promised his friendship and his assistance in divining the future; at the same time Uriel gave him a highly polished crystal by means of which he would be able to hold communications with celestial spirits. By gazing intently at this crystal, or "shew-stone," as he called it, Dee saw on its surface floating visions of unutterable things, and heard angelic voices addressing him. These visions were vague, mysterious and usually inscrutable; a little maiden eight or nine years old, who said her name was Madini, and conversed in Greek as well as English, frequently appeared to him talking indescribable nonsense. Galveh, Murifri, Michael, Gabriel and Raphael were on a friendly footing with Dee, who wrote out their spiritual messages; these were commonly ridiculous rhapsodies, and sometimes they were fanciful, unmeaning arrangements of numbers, or arbitrary combinations of letters. Besides personages, the crystal revealed scenes and objects of enigmatical character; on the 13th November, 1583, Dee recorded the following:—"At length appeared a sword, two-edged, fiery, or rather bloody, and a bunch of rags hanging at the top of it. The sword stood upright, and a voice announced: 'So be it O Lord, for Thou art mighty; be it so unto them,' and then the sword shook mightily."

Unable to remember these apparitions and these celestial communications, Dee decided to employ the services of a

secretary to record them, and he secured a young notary, Edward Kelley by name, who was installed in his "mystical study" as "skryer," or clairvoyant, while Dee wrote down the "angellical" revelations.

Crystal-gazing is now a recognized agent of auto-hypnotism, and at first Dee was probably self-deceived; but the young notary was an unscrupulous knave who found it profitable to impose on the credulous Doctor and he soon excelled him in "skrying" spirit communications.

Kelley, whose black skull-cap scarcely concealed his mutilated ears, a souvenir of punishment for forgery, was experienced in the tricks of alchemists and the nummeries of necromancy, and he obtained a masterful hold on the superstitious Dee, who abandoned his serious studies and spent months and years over the shew-stone; the results of this misplaced devotion were afterwards published by Dr. Meric Casaubon in a folio volume entitled: "A True and Faithful Relation of what passed for many years between Dr. John Dee and some Spirits," (London, 1659), and it is hard to find in print a more amazing farrago of nonsense.

Dr. Dee was a truly devout worshipper of God, and in his "True and Faithful Relation," he always began his crystal-vision with pious prayers to the Almighty, but as Dr. Casaubon remarks, Dee "mistook false lying Spirits for Angels of Light, the Divil of Hell for the God of Heaven." And as Butler has said:

"Kelley did all his feats upon
The Devil's looking glass, a stone."

The fame of Dee and Kelley as magicians spread rapidly, and was enhanced by their claims to success in the manufacture of gold from base metals, a claim that ill-accorded with the chronic poverty in Dee's household. The Philosophers' stone used in transmutation had been found by



DR. JOHN DEE.



digging in the ruins of Glastonbury Abbey, together with a book explaining the process, written by St. Dunstan, the same:—

“who in his cell’s repose
Plucked the devil by the nose.”

Among the visitors to the now celebrated alchemists came a Prince from distant Poland, Albert Laski by name, who was visiting the Elizabethan Court with great pomp, and incidentally seeking for an adept in transmutation by whose aid he hoped to retrieve the fortune wasted through extravagancy and folly. Being introduced to Dr. Dee by the Earl of Leicester, to whose care the Pole had been committed by her Majesty, he invited himself to dine with the famous magician; Dee’s poverty was however so great that he was about to sell some silver-plate to provide an entertainment suitable for so exalted a personage; but this becoming known to the Queen, she sent him a present of forty golden angels.

At the feast the Polish nobleman was captivated by the learning of Dee, and impressed by the impudent claims of Kelley; he admitted his belief in the Elixir Vitæ, the Philosophers’ stone, and in other popular chimeras, showing himself so gullible that the English adventurers conceived a plan to wrest from him a share of his supposed wealth. They discoursed in low tones, with mysterious hints, of the magical powers of the shew-stone, and the credulous Count besought the favor of initiation into its secrets. After delays and postponements calculated to stimulate curiosity, a séance was arranged; Kelley sitting at a distance from the marvellous crystal, gazed intently at it and spasmodically uttered aloud the messages he claimed to hear and described the apparitions he saw, while Dee, at a lighted table, transcribed the spiritual communications, the Count being allowed to sit in a corner of the darkened room. Amid an incoherent medley of ab-

surditities, the spirits revealed in broken sentences a future for Laski that delighted and fascinated him; they prophesied that he should become the fortunate possessor of the Elixir of Life, and that he would succeed to the throne of Poland, becoming rich, illustrious and victorious over the enemies of that kingdom:— all of which could only be accomplished by the cooperation of Dee, the Skryer and the shew-stone.

This bold scheme of the Englishmen met with great success, and having aroused the impatient ambition of the credulous Pole, he invited them to visit him at his estate near Cracow. Dee being involved in debt, and threatened with civil processes, gladly consented, and in September, 1583, the Count, accompanied by the Doctor and his family, Kelley with his wife and his brother, as well as a whole retinue of servants, embarked for the continent. They travelled in great style, by the way of Lübeck and Hamburg, and after four months reached the princely estate in Poland. Meanwhile the “angellical stone” was not allowed to gather moss, being brought out at each of the resting places of the travellers, and consulted for the enlightenment and mystification of their noble host.

Arrived at Cracow the Englishmen established themselves leisurely in luxurious quarters, and month after month passed without their showing any disposition to labor at transmutation; the Count urged action, but the needed materials and apparatus were difficult to procure, the proper conjunction of the planets had not taken place, and certain operations once begun required seven times seven weeks for their accomplishment. To satisfy the impatient Pole, however, Kelley arranged a demonstration, and in the presence of their host, with the aid of a double-bottomed crucible, lined with wax in which gold-filings were concealed, the adept in trickery performed the feat of transmuting quicksilver into

the precious, coveted, yellow metal, that withstood the tests of the Cracow goldsmiths.

Enormous sums of money were drawn out of the coffers of the Count, who was obliged to sell a portion of his estates "to find aliment for the hungry crucibles of Dee and Kelley and the no less hungry stomachs of their wives and families." When Laski showed signs of discouragement Kelley arranged a new imposture, and thus the clever swindlers prolonged their stay in Poland. After many months, however, the Count realized that the alchemists consumed far more gold than they produced, and he urged them to make a visit to Prague, where the wealthy patron of alchemists, astrologers and artists, the Emperor Rudolph II, held his court. Furnished with letters of introduction and a safe-conduct, Dee, Kelley, his brother, and a servant named Hilton, bid their host farewell and proceeded through Cracow to the Capital of Bohemia, which they reached, after an eight days journey in carriages, on August ninth, 1584.




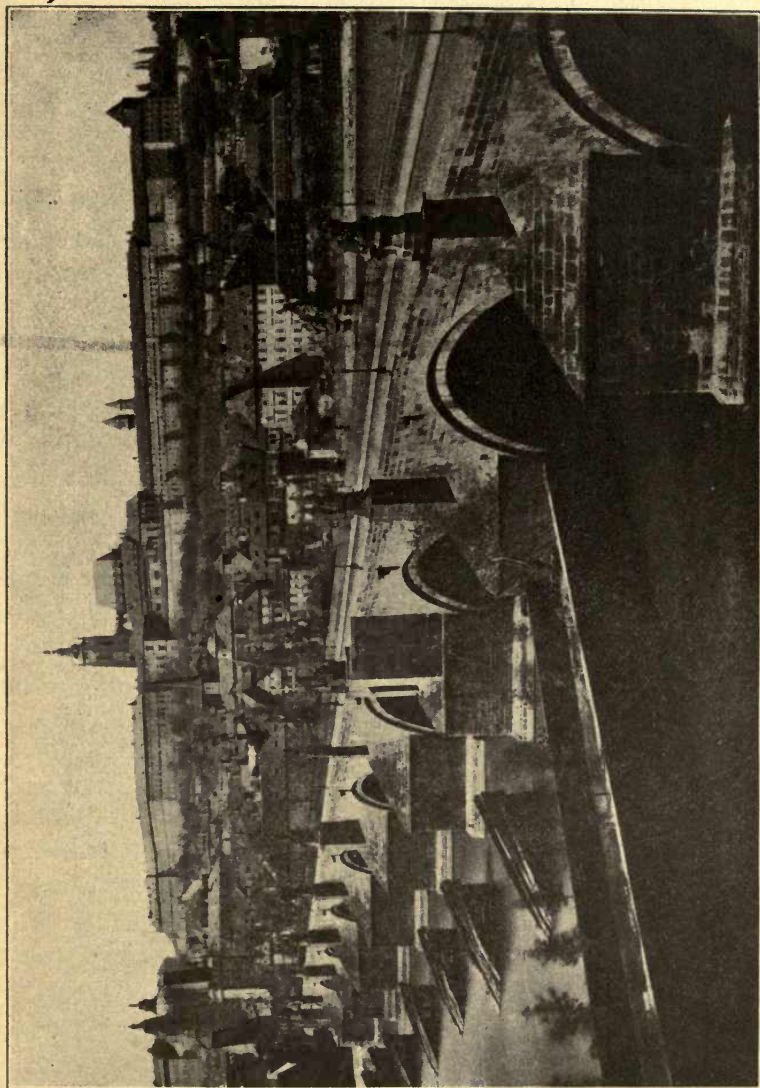


CHAPTER II.

THE SOLOMON OF BOHEMIA.

"He never said a foolish thing
And never did a wise one."

N A BOLD rocky height overhanging a beautiful wooded ravine on the one side, and towering above the river Moldau on the other, stands a group of ancient edifices comprising a fortress, several palaces and churches, which together with minor buildings lining steep, narrow and crooked streets, form the quarter of Prague known as the Hradschin. On this noble site royal castles have stood for more than a thousand years, and one of the earliest Christian churches of Bohemia was erected here in the year 874. Most imposing in appearance, at the time of which we write, was an ancient palace with an ornate façade and a dome at each corner, the residence of the extremely rich and influential Prince William von Rosenberg, Knight of the Golden Fleece, a magnate of such high degree that when he was Ambassador to Poland he had been offered the throne of that country, and under Rudolph he filled a most important imperial office. This palace was connected by an underground, secret passage with the royal castle, partly for the convenience of the reigning monarch who secured thereby a private exit in case of siege, and partly on account of the imperial bureau of finance which had occupied a portion of the building since the destructive fire of 1541.



BRIDGE OF CARL IV, AND THE HRADSCHIN, PRAGUE.



Near the Rosenberg palace stood two churches; the older was All Souls, founded by Ottakar II, enlarged by Carl IV, and after the great fire restored by Rudolph's sister Elizabeth, the widow of Charles IX, of France. The other church was dedicated to St. George and was recognizable by its lofty twin towers; the interior was richly decorated in Byzantine style, and its cloisters connected with the Benedictine Convent adjoining. The nuns of this convent were all of noble blood and enjoyed great privileges, the Abbess having the right to crown the Queens of Bohemia, a right last exercised on the wife of Maximilian II, Rudolph's mother.

The Royal Castle built in 1333 by the Emperor Carl IV in imitation of the Louvre at Paris, enlarged and beautified by successive monarchs, was almost destroyed in 1541 by the conflagration that ravaged the Hradschin; it was, however, restored and at the end of the sixteenth century constituted a magnificent structure. Its massive walls were interrupted at intervals by projecting towers, the oldest being the square Black Tower of hewn stone, a relic of Wenzel's reign (1378—1400). The upper floors of this tower served as a prison for political offenders, and in the depths below stood that horrible instrument of death facetiously called the "Iron Maiden." Conspicuous also were the round White Tower known as "Mihulka," and the "Daliborka," so named from the first prisoner "Dalibor" confined within its walls. Of evil repute was the terrible Hunger Tower with the underground cells and oubliettes that rarely surrendered their inmates alive. Close to the Royal Castle stood the Cathedral of St. Veit with its stately steeple.

Within the fortified enclosure was the princely residence of the Kings of Bohemia and Emperors of Germany; spacious apartments for a luxurious Court and for entertainment of noble guests on a grand scale. Of these the most magnificent

were the Spanish Hall, the German Hall, and the Wladislaw Hall of such huge dimensions that within it tournaments had once been held. The windows of the Castle looked out upon the spires of the ancient church of St. George, and beyond these over a beautiful, highly cultivated garden on one side, and over the picturesque city of Prague on the other. A covered passage led from the palace to the gardens situated at the bottom of a deep ravine.

Monarch of this regal residence and living within its bounds from choice was one of the most interesting and eccentric princes of Europe, Rudolph II, German Emperor. Rudolph was born in Vienna, July 18th, 1552, being the oldest son of Emperor Maximilian II; at the age of eleven his father sent him to the court of his bigoted, gloomy, man-hating uncle, Philip II of Spain, who had recently removed his royal residence from Toledo to Madrid. Here the young Prince remained eight years receiving his education at the hands of Spanish Jesuits, and absorbing by contact with his surroundings the morose, intolerant nature of his fanatical uncle, and laying the foundations of the hypochondria and unhappy distrust of mankind that darkened his whole life. At the age of nineteen he returned to Vienna; some authorities say he was attacked with homesickness, which does not seem likely to have seized so young a boy after eight years absence; others assert he was recalled owing to amorous intrigues with the fair and frail ladies of the dissolute Spanish court. One year later he was crowned King of Hungary, three years later he became King of Bohemia, and on the death of his father in 1576 he succeeded to the throne of Germany. Although only twenty-four years of age he despised the gay and brilliant life of the Viennese Capital, and retired to Prague taking up his residence in the austere Hradschiner Castle. Here he soon wearied of the cares of State, and al-

though the Empire was disturbed by dissensions within and attacked by enemies without, he threw upon his Ministers and later upon his brothers, the management of imperial affairs. Always taciturn and morose, he was attacked by hypochondriacal moods at which time he refused audience to foreign ambassadors and even drove his Ministers from his presence. Courtiers wishing to secure favors from this egocentric Emperor sometimes addressed him when he was visiting the royal stables, as he was then apt to be in a complaisant mood. Withdrawing more and more from executive functions he was nevertheless a very busy man, devoting himself with great zeal to the accumulation of treasures of art and to the cultivation of science as he understood the term.

"Nicht so wie Max war dessen Sohn,
Der nun bestieg den Kaiserthron;
Das Reich bekümmert ihn nicht sehr,
Sterndeuterei bei weitem mehr
Und ebenso—, es ist zum Lachen—
Die Kunst, aus Steinen Gold zu machen."

Rudolph did not pursue science for the purpose of increasing knowledge, nor did he collect paintings, statuary, antiquities and natural curiosities with a view to stimulating progress in art and archaeology; astrology, alchemy and magic were to his superstitious mind true sciences of pre-eminent importance; charlatans claiming knowledge of the Philosophers' Stone and the Elixir of Life, of divination by celestial signs, and pretending to cure diseases by Potable gold or by tincture of pearls, were more cordially welcomed at the Hradschin than genuine scholars in chemistry, astronomy and medicine. Rudolph's intellectual bias and peculiar disposition made him the ready prey of swindlers and tricksters of every nation who flocked to Prague and with impudent assurance obtained entrance to the inner circles of the im-

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perial court; some by flattery and skill in catering to the taste of his Majesty became dignitaries of the palace as well as trusted advisors on all matters pertaining to science and art. Courtier-like these arrant knaves addressed the Emperor as the "Solomon of Bohemia," and as the "Hermes Trismegistus of Germany."

A zealous attachment to the pseudo-sciences was not regarded as inconsistent with learning, true piety and exalted rank, and Rudolph had many precedents among the crowned heads of earlier and contemporary times. Even as early as 1150 the Sultan Kalid, of Egypt, gathered a number of alchemists at his court, and he himself composed hermetic treatises still extant. Alphonso X, King of Castile, Robert Bruce of Scotland, and Henry VI, of England, are credited with belief in and practice of the mystic art; the latter being greatly in need of money issued four successive decrees commanding all nobles, doctors, professors and priests to conduct experiments in transmutation with a view to discharging the nation's debt. In a patent dated 15th September, 1449, King Henry states that he includes priests in his decree because their experience in the miracle of transubstantiation well qualified them for success in transmutation. Edward VI of England, and more than one Pope delighted in alchemical investigations, and Frederick III of Germany, who preceded Rudolph by two centuries, anticipated him in the neglect of affairs of state for love of the pseudo-science; he surrendered his throne to his son Maximilian and retired to Linz, where he devoted himself to astrology, alchemy and botany until his death in 1493. Of Augustus, Elector of Saxony, more will be told in another place.

As became the wearer of the crown of Germany, Rudolph maintained a royal retinue of knights, noblemen, officers of the guard, gentlemen of the privy chamber, stewards,



THE CATHEDRAL OF ST. VEIT.



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cup-bearers, carvers and servers; there were also physicians, almoners, librarians and curators of the Cabinet of curiosities and of the Art-gallery. In addition to these functionaries he surrounded himself with retainers whose duties and occupations were in harmony with his personal interests; such were the court artists, musicians, poets, mathematicians, archaeologists, astronomers and alchemists. These he esteemed in proportion to their success in impressing him with exalted ideas of their esoteric knowledge; the librarian held his post not only for his book-learning, but because he had discovered perpetual motion; those physicians were most successful in establishing intimate relations with his Majesty who discoursed most learnedly on theosophy and magical cures, and promised most confidently genuine panaceas for all diseases; the eminent astronomer John Kepler was never quite enough of an astrologer to please this superstitious Prince.

Philosophy was not altogether neglected by the encyclopaedic Emperor; he studied the extravagant tenets of theosophy with his young Secretary, Dr. Michael Maier, and the mysteries of the Kabbala with the venerable Rabbi Bezael Loew. This master in Israel was as pious and charitable as he was learned; he was beloved of the common people for his unselfish benevolence and admired by scholars for his proficiency in medicine, physics, mathematics, astronomy, as well as for his knowledge of the Talmud. Modestly holding the position of leader in Jewish circles, he was regarded as the oracle of Hebrew savants and a father to the poverty-pinched residents of the Ghetto. Although Catholic influence was predominant at the court, the pious Rabbi was ever welcomed by the Emperor as the great expositor of the Kabbala, and it was no fault of his that a family intrigue + ? eventually brought great sorrow to both.

To enumerate the host of minor dependants in the im-

perial service would be profitless; they were employed in the laboratories, the observatory, the art-gallery, the museum, the stables, the menagerie and the botanic gardens; all these found an asylum either in the Hradschin or in the city across the Moldau; many received small stipends, while a favored few resided within the precincts of the royal palace, receiving daily bounty from the imperial kitchens and cellars.

Next to science and art, Rudolph was most attached to his stables and to his pleasure-gardens. The stables, situated on the ground-floor of one of the wings of the huge palace, beneath the workshops of the stone-polishers and the art rooms, were filled with noble horses of many races; to some of these four-legged pets Rudolph gave the names of certain two-footed darlings who resided in the Castle. Exhibitions of the beauty and intelligence of the horses and of the skill of their riders were occasionally given in an immense covered riding-hall, fitted up with galleries and a royal box.

Beyond the mews, in a beautifully planned pleasure-garden, flourished a profusion of exquisite flowers of every clime, protected in winter by removal to hot-houses; here the first tulips seen in Europe were cultivated, brought by an imperial ambassador from the Orient, many individuals costing more than the plants of an entire garden. The first tulip that bloomed in this lovely spot, the Emperor, in a rare poetic mood, christened "Maria," after his much-loved Mother. Opposite the grim Black Tower was a conservatory in which were planted fig-trees, oranges, lemons, pomegranates and peaches, as well as palms and tree-ferns from the tropics. In a raised parterre bright colored blossoms in the green grass formed the letters of Rudolph's enigmatic device:—

A D S I T

which is said to signify:—

"A Domino Salus In Tribulatione."

Several fountains with marble basins and artistic figures spouting crystal water, as well as statues, columns and antiques ornamented this attractive "Lust-Garten."

Near the bottom of the natural slope was a group of strongly built, low-roofed huts, open on one side and fitted with stout iron gratings, in which were confined wild animals from Asia, Africa, and even from distant America; lions, tigers, leopards, panthers, bears and other savage beasts. The custom of keeping a majestic lion in a cage in this locality had existed from the fourteenth century, and the live beast was regarded as a symbol of the heraldic lion on the imperial arms, just as bears are seen to-day at Berne, preserved at the cost of the Swiss canton. One of the lions born in captivity had been tamed and trained when a cub by Rudolph himself, and was permitted to prowls around the workshops under his master's control to the great alarm of his attendants and to the consternation of the visitors; this baby lion was named Otakar.

In the neighborhood of the animal houses was a larger building with a wire-net front, filled with parrots and paroquets whose brilliant rainbow plumage was as attractive to the eyes as their incessant chatter and shrill screeching was offensive to the ears. This menagerie was founded by Maximilian II and became under Rudolph the finest in all Europe.

Overlooking this well kept garden, on a height opposite the Castle, was the ornate building erected by Ferdinand I, known as the Belvedere, a choice gem among the imperial edifices. Within its highly decorated walls a grand staircase led to a magnificent hall crowded with pictures, statuary, reliefs and casts. Rudolph, who had constructed a covered passage leading from his private apartments in the palace to the pleasure-garden, was accustomed to spend much time in

the sumptuous Belvedere; here he amused himself painting in oil, polishing gems, or studying his favorite science astronomy under the guidance of his salaried observers.

Such were the surroundings of the remarkable monarch to whom the two English adventurers, John Dee and Edward Kelley, addressed themselves in search of favors and fortune.





CHAPTER III.

GOLD ALLEY.

They speken faste of thilke stone,
But how to make it now wot none,
After the true experience.
And natheless great diligence
They setten up thilke dede,
And spillen more than thei spede.
For alway thei fynden a lette
Which bringeth in poverte and dette
To him that riche were tofore
The losse is had, the lucre is lore.
To gette a pound thei spenden fyve
I know not how such a craft shal thryve.

Gower, Confessio Amantis.



WARD by the cloisters of St. George's Church in the Hradschin quarter of Prague, ran a narrow steep street, no wider than an alley of a modern town and not half so clean, lined with small insignificant houses, which were occupied largely by the alchemists and occultists who were attracted from near and far by the predilections and liberality of the marvel-loving Emperor. This short street was known as "Gold Alley," a name that it retained for centuries; here lived, at the time of Dee's visit, Daniel Prandtner, an alchemist of doubtful reputation; Christopher von Hirschberg, whose well-filled purse seemed to imply success in transmutation, or perhaps in swindling an opulent patron; a certain Magister Jeremias, learned in phar-

macy; the noted Bawor Rodowsky von Hustrian; who had wasted a considerable fortune in a vain search for the Philosophers' Stone; the mischievous female clairvoyant Salomena Scheinpflug, who was responsible for intrigues that disgraced more than one aristocratic family in Prague; and the mystic occultist Doctor Leonhard Vychperger von Erbach. More eminent than these was the Italian alchemist Claudius Syrrus, who was in the employ of the great Prince von Rosenberg and with whom he had made a remarkable contract in which the Italian bound himself to make efforts to discover the secret of transmutation, and expressly stated in a dignified and honorable way that he could not promise success as all depended on the will of the Almighty. As Thomas Norton, of Bristol, wrote in 1477:

"Maistryefull, merveyulous and Archimastrye
Is the tincture of holi Alkimy:
A wonderful Science, secrete Philosophie,
A singular grace and gift of th'Almightie:
Which never was found by labour of Mann,
But it by Teaching or Revelacion begann."

Syrrus had previously worked in the laboratory of Wenzel Wresowec, who lived in "Little Prague," as a certain quarter was called. Wresowec, though devoted to occult studies, was accounted so learned and shrewd that his services were in demand as Ambassador to foreign courts and as Envoy in delicate diplomatic missions. To him Syrrus had dedicated his two Latin treatises on the Great Elixir.

Besides the dwellings of alchemists, fortune-tellers and other charlatans, Gold Alley contained the modest workshops and unpretentious houses of many of the genuine artists who found scope for their talents and a market for their wares at Rudolph's court. Here lived the gold and silver smiths, engravers of precious stones, cameo-cutters, wood-carvers, illuminators of manuscripts, painters and sculptors, occupied

in manufacturing and repairing art-treasures for the Imperial Cabinet and Galleries.

Living in a palatial mansion situated in a more aristocratic neighborhood, was the court physician and director of alchemical laboratories, Dr. Thaddeus von Hayek, whose spacious parlors were the rendezvous not only of the residents of Gold Alley, but also of the poor journeymen alchemists who wandered through Europe earning a precarious living by pretence of transmutation. Dr. von Hayek was educated in the sciences and in medicine having taken his degree at the University of Bologna, where through friendship with the learned Geronimo Cardano he had imbibed fondness for mathematics and astrology. He is even credited with the discovery of a new star in 1572. Being in charge of the Imperial laboratories, Dr. von Hayek examined alchemists who sought positions at this singular court as to their proficiency before recommending them to the Emperor. Shortly after his arrival at Prague Dr. Dee took pains to make the acquaintance of this important functionary.

The two English adventurers reached Prague in mid-summer and found lodgings at the "Golden Ball," a popular inn whose landlord Zdenko was one of the greatest gossips in Bohemia. Dee at once presented his letters of introduction to the Imperial Vice Chancellor, Jacob Curtius, one of the most influential persons at the court of Rudolph, although but thirty-one years of age. Curtius, being a bigoted adherent of the Jesuit party, was not very cordial to the English Protestant, but made him acquainted with Dr. von Hayek, of whom Dee rented a small house in Gold Alley. As soon as Dee and Kelley were settled in their new home, the Doctor resumed his conferences with Uriel by aid of the shew-stone and his unscrupulous "skryer." The Spirits informed him that he must make a demonstration in proof of spagyric

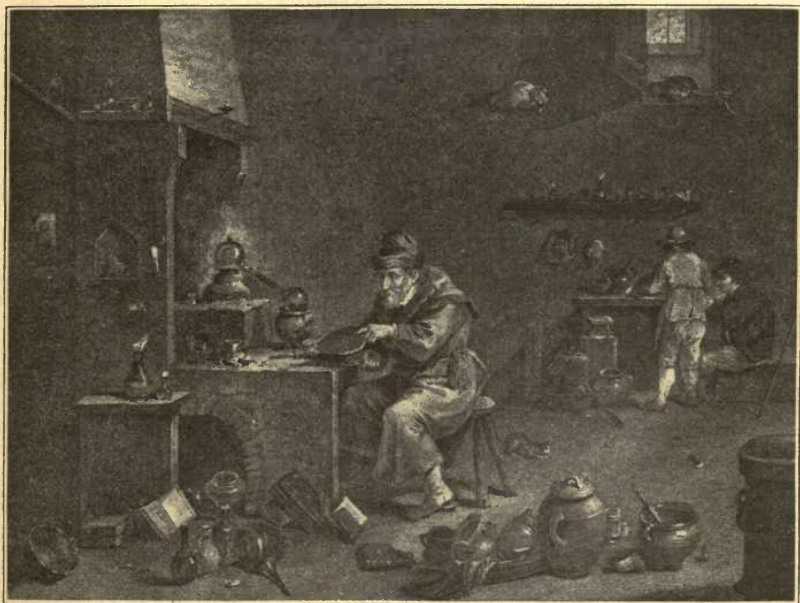
power before approaching the Emperor, and plans were made for astonishing the residents of Gold Alley and the court adepts.

Meanwhile Edward Kelley, true to his vulgar instincts, got into vicious company and spent days in gossip and his nights in low carousels; when excited with drink he boasted of the powers of his master as a diviner of the future and as possessor of the Philosophers' Stone. Moreover money was getting scarce in the household of the Englishmen, so a bold stroke was resolved upon. The curious, the credulous, the avaricious and the professional tricksters:

“Nasty, soaking, greasy fellows,
Knaves would brain you with their bellows;
Hapless, sapless, crusty sticks,
Blind as smoke can make the bricks;”

assembled by invitation in the laboratory of Dr. von Hayek, built in the basement of his house; after a learned, mystifying discourse by Dr. Dee, Kelley, with a few drops of a blood-red oil, converted a few ounces of mercury, heated in a crucible, into shining, yellow gold that stood the tests with hammer and file and drew forth the plaudits of the astonished company. On the surface of the ingot was found a small excess of the tincture glistening like a ruby, proving that an unnecessary amount of the precious oil had been used. The historic verity of this transmutation was confirmed by Nicholas Barnaud, a guest of von Hayek, and by von Hayek himself, whose heirs long treasured a fragment of this hermetic gold.

The success of this venture placed Dee and his associate on a pinnacle of fame, and the leading residents of Gold Alley besought the court Doctor to arrange a more public conference on alchemy at which they might meet the Englishmen. With great hospitality, von Hayek opened his parlors to a



TENIER'S ALCHEMIST.



large assemblage which embraced the alchemists already named, the distinguished physician Christopher Guarinonius, three gentlemen of the privy chamber, namely, Martin Rutzke, Hans Marquardt, and Johannes Frank, the court poet Mardocheus de Delle, and the Vice Chancellor Jacob Curtius, who arose to welcome the English guests of the evening and conducted them to seats of honor. Curtius presided over the informal gathering and discussion was opened by Claudius Syrrus, who related some of his experience in seeking the Philosophers' stone. He said the "red tincture" can be procured only by the conjunction of two substances, ordinary gold (the male principle), and philosophical mercury (the female principle), and to discover the latter was the great problem; he had sought it in common quicksilver, in arsenic, tin, common salt, saltpetre, vitriol, and in the juices of many plants without success; he had also examined human bones, flesh, blood, hair, saliva and other secretions, and he cautioned his hearers against wasting their time and substance on these materials. "It is quite evident," he continued, "that the substance nearest by nature to gold is quicksilver, which needs only to be solidified and to have its color changed to yellow." Now since all metals are composed of three primary principles, volatility, fixedness and metallicity, all that is necessary to be done is to deprive mercury of its volatility and to change its color, for its metallicity is quite equal to that of gold."

Christopher von Hirschberg, replying to the speaker, said: "The Philosophers' stone in its perfection is permanent in the fire, it is not resolvable in any liquor, it has two distinct parts, one volatile and one fixed, it contains *in potentia* gold and silver; it is composed of 2, of 3, of 4 and of 5. Of 5, that is to say, of the quintessence; of 4, that is to say, of the four elements; of 3, that is to say, of the three principles of

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natural bodies; of 2, that is to say, of twofold mercury; of 1, that is to say, of the primary principle of all things which was spoken into existence at the creation of the world." "When about to make use of the miraculous power of the stone, it is necessary to pay great attention to the twelve steps in the process: calcination, solution, separation, conjunction, putrefaction, coagulation, cibation, sublimation, fermentation, exaltation, augmentation, and lastly projection." Then in the metaphorical diction characteristic of his kind, he continued: "The greater the quantity of the Eagle opposed to the Lion the shorter the combat; torment the Lion until he is weary and desires death. Make as much of Eagle until it weeps, collect the tears and the blood of the Lion and mix them in the philosophical vase."

The learned student of occult philosophy, Dr. Leonhard Vychperger von Erbach, then announced that he had just discovered the esoteric meaning of the legend of the Argonautic Expedition, saying: "When ancient Philosophers by poetic parables described the laborious navigation of Jason to the island Colchos, where resided an huge Dragon vomiting fire, which with eyes never closed diligently watched the Golden Fleece, they added this, viz.:—that Jason was taught by his wife Medea to cast to this waking Dragon an edible medicine to be swallowed whereby he should be killed and burst, and that Jason should presently take the Dragon thus slain and totally submerge him in the Stygian Lake. Jason, in this ingenious fable, hieroglyphically represents the philosophers; Medea, accurate meditation; the laborious and perilous navigation signifies manifold chemical labors; the watching Dragon vomiting fire denotes saltpetre and sulfur; and the Golden Fleece is the Philosophers' stone, by the help of which Jason restored health to his aged father and acquired for himself immense riches. By the pills of Medea is meant

the preparation of sulfur and *sal mirabile*; by the total submersion of the Dragon in the Stygian Lake is intimated the fixation of sulfur by *aqua fortis*."

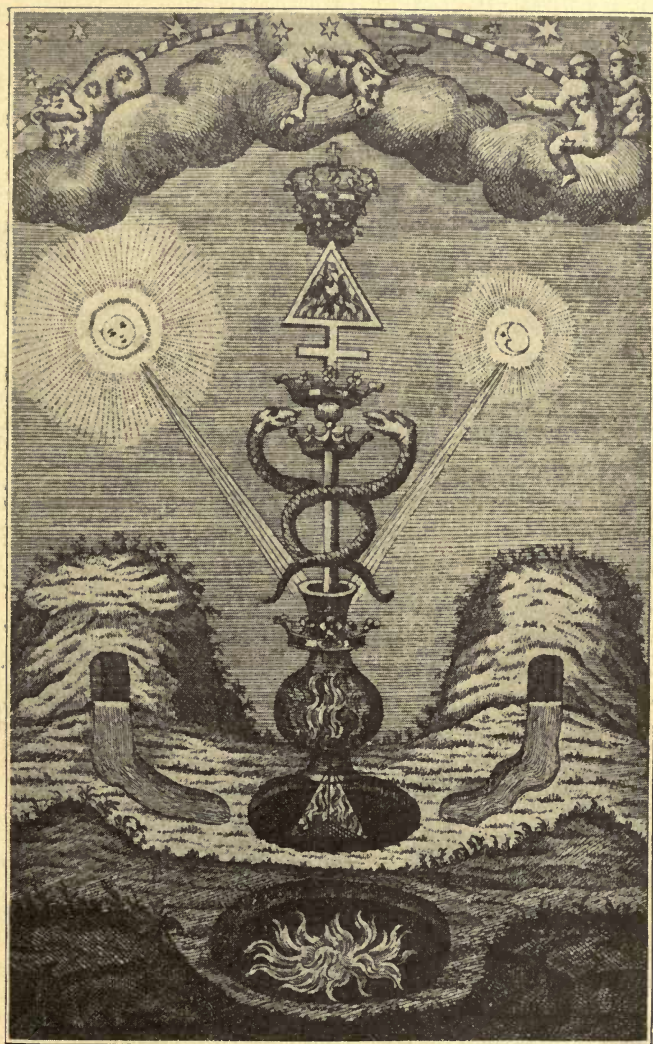
This spagyric interpretation of the Grecian myth won great applause from the assembly, but the learned Dee whispered to Dr. von Hayek: "The speaker has stolen his idea from Dionysius of Mitylene, who died 50 B. C."

Daniel Prandtner next addressed the company and stated he had lately found in an ancient manuscript a recipe for the quintessence composed by the Egyptian "Father of Sciences," Hermes Trismegistus, and although he had not essayed its merits he would communicate it unselfishly to his friends. "Take of moisture one and one-half ounces, of meridional redness, that is the soul of the sun, a fourth part, that is half an ounce; of yellow seyr likewise half an ounce; and of auripigmentum a half ounce, making in all three ounces. Know that the vine of wisemen is extracted in threes and its wine at last is completed in thirty."

Bawor Rodowsky rose with a melancholy air that agreed well with his shabby appearance, and said that for his part he found the old saying true that "Alchemy is a coquette inviting flirtation, but denying favors; an art without art; of which the beginning is avarice, the middle falsehood, and the end either a beggar's staff or the gallows."—but he hoped to escape this tragic end. He was inclined, moreover, to agree with that mystical philosopher, Henry Cornelius Agrippa, who styled alchemy the "sister of theology," for the latter directs man to eternal happiness after death by false paths, dreams and myths, while the former promises to the living long life, health and immeasurable riches by false speculations and useless labor. At this point, von Hustrian was interrupted by Martin Rutzke, who inquired whether the speaker believed the artificial gold made by alchemy to be true gold

or not. Rodowsky said in reply that it would appear at first sight as if the question must be answered negatively. "Since gold is properly generated in the bowels of the earth, it would seem that whatever is not so generated cannot have the same essence; moreover, the substantial qualities can be introduced into the primordial matter only by the celestial sun, which is not the sun or fire used by alchemists. But the real question is whether there can be elicited from the sun, by an artificial process, any seminal virtue which shall possess the power of hardening quicksilver in a moment of time into gold. That gold possesses such seminal virtue is certain, for St. Augustine says that every substance contains seminal possibilities of a specific character, which will always produce certain given effects, whenever the requisite, causal, temporal and local conditions are fulfilled. Hence gold contains the radical virtue sought; this may be developed by digestive heat and the impulse of an overruling intelligence. First, however, the gold must be reduced to its *prima materia* by calcination in a reverberatory fire, and the seminal virtue thus extracted must be sown in sublimed mercurial earth so as to impregnate the latter by fixation, the vessel being kept closed to prevent escape of the spiritual power."

When the handsome, dignified foreigner left his seat, at the invitation of the Vice Chancellor, the assembly gave utterance to a low murmur of satisfaction. Dr. Dee saluted the Chairman with a low bow and apologizing for his ignorance of the colloquial tongue, spoke in Latin. He took a religious view of the studies of theosophy, hermetism and crystallo-mancy, and referring to the Philosophers' stone said: "Whosoever attempteth the search for the glorious Elixir ought in the first place to implore the assistance of the all-powerful Jehovah at the throne of his mercy, who is the true and sole author of all mysteries of Nature. See what Scripture saith:



BIRTH OF THE PHILOSOPHER'S STONE.

From *Der Hermetische Triumph*,
Amsterdam, 1689.



‘He stroke the stone and water flowed out, and he brought forth oil out of the flinty rock.’ Again: ‘To him that overcometh will I give of the hidden manna, and I will give him a white stone, and upon the stone a new name written, which no one knoweth but him that receiveth it.’”

Suddenly dropping this line of thought, Dee informed the expectant audience that his Associate, Kelley, had reluctantly consented to the disclosure of the secret of the projection made in Dr. von Hayek’s laboratory a short time before, and proceeded to give the preparation of the blood-red oil as follows: “Take distilled vinegar of the philosophers, dissolve therein the green lion, putrify and filter the solution, draw off the liquid *in balneo* to an oiliness. Place this in a retort and distil with a gentle fire, then increase the fire until the green lion yield his glue; to the *caput mortuum* pour its phlegm, putrify *in balneo* and distil as before, and there will come over a bloody oil.”

A short pause ensued during which many in the audience wrote rapidly on tablets their notes of this valuable recipe; presently Dee continued, and with twinkling eyes and an amused countenance, repeated the following enigma:—

“A Riddle to you I will propose
Of a common thing which most men knows,
Which now in the earth very reef doth grow,
But is of small price, as all men know.
And that without root, stalke or seede,
Therewith of his kinde another to breede;
Yet of that nature, that it cannot cease,
If you plant it by peeces itselfe to increase;
Right heavy by kinde, yet forced to fly,
Starke nought in the purse, yet good in the eye.
This something is nothing, which seemeth full strange,
Having tasted the fire which maketh the change
And hath many Collours, yet showeth but one;
This is the materiall of our STONE.”

Dr. von Hayek thanked the speaker in the name of those present for his interesting address, and referred to a passage in the writings of his own former master in occult science, Cardano: "Alchemy," he wrote, "contains several admirable things, several useless, several doubtful, several desirable, but none salutary, none efficacious, none of great hope, none of peril, none of which to boast." He thereupon stated that in his long experience as Director of the laboratories of the Imperial court and as examiner of those who claimed to be adepts in transmutation, he had detected many kinds of frauds and he proposed to give a summary of them to put his friends on their guard. Some imposters used double-bottomed crucibles, the false bottom being made of powdered crucible-earth mixed with wax, gold-filings being concealed in the space between. Others devised hollow rods for stirring the molten ingredients, the ends being stopped with wax which melted easily, and thus gold-powder secreted in the rods was introduced into the crucibles. Another adept was detected in dropping into the crucible a piece of charcoal in which gold-leaf had been hidden; one well versed in the chemical art had steeped a bit of charcoal in a solution of gold and when busy about the furnace-fire he slyly threw it into the crucible. Those who pretended to make gold and silver without fire, coals, crucibles and metallurgical accessories, resorted to other ingenious schemes; one used *aqua fortis* in which silver had been secretly dissolved; another had a knife-blade made of two metals soldered together, the golden half painted black with a varnish soluble in alcohol, and the removal of the coating from the gold by immersion in spirits of wine effected the deception. A more unusual trick was to bleach copper with a preparation of arsenic, but the most common of all consisted in using a compound of gold and mercury known as amalgam; when this amalgam is heated to the third

degree, the mercury flies away in the smoke leaving the precious metal behind. Dr. von Hayek, in conclusion, warned his hearers against these deceitful schemes.

This discussion was very differently received by those present; several winked at their neighbors as if to imply they had tried that method themselves, and others made mental notes of the processes for future use in case of need; among the latter was the wide-awake, unscrupulous Kelley.





CHAPTER IV.

RUDOLPH AND DR. DEE.

"He will show you the Devill in a Christal, calculate the nativity of his gelding, talk of nothing but Gold and Silver, Elixir, calcination, augmentation, citrination, cementation; and swearing to enrich the world in a month he is not able to buy himself a new Cloake in a whole year."



ON entering the gorgeously decorated and spacious hall which was crowded with a rich collection of antiquities and art-treasures, Doctor Dee was met by the Vice Chancellor Curtius, whose duty it was to present invited guests to the Emperor. Passing through a corridor, hung with paintings, into a private room, Dee was received by Rudolph, who was seated on a table on which lay a copy of "Monas Hieroglyphica," the book that Dee had dedicated to Rudolph's imperial father many years before, together with the letters Dee had written to his Majesty soliciting the privilege of an audience. These were auspicious omens and forshadowed the affable manner in which the Emperor received the Englishman, who knelt humbly before him; he bid Dee not to kneel and soon set him at his ease.

The personal appearance of the Emperor of the German nation was not at all imposing; he was rather below the average height and slight in body; his face was pallid and his cheeks sunken; his large lips were somewhat irregular, being slightly twisted to the right side; his hair was curly



RUDOLPH II, GERMAN EMPEROR.



but thin and early became streaked with grey, at the age of fifty-four it was silvery-white; his eyes, however, were large and brilliant, and his countenance though rarely lit up by a smile was friendly to those he desired to meet. His manners were courtly as became a Prince, and agreeable when he was not depressed with melancholia. He did not affect luxury in his dress and rarely displayed gorgeous costumes, but on ceremonious occasions he exhibited magnificent and imperial pomp. Rudolph was an accomplished linguist speaking German, Bohemian, Spanish, Italian, French, and Latin, being quite fluent in the dead language owing to his early training by the Jesuit fathers at Madrid.

After an exchange of courtly phrases, Rudolph gave Dee liberty to speak at length and he delivered a grandiloquent speech in Latin telling his Majesty that he had come to Prague to communicate a Divine message; Dee explained that for two and a half years he had held converse with God's holy angels through the medium of a magic crystal and the instrumentality of his "skryer" and that he had been recently commanded by the archangel Uriel to give to the Emperor the following reproof:—

"The Angel of the Lord rebuketh you for your sins; if you will hear me and believe me you shall triumph; if you will not hear me the Lord God that made heaven and earth putteth His foot against your breast and will throw you headlong. Moreover the Lord hath made this covenant with me by oath that He will do and perform: if you will forsake your wickedness and turn to Him your throne shall be the greatest on earth, and the Devil shall become your prisoner." Dee then immediately added: "I conjecture this Devil to be the Great Turk. This is my commission."

Rudolph was at first amazed at Dee's boldness of speech, then angry at his attack, but soon perceived that he had to

deal with a harmless, religious fanatic, and instead of taking umbrage quietly replied that he trusted he would not need earnest protestations to lead a correct life. He also expressed curiosity about the "holy-stone" and Dee soon forgot his fervid religious mood in the quiet conversation that followed on the mysteries of crystallogomancy. He told the Emperor that the use of crystals in divination was very ancient and analogous to the method with mirrors known as catoptromancy. According to Varro, the intimate friend of Cicero, these methods originated in Persia; the Greek mathematician Pythagoras constructed a highly polished steel mirror at the full of the moon, for divination, as early as 500 B. C. Diviners by mirrors were called by the Romans *Specularii*; they were employed by the ill-fated Roman Emperor Didius Julianus (born 133 A. D.) who sought to learn the issue of the battle about to take place between his general, Severus, and Tullius Crispinus, a child being the seer on that occasion. Dee remarked that Rudolph was of course acquainted with the recently published work describing excellent methods for reading the future, by the Italian philosopher Pico della Mirandola. The mirrors used by these and others were, however, of human manufacture, whereas the "shew-stone" was of supernatural origin, having been given him by the angel Uriel. Rudolph expressed great interest and curiosity in the matter and Dee promised to exhibit its powers on another occasion.

The conversation then drifted into astrology, especially on the influence of the zodiacal signs on the human anatomy; Dee criticised the horoscope of the Emperor cast by a Bohemian expert as barbarous and offered to work out a correct one, for which purpose he obtained the necessary data as to Rudolph's nativity. The learned Englishman's lofty, mathematical way of discussing astronomy rather bored his Majesty

who turned the conversation to chiromancy, a topic in which Dee was also proficient.

At the hint from the Vice Chancellor Dee withdrew, first promising the Emperor a second visit, and returned to his house in Gold Alley; soon after he received through the Emperor's private almoner a royal gift of coins, representing more gold than his crucibles and retorts had ever yielded.

Though passionately devoted to the sciences, Rudolph was not a profound scholar; he hired skilled men to work in his laboratories and observatories and hoped to reap the benefit of their success in the creation of gold and in penetration of the future. He had no book-learning aside from the advantages gained by linguistic ability, and he had no disposition to work hard at the literature of the past. His courtiers and salaried scientists were chiefly parasites, and a great contrast to the profound, well-read English philosopher who had settled in Prague. Consequently at the next and many subsequent visits paid by Dee to the Emperor, the Englishman discoursed on the mysteries of spiritualism, and the arcana of hermetic philosophy; they exchanged views on the true sources of the *prima materia*, knowledge of which is indispensable to transmutation; they discussed the best form of Alcahest, the Azoth of Paracelsus, and methods of preparing *Aurum Potabile*. Then, penetrating more deeply into the mysteries of spagyric secrets, they conferred on the doctrine of *palingenesis*, the operation of reconstructing from its ashes a plant or a flower; this phenomenon consists in the evocation of the primitive form of the being, its astral body, by the will-power of the Spagyrist, under the influence of heat and of the *spiritum universalem*. The marvels of *homunculi* also engaged their attention; Dee maintained that these artificial manifestations of the microcosm were merely elemental gnomes, sylphs and undines endowed with bodies

analogous to that of man; and he said he had always refrained from experimenting with *homunculi* owing to the terrible moral responsibility involved. Dee then spoke of the fascinating study of *gamahes*, those natural objects made of marble, silex and other minerals which imitate perfectly man's artistic work. He pointed out the supreme importance of these objects in their relation to transmutation, for the Philosophers' stone is a gamahe in the form of gold.

Discussion ensued on the influence of the Lemures in developing hermetism, and of the real significance of the great Thelesma of Hermes, when the royal pupil of the erudite Englishman found himself getting beyond his depth in a philosophical maze; to extricate himself he suggested that the goal of transmutation might best be reached by obeying the precepts embodied in the ancient saying:

"Labora, opera, ora et invenies."

To this, however, Dee, with the skill of a courtier, added that due weight should be given to another maxim:

"Omni ex voluntate Dei,"

which was one of Rudolph's favorite mottoes.

That famous embodiment of alchemic lore, the *Tabula Smaragdina* of Hermes Trismegistus, aroused a heated discussion inasmuch as Dee ventured to oppose Rudolph's interpretation of it. The 'Father of Alchemy,' Hermes, was identified with Canaan, Noah's grandson; he invented mathematics, astronomy and music, taught the Egyptians the art of writing and gave them legal institutions and religious rites. Moreover he was perfectly acquainted with the Philosophers' stone, and being desirous that posterity should inherit the wonderful gift, he had the process for creating gold engraved on an emerald tablet which was placed in his sepulchre. Many years later it was removed by Sarah, Abraham's wife, and she concealed it in a cave near Hebron where it remained until

discovered by Alexander the Great. The inscription on the emerald read as follows:—

“I speak not of fictitious things but of that which is most certain and true. Whatsoever is below is like that which is above, and that which is above is similar to that which is below to accomplish the miracles of one thing. And as all things were produced by the meditation of one Being, so all things were produced from this one thing by adaptation. Its father is *Sol*, its mother *Luna*; the wind carried it in its belly, the earth is its nurse. It is the cause of all perfection throughout the whole earth. Its power is perfect, if it be changed into earth. Separate the earth from the fire, the subtile from the gross, acting prudently and with judgment. Ascend with the greatest sagacity from the earth to heaven, and then again descend to the earth, and unite together the powers of things superior and things inferior. Thus you will possess the glory of the whole world, and all obscurity will fly far away from you. This thing has more fortitude than fortitude itself, because it will overcome every subtile thing and penetrate every solid thing. By it this world was formed. Hence proceed wonderful things which in this wise were established. For this reason I am called *Hermes Trismegistus*, because I possess three parts of the philosophy of the whole world. What I had to say about the operation of *Sol* is completed.”

In discussing this ancient parable Dee preferred to give a theological interpretation to it, whereas the Emperor maintained it was the key to hermetic philosophy. Dr. Dee then remarked that it reminded him of another enigma of unknown origin:—

“If ye wolle to thys Medycyn aplye,
Make furst hevvy, hard, hotte and drye:
Nesshe, lyght, cold and wete,
Put ham togeder and make ham mete,
Thus may ye spend mor thann the King,
Yf ye have connyng of suche a thyng.”

Doctor Dee found that Rudolph desired to learn more of the famous English and French masters in science, and he informed his Majesty of the celebrated Franciscan monk Roger Bacon who flourished in the thirteenth century. He told

him of Bacon's great learning in every branch of knowledge, theology, medicine, mathematics, mechanics, optics and chemistry; and he spoke of his inventions, the magic-lantern, the burning glass, the telescope and gunpowder, as well as of his wonderful magical powers that enabled him to construct a machine to rise in the air, statues having the power of locomotion, and a brazen head that emitted articulate speech. Rudolph was of course acquainted with Bacon's *Mirror of Alchemy* published a short time before at Lyons. Dee then spoke of the skillful physician, Arnold of Villanova, and of the transmutation he accomplished with the aid of Raymund Lully at Rome in 1288; also of Sir George Ripley, who gained such enormous wealth by the hermetic art that he presented the Knights of St. John of Jerusalem with five hundred thousand pounds of gold, as proved by documents at Malta.

Passing to France, Dee reminded the Emperor of the extraordinary history of the poor Parisian scrivener, Nicholas Flamel, who had labored with crucibles, athanors and alembics for twenty years before he gained the secret of the Philosophers' stone; and then, with the assistance of his faithful wife Perrenelle, on January 17th 1382, about noon, he made a successful projection on one pound and a half of mercury, transmuting it into good gold, more pliable and lustrous than the natural metal. As visible evidence of this claim Dee assured Rudolph that he had seen the handsome archway in the cemetery of the Holy Innocents erected at Flamel's expense, on which were sculptured hieroglyphical figures explaining the whole process; and that when he, Dee, fell ill during a visit to Paris in his youth, he had been kindly treated in one of the hospitals endowed by the pious Flamel with a portion of the wealth secured by spagyric skill.

The learned Englishman delighted the Emperor with the picturesque narrative of another French alchemist, Denis

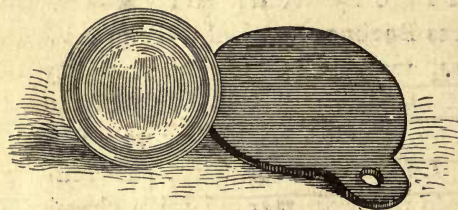
Zachaire, who labored vainly for nearly a lifetime and had spent a fortune before success had crowned his efforts by a projection made on Easter Monday, 1550, when in less than an hour common quicksilver was converted into gold. Rudolph, who was accustomed to see his alchemists maintain fires for seven weeks at a time, only to produce dross, was greatly impressed by this report.

On one occasion the Emperor himself became communicative and conversed on the progress of alchemy in Bohemia in recent years. His Majesty spoke of the chemical laboratory founded at Königgrätz in 1476 by Wenzel von Troppau, in which the dowager Empress Barbara worked with great zeal. Rudolph, though credulous, was aware of the necessity of taking precautions against trickery and told Dee with great glee, of the simple scheme by which Christopher von Hirschberg swindled the opulent Lord von Rosenberg. Hirschberg informed the Prince that gold properly treated with chemicals would increase in quantity if merely buried in the soil and watered with certain secret liquids. Rosenberg loaned the knave eighty gold ducats for the experiment; they were buried in the garden and duly sprinkled with the nasty liquid supplied, but after a few days Hirschberg disappeared and on digging for the ducats it was found that they too had vanished.

Mardocheus de Delle, who with other courtiers was present at the interview, laughed heartily at this narrative and promised the Emperor a poem on the adventures of the noble lord and the wily alchemist. Dee was about to inquire as to the penalty imposed on von Hirschberg, whom he had met in Gold Alley, when conversation was interrupted by the entrance of Martin de Rutzke, bringing with him a beautifully illuminated and rare manuscript rescued at the dispersal of the library of Wresowitz, who was reputed to have been a successful experimenter. The work was entitled "The True

Path of Alchemy," and was written by Antonio of Florence in the year 1475; being couched in exceedingly obscure and mystical language, hinting only at the secrets of the black art, it was particularly admired by Rudolph who ordered his treasurer to pay the high price demanded for it, and instructed his librarian to add it to his valuable collection.

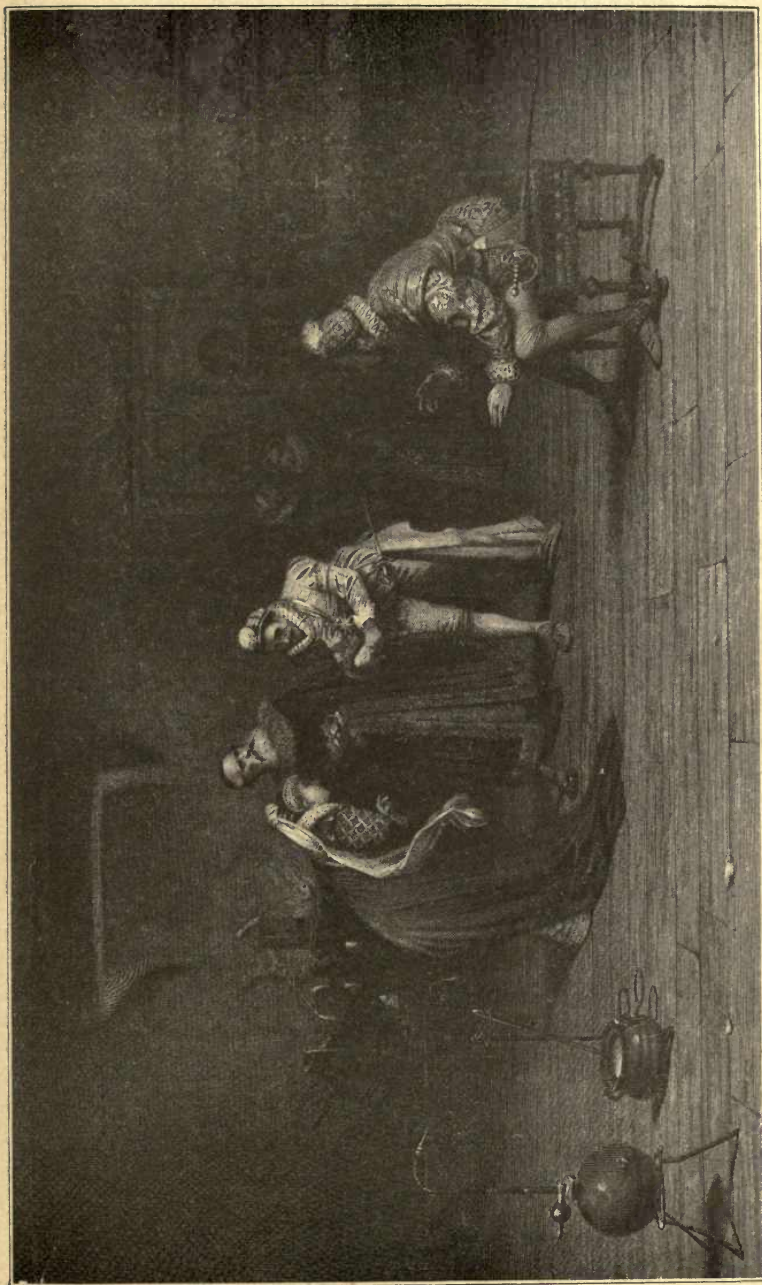
The promised exhibition of the magic virtue of the "holy stone" was not arranged until the 20th of March 1585, and the occasion was invested with great mystery and solemnity by Dr. Dee, and by Kelley, who made his first appearance



DR. DEE'S SHEW-STONE,
Preserved in the British Museum.

before the Emperor. The precious crystal was removed from its velvet-lined, silver-mounted ebony case and laid with due ceremony upon a table; Kelley placed himself before it and after gazing fixedly at the

glittering bauble went into a sort trance; Dee sat at another table furnished with writing materials; the Emperor for once had to play a subordinate part as onlooker and to await the pleasure of the spirits. The only other persons in the dimly lighted room were the Vice Chancellor Curtius and Martin de Rutzke of the privy chamber. After a devout invocation to the Almighty in which Dee besought the good will of the angelic host, Kelley, with halting speech and monotonous drawl, began to dictate both the visual and oral mysteries revealed by the spirits in the shew-stone. At first he recited a chaotic mass of absurd rhapsodies in an incomprehensible jargon well calculated to mystify the credulous Emperor; then followed oracular utterances prophesying Rudolph's success in war, and a dark allusion to a powerful



A SUCCESSFUL TRANSMUTATION.



alliance with a foreign power destined to yield some beneficial and some evil results. Finally Kelley announced that the spirit Zadkiel wished to communicate directly with his Majesty, and the Emperor replacing Dee at the writing table, took down the following recipe for the Philosophers' stone:

"Take common Audcal, purge it and work it by Rlodnr of four divers digestions, continuing the last digestion for fourteen days in one and a swift proportion, until it be Dlafod fixed, a most red and luminous body, the Image of Resurrection. Take also Lulo of red Roxtan and work him through the four fiery degrees until thou hast his Audcal and there gather him. . .

So doth it become Darr, the thing you ask for; a holy, most glorious and dignified Dlafod. But watch well and gather him so at the highest, for in one hour he descendeth or ascendeth from the purpose. Take hold."

Doctor Dee, who had much experience in the language of spirits, explained the obscure words thus: Audcal signifies gold, the *prima materia* in this operation; Dlafod represents sulfur, the essential component; Lulo means tartar and Roxtan means wine, so the phrase refers to philosophical cream-of-tartar. Darr, in the angelic tongue, is the true name of the stone.

In commemoration of this extraordinary séance, Rudolph graciously presented to Dee a fragment of so-called "immortal paper," paper that had been rendered indestructible by immersion in the water of a mineral spring in Silesia. The paper thus acquired properties that protected it from decay as well as from attacks of moths and worms. It had been given to the Emperor by George Kretschmar, a resident of Gold Alley, who was rewarded by a patent of nobility.

The Emperor, the English savant and his companion in charlatanism, probably all felt that:

.... "The pleasure is as great
Of being cheated, as to cheat."



CHAPTER V.

RUDOLPH AND THE "GOLDEN KNIGHT."

"By fire
Of sooty coal th'empiric alchemist
Can turn, or holds it possible to turn,
Metals of drossiest ore to perfect gold."

Milton.

JOHAN DEE'S séance with the "holy stone" in Rudolph's private apartment raised his reputation to a prodigious height; a further display of philosophical instruments whose use was little understood by the Emperor, and of a magic mirror together with an exhibition of Catoptromancy, secured for the Englishman the fullest confidence of this eccentric patron of science. Dee was assigned one of the best equipped laboratories on the Hradschin, and with the useful Kelley went to work with renewed zeal at the search for the Philosophers' stone. At first the costly materials and apparatus were supplied by the Emperor's orders with liberality and promptness, but after some time the foreigners had to avail themselves of the contributions of the gentlemen of the privy chamber, the courtiers and the noble attendants, all of whom had blind faith in transmutation and a willingness to aid in sustaining the labors of such distinguished and skillful adepts.

Dr. Dee's eldest son, Arthur, already initiated in occult lore, became an assistant in the royal laboratory; having

real skill in the management of fire and in all metallurgical operations, Arthur Dee won the highest esteem of the Emperor's trained alchemists. John Dee now found himself so pleasantly situated and profitably occupied that he removed his family, in January, 1585, to a better residence, rented of two sisters at seventy dollars per annum; he conducted his household affairs in a lavish style and began to mingle with the aristocratic residents of the Hradschin and of Old Prague. His high reputation even reached the Russian court; the Czar Feodor invited him to enter his service, promising him a stipend of two thousand pounds per annum, besides laboratory expenses and apartments for his family and household servants. Dee refused this brilliant offer but sent his son Arthur to Moscow, where he became court physician and a favorite with the powerful Czar. While at Moscow Arthur Dee wrote his famous book on alchemy entitled "*Fasciculus Chemicus*," printed at London in 1650, after his return to England.

Had Dee's magic crystal really shown him the future in store for him, he would have accepted the offer of the Russian potentate, for within two years he fell into disgrace and was forced to leave Prague; in an evil hour he began to meddle in court intrigues of a perilous nature. Fierce controversies had long raged in Bohemia between Catholics and Protestants, and Rudolph, influenced by the wily Jesuits attached to the court, promulgated harsh measures against the new party, although a constitutional disinclination to exert his power as monarch disposed him to be tolerant to his political opponents. Theological disputations even penetrated court circles and naturally the staunch Protestant from England took sides against the Catholic party, at the head of which was the Grand Steward George Popel von Lobkowitz and the Papal Legate. Among the courtiers inclined to show

polite attention to the learned Englishman was the Ambassador of Spain, the crafty Octavius Spinola. He secured Dee's confidence by inviting him to dinner, in the course of which he claimed to be a descendant of the noted alchemist Raymund Lully, one of the reputed possessors of the Philosophers' stone, who late in life through religious convictions, went as a missionary to the Moors of North Africa, where he perished at their hands by stoning,—a Christian martyr. This interested Dee immensely and he besought his good friend to use his influence with Rudolph in his favor. Instead of so doing, however, the treacherous Spaniard told his Majesty that Dee was a bankrupt adventurer, a conjurer of infernal demons, who was practising magical arts against the Emperor's person, and whose only object at Prague was to wheedle him out of silver and gold. Some of this Rudolph already knew, some of it was unfortunately true, but the slanderous accusation greatly prejudiced Dee's position at court. A decree of banishment was issued, and Dee and Kelley fled with their families to Cracow where they still had a few friends.

The finances of the Englishmen were now very low, and they were in sore straits to keep up the appearance of opulence so necessary to their pretensions as possessors of the secrets of Hermes. Fortune favored them, however, when they gained the ear of Stephen, King of Poland; in the royal presence Dee again consulted the invaluable "holy stone," under Kelley's excellent management as "skryer," and the spirits announced that Rudolph would soon be assassinated and that Stephen himself would succeed to the imperial throne. This flattering prediction pleased the King, and for a time he furnished money for experiments in transmutation, a large part of which was devoted to the necessary expenses of the English families. But the King of Poland soon grew



EDWARD KELLEY, "THE GOLDEN KNIGHT."



weary of his costly protégés, and for their part they secured a more profitable station with the extremely wealthy William von Rosenberg. Their return to Bohemia was conducted secretly, yet Rudolph heard of it and sent envoys to von Rosenberg to demand their persons, but the powerful noble was bold enough to refuse to surrender them.

While in Bohemia the artful Doctor deemed it prudent to maintain his friendly relations with Queen Elizabeth and to remind her of his skill in alchemy; he sent her accordingly a small disc of silver the size of a ducat, which he claimed to have made out of brass cut from a warming-pan, and a few weeks afterward he dispatched the utensil itself, with a circular hole cut the exact size of the silver disc as tangible proof of his claim. By such transparent tricks sixteenth century imposters kept alive a belief in alchemy among persons of real learning and of experience in worldly affairs.

Meanwhile at von Rosenberg's palatial mansion in Trebona, Dee met with great success, converting pewter flagons and brass platters into silver, as attested by expert silversmiths. At this time Edward Kelley misbehaved shamefully and after a quarrel with Dee, which was quite justifiable on Dee's part, deserted him. The Doctor was in despair having become dependent on his "skryer" for daily spiritual food; he tried to initiate his youngest son in clairvoyance and consecrated him with solemn ceremonies, but the boy was unable to discern visions, and to hear spirit messages in the Shew-stone. Kelley had anticipated this and after a short absence returned to Dee who welcomed him gladly and granted the profligate his wicked demands.

After five years absence from England, John Dee received an invitation from the Queen to return. He had saved some money while with Rosenberg and made the land journey in great style, having three coaches for himself and family,

drawn each by four horses, several baggage wagons and a guard of twenty-four armed horsemen. He left Trebona in March, 1589, and travelled via Bremen, where he received a visit from a famous hermetic philosopher, Dr. Heinrich Kunrath, of Hamburg, and conducted amicable correspondence with the Landgrave of Hesse, to whom Dee presented his twelve Hungarian horses. On his arrival in England, in November, he found that his residence at Mortlake had been pillaged during his absence by a mob who had accused him of necromancy; all his furniture had been broken, his valuable library had been burned, and the philosophical instruments and the curiosities in his museum had been ruined or stolen. Dee endeavored to get compensation from the state, but though the Queen received him graciously at Richmond, he never recovered the value of his property. Being settled again at Mortlake, he was occasionally visited by Elizabeth as of old, and at Christmas, 1590, she sent him two hundred angels, and other presents. Being in favor at court Dee carried on his studies and experiments without molestation, but six years passed before he was given substantial emoluments; in 1595 he was granted the Chancellorship of St. Paul's Cathedral, and a few months later he was installed Warden of Manchester College, "wherein he had the unhappinesse to be often vext with the Turbulent Fellowes of that Colledge". These sinecures he held until his death in the eighty-first year of his age, "deserving the Commendations of all learned and ingenious Schollers, and to be remembered for his remarkable Abilities."

While at the court of Rudolph Dr. Dee had kept Kelley in the background, through mistrust and jealousy, but after Dee's banishment Kelley secured an intimate footing in imperial circles. He was at that time about thirty years of age, a few years younger than the Emperor; he had an

attractive presence to those that overlooked an expression of low cunning, and he acquired a courtly manner which combined with unbounded assurance helped his subtle schemes; he won over the Emperor completely, promising him all sorts of impossible things, allowing him to taste an Elixir of Life of his secret manufacture, and giving him a powder warranted to produce gold, being a portion of that found in an ivory ball at the tomb of St. Dunstan. In his experiments before the Emperor, Kelley used legerdemain rather than metallurgical knowledge, rumor magnified his seeming success and his fame became great throughout Prague. Rudolph gave him a large salary as court alchemist, and endowed him with landed estates; he even raised the scheming charlatan to the dignity of a Knight of the Bohemian Kingdom, the royal patent, dated the twenty-third of February, 1590, naming Sir Edward a "Golden Knight." (*Eques auratus*.)

In devising transmutation schemes to deceive the Emperor the golden Knight was obliged to avoid the well-known tricks that Dr. von Hayek had exposed at the conference on alchemy held in his parlors, and he succeeded in arranging a new one that had the merits of safety, simplicity and originality. The crafty knave informed his Majesty that he should make a projection with his own royal hands, and that he, Kelley, would not touch the crucibles, the coals or the ingredients, nor would he permit himself or his assistant to approach the furnace during the operation. Kelley had had constructed a large wooden box with a strong horizontal partition, ostensibly to hold the apparatus employed; beneath the shallow tray he concealed his brother, who was both short and slight and capable of curling up into a surprisingly small space. When the day arrived for the grand demonstration, the heavy box was placed in the imperial laboratory under Kelley's orders, and from it Rudolph's trusted alchemists

drew the crucibles, tongs, bellows, and charcoal, as well as the litharge, orpiment, borax and salt required for the experiment. Rudolph, who was not without experience in manipulation, proceeded in the usual fashion, and under his direction the fire was pushed to a white heat; then as previously agreed, all persons withdrew from the laboratory for one hour so that the spirits whom Sir Edward had invoked might work their will undisturbed. No sooner had the door been locked and sealed by the Emperor himself, than young Kelley crawled out of his hiding-place, stepped quickly to the furnace, threw into the crucible a quantity of gold-filings and returned to his tool-box, the hinged partition closing after him. The instant the hour had elapsed the royal party broke the seal, unbolted the door, and reentering the apartment found that nothing had been disturbed. The fire was replenished with coals and maintained at great intensity for some time and then allowed to die down; the crucible was cooled and broken with a heavy hammer, in the bottom lay a bright button of gold delighting all beholders. The Emperor was confirmed in his belief that in the Golden Knight he had a prodigy, and Kelley perceived that his brother made an excellent conspirator. As soon as convenient the wooden box was removed to Kelley's private house and the prisoner was liberated from his uncomfortable retreat.

Fully three years Sir Edward lived in imperial favor, busy day and night either in the Hradschiner laboratories or in gossiping and carousing with boon companions at the Golden Ball. He was permitted to make occasional visits to Prince von Rosenberg at his estates near Krumau, and authorities affirm that the Englishman swindled the Bohemian out of the enormous sum of three hundred thousand florins; this is in part sustained by the fact that the foreigner acquired valuable landed estates in the kingdom. Kelley lived in lavish

style and ostentatiously bestowed gifts on persons likely to gossip about his wealth; upon the occasion of the marriage of one his maid-servants he gave away rings, twisted with three gold wires, to the value of four thousand pounds, which caused the English author and antiquarian, Elias Ashmole, to remark, a century later:— "This was highly generous, but to say the truth, openly profuse beyond the modest limits of a sober philosopher."

The good fortune of Sir Edward culminated with this opportunity of fleecing two wealthy dupes simultaneously, and it terminated suddenly through an unforeseen event. A quarrel with one of the Emperor's retainers led to a duel, and unfortunately Kelley slew his antagonist. Rudolph was especially severe towards duellists, and made no exception in behalf of his favorite alchemist. Threatened with the displeasure of a despot, he fled for his life, but was pursued by dragoons, captured and confined in the White Tower on the Hradschin; a short time afterward he was transported to Purglitz and thrust into a horrible dungeon. The miserable man fallen from so high a position, was treated with great severity like a common malefactor; his food was passed into his cell through a hole in the door, and he was refused the consolation of writing materials and books. But even a worse fate was in store for him; the Emperor finding him in his power formed the plan of wresting from him the secret of the manufacture of the gold producing powder. Sir Edward was put to torture and while in bodily agony questioned by the Governor of the Castle. A letter dated the eighth of February, 1592, written by the Emperor's secretary to the Governor, discloses the details to be extorted from the wretched prisoner; the Emperor wished to learn:—

First; in what way can the four pounds of tincture found at Kelley's house be purified and used in projections?

Secondly; how is the potable gold prepared that Kelley gave Rudolph to taste?

Thirdly; how is the apparatus called Tritrop used?

Fourthly; how is white earth, or unripe silver, manufactured?

Fifthly; how are certain precious stones made by artifice?

Lastly; what is the signification of the secret characters in Kelley's note-book?

The unhappy victim could not have answered these queries under ordinary circumstances and torture was unavailing. Failing in this attempt to force Kelley, he was treated more leniently for a while and allowed paper, pens and books.

The news of Kelley's pitiable plight reached Dee at Mortlake, and he besought Queen Elizabeth to appeal to Emperor Rudolph to release the Englishman, but in vain. The prisoner hearing of this fruitless attempt at succor, planned an escape; friends outside bribed the jailors and gave drugged liquor to the sentinels, placed horses at convenient points and made all preparations for flight. Kelley got out of his dungeon but in attempting to let himself down from the outer wall of the castle by a rope, fell, broke his leg and injured himself internally; he was immediately recaptured and again immured in the fortress, where he was shortly relieved of his sufferings by death. Sir Edward was then about forty-two years of age; some authorities say he was an Irishman by birth, and that his real name was Talbot, which he dropped after his punishment for forgery.

While in captivity Kelley composed a treatise in Latin on the "Stone of Philosophers," which he dedicated, October, 1596, "To the most potent Lord of the Holy Roman Empire,

Rudolph II., King of Hungary and Bohemia". The opening paragraph, addressed to his old patron, exhibits his bold arrogance that never forsook him even in distress:—

"Though I have already twice suffered chains and imprisonment in Bohemia, an indignity which has been offered to me in no other part of the world, yet my mind remaining unbound, has all this time exercised itself in the study of that philosophy which is despised only by the wicked and foolish but is praised and admired by the wise. Nay, the saying that none but fools and lawyers hate and despise alchemy has passed into a proverb. Furthermore, as during the preceding three years I have used great labor, expense and care in order to discover for your Majesty that which might afford you much profit and pleasure, so during my imprisonment—a calamity which has befallen me through the action of your Majesty—I am utterly incapable of remaining idle. Hence I have written a treatise by means of which your imperial mind may be guided into all the truth of the ancient philosophy; but if my teaching displease you, know that you are still altogether wandering astray from the true scope and aim of this matter, and are utterly wasting your money, time, labor and hopes . . . Nothing is more ancient, excellent, or desirable than truth and whosoever neglects it must pass his whole life in the shade . . . I venture to hope, however, that my life and character will so become known to posterity that I may be counted among those who have suffered much for the sake of truth."

Shakespeare might have had this arrogant boaster in mind when he wrote:—

"The empty vessel makes the greatest sound."

Elias Ashmole prints in the "Theatrum Chemicum Britannicum" (London, 1652) the "scheame of nativity" of Kelley and shows that it was impossible for this "Philosophus Dubius" to escape the hard fate decreed him by the stars because of the "Dragon's Tayle" in the Ascendant.



KELLEY'S HOROSCOPE.

When the news of Sir Edward's tragic death reached the Hradschin, his entire property was confiscated, and the Emperor's ridiculous poet Mardocheus de Delle wrote some affecting lines which lose their charm if translated:—

"Ein Engelländer, Eduard Kelläus zu Prag,
Von dem ich noch wahrhaftig sag,
Kam zum alten Herrn von Rosenberg
Und gab da vor ein grosses Werk,
Tingirt in lauter Gold ganz hoch.

Der Kaiser Rudolph erfuhr es auch,
Liess vor sich kommen diesen Held,
Gab ihn gross Gut und Geld.
Da der Kaiser mit seinen Augen sah
Was der Natur Kunst vermag,
Das that dem Kaiser behagen,
Liess ihm öffentlich zum Ritter schlagen.
Nach grosser Freud kam Traurigkeit,
Mit Jürgen Hunkler kam er in Streit;
Kelläus den Hunkler hat erstochen,
Das liess der Kaiser nicht ungerochen.
Kelläus ins Gefängniss kam,
Dadurch er auch sein Ende nahm;
Zerbrach in fliehen das eine Bein,
Musst also sterben ganz allein.
Ach wo mag seine Tinctur sein?
Sie ist noch nicht erfunden
Bis auf die heutigen Stunden."





CHAPTER VI.

RUDOLPH'S ART-TREASURES.

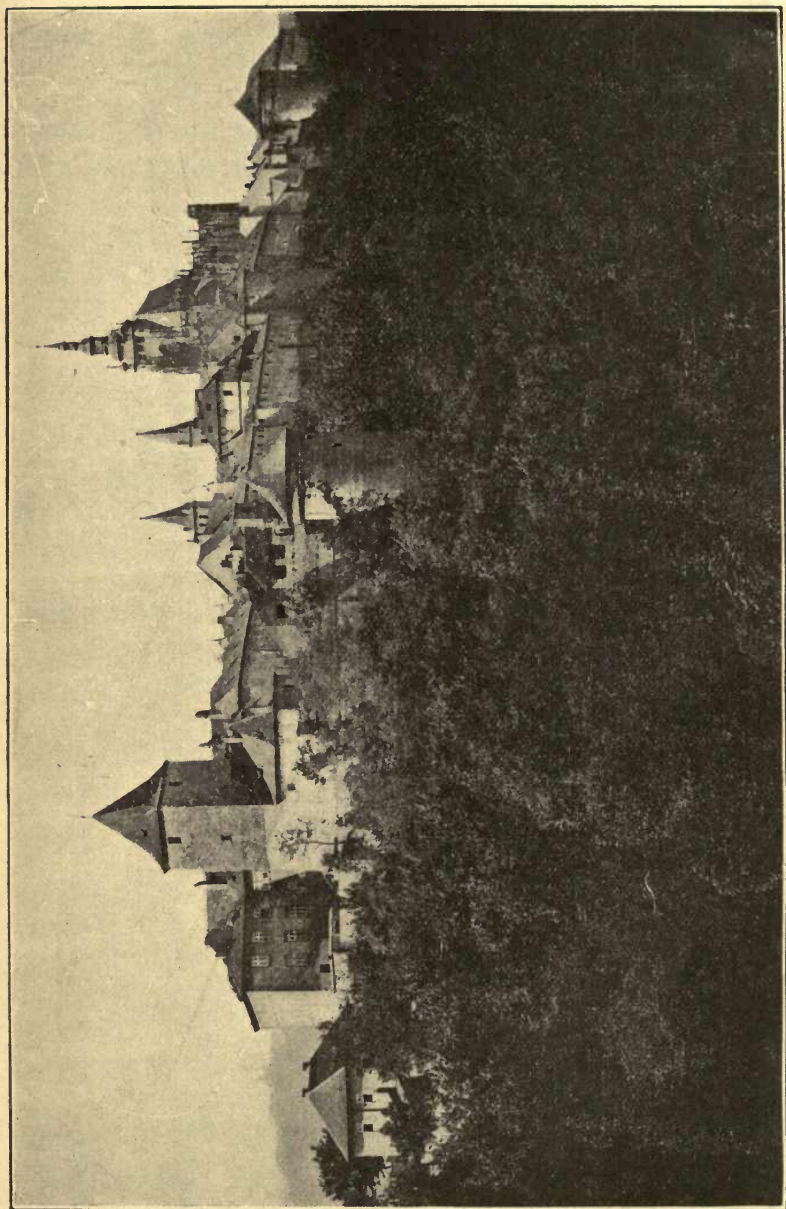
"Wherever power, or pride, or wealth keep court,
Behold this fulsome race resort:
A motley group—a party-coloured pack,
Of knave and fool—of quidnunk, and of quack,

* * *

Dabblers in science—dealers in virtue,
And sycophants of every form and hue.
Low Artists too, a busy babbling fry,
That frisk and wriggle in a great man's eye."

Sir Martin Shee.

THE MÆCENAS of Bohemia, as Rudolph was styled, besides devoting his energies to alchemy and the occult sciences was a liberal patron of art, and in this activity showed the same weakness, extravagance and caprice as when dealing with the disciples of Hermes. He collected at enormous expense, and without definite purpose, beautiful examples of the art of the sculptor and of the painter, as well as costly objects of artistic and historical interest, and crowded them with no attempt at intelligent arrangement into rooms, corridors and great halls of the imperial palace. Rudolph's passion for art was not without precedent on the part of those who had occupied the imperial throne; the stately cathedral of Carl IV., the exquisite Belvedere of Ferdinand, and the Byzantine, Italian and German pictures decorating the same Cathedral and the



THE HRADSCHIN, PRAGUE.



Castle Karlstein, were noble examples of art well calculated to stimulate the beholder to further acquisitions. The Emperor was undoubtedly influenced by the success of the Archduke Ferdinand of Tyrol, for fifteen years Governor of Bohemia, in forming the remarkable collection at the Castle Ambras, the richness of which can hardly be appreciated by the few specimens still preserved in the imperial museum at Vienna.

The nucleus of Rudolph's world-renowned "Kunst-Kammer" was formed by the union and removal to the Hradschin of two great collections, that of Maximilian II. at Vienna, and one gathered by the noted art-connoisseur Jacopo di Strada, of Mantua. This learned antiquarian and numismatist, author of several works on coins and medals, was one of the first to apply knowledge of these objects to the elucidation of history; as a profound student of antiquities he perceived too their historical bearing and did much to establish archæology as a science. While residing in Italy he formed acquaintances with prominent artists, sat for his portrait to Titian (a painting now preserved in Vienna,) and acquired a good knowledge of their masterpieces; under Maximilian he became curator of the Viennese Galleries and within a year after Rudolph's accession to the throne, he was invited to Prague and appointed custodian of the imperial collections. Strada and his son Octavius soon secured great influence at the court; Rudolph placed the utmost confidence in his fidelity and judgment and raised him to the dignity of a Knight with the appellation "von Rossberg". The intimacy was undoubtedly strengthened by Rudolph's passion for Strada's extremely beautiful daughter, who bore the Emperor three sons and three daughters.

Agents in every part of the world sought for the imperial museum natural curiosities, antiquities, and art-rarities; not

only were Germany and Italy ransacked for treasures, but Greece, the Levant, Egypt and even America contributed their quota; from the New World notable specimens of Indian curiosities were secured. Although often hampered by lack of funds to meet national demands of prime importance, the Emperor always found money for the purchase of the articles collected by Strada and his agents. Frequent and large levies were exacted by the crown from the impoverished people, nominally to defray expenses of the exhausting war with the Turks, and it has been suggested, perhaps unjustly, that a portion of this gold was applied to the Emperor's personal hobbies. No extravagance was too great provided the ends were attained; absurdly high prices were paid the wily emissaries who knew how to profit by the Emperor's weakness and credulity.

The cabinet of curiosities and gallery of art grew very rapidly, soon overflowing the great Spanish Hall, the German Hall, and filling the entire floor of one wing of the huge palace. The collections were frequently increased by costly presents from Bohemian noblemen, foreign potentates and city magnates who desired to secure the good-will of the Emperor for personal or political advantage; the Elector of the Palatinate contributed an exquisitely carved ivory altar; Count Fugger sent the Emperor a marble sarcophagus found near Athens, ornamented with reliefs of the battle of the Amazons; Count Khevenhiller, a Spanish Grandee, presented to the gallery several paintings by Titian, by Pietro Rosa and by Parmigianino; and the Burgomaster of Nuremberg added Holbein's valuable picture "Isaac blessing Jacob" as well as Dürer's "Trinity."

Mingled in dire confusion with superb treasures of art of highest rarity and priceless value were worthless objects bought in ignorance and preserved through credulity, such

as monstrous animals having an abnormal number of heads or legs, the teeth of a mermaid captured in the Aegean sea, the horn of an unicorn, the feathers of a phoenix, the claws of a salamander and other natural history specimens of doubtful authenticity. Unscrupulous dealers in fraudulent antiquities palmed off on the Emperor's curator the cap and sandals of Duke Premysl, and two iron nails from Noah's ark!

The horn of the unicorn was actually the tooth of the narwhal; it was valued as a miraculous remedy for certain diseases. A specimen at Dresden was supposed to be worth seventy-five thousand dollars, and on the rare occasions when a piece was sawed off for medicinal purposes two delegates of princely rank were required to be present at the ceremony. The Duke Premysl, just named, was one of the semi-mythical heroes of Bohemia; a peasant farmer, he became the husband of Libusa the first judge of the people, and was called from the plough to the throne. Cosmas, writing in the eleventh century, says: "Premysl's boots are preserved at Vyschrad in the Duke's room to this day."

One of Rudolph's favorite fads was the collection, cutting and polishing of bright-colored stones and precious gems; lapidaries and jewelers sent to the Riesengebirge and other mining regions brought back agates, jaspers and semi-precious stones, which Rudolph had cut and polished so as to bring out the variety and brilliancy of their colors. From such he had a table-top made, of small pieces ornamented with valuable gems, valued at more than one thousand ducats and classed by Dr. Guarinonius as one of the wonders of the world. The Emperor employed many workmen skilled in the arts of the lapidary and these always had free access to his Majesty, while Ambassadors from foreign courts, privy ministers and officers of state often waited for days together to secure an unwilling audience; he preferred to spend long

hours watching the revolutions of the lathes and the swing of the polishing stones, to listening to the appeals of his councillors for advice on religious problems and political exigencies which were threatening disaster to the Empire.

Mineralogy as a science had no existence; an empirical knowledge of the value of ores and of the methods of extracting the useful constituents was all that learned men had attained; it is hardly surprising therefore that Rudolph set a high value on specimens of rocks and minerals having accidental markings on their surface that bore fancied resemblances to natural objects, such as clouds, marshes, rivers, cities, plants, animals, letters of the alphabet, and even the features of the Saints. For these and for lodestones, thunder-stones so-called, and stones believed to increase in size as they reposed on the shelves of the cabinet, extraordinary prices were paid, relatively higher than for the magnificent emeralds, sapphires, opals, topazes, pearls and diamonds that gave real value to the imperial collections. Among the highly prized curiosities were a skull carved out of yellow agate, an ewer and basin of rock crystal bought of Octavio Miseroni for eight hundred thalers, and a bowl of the same translucent material, valued at twenty thousand thalers, now preserved in the royal museum at Vienna.

Josef Svatek, the Bohemian historian, whose essay we follow, likens the Rudolphine cabinet of curiosities to the heterogeneous assemblage in Barnum's museum long time one of the sights of New York city; and with some reason, for besides the objects above named, might have been seen the following: Mummies and other Egyptian antiquities, ethnological curiosities of American Indians, stuffed birds and bird eggs from the four quarters of the globe, ivory carvings of exquisite workmanship in great variety, a small altar of silver inlaid with gold, artistic and unusual clocks, a superb

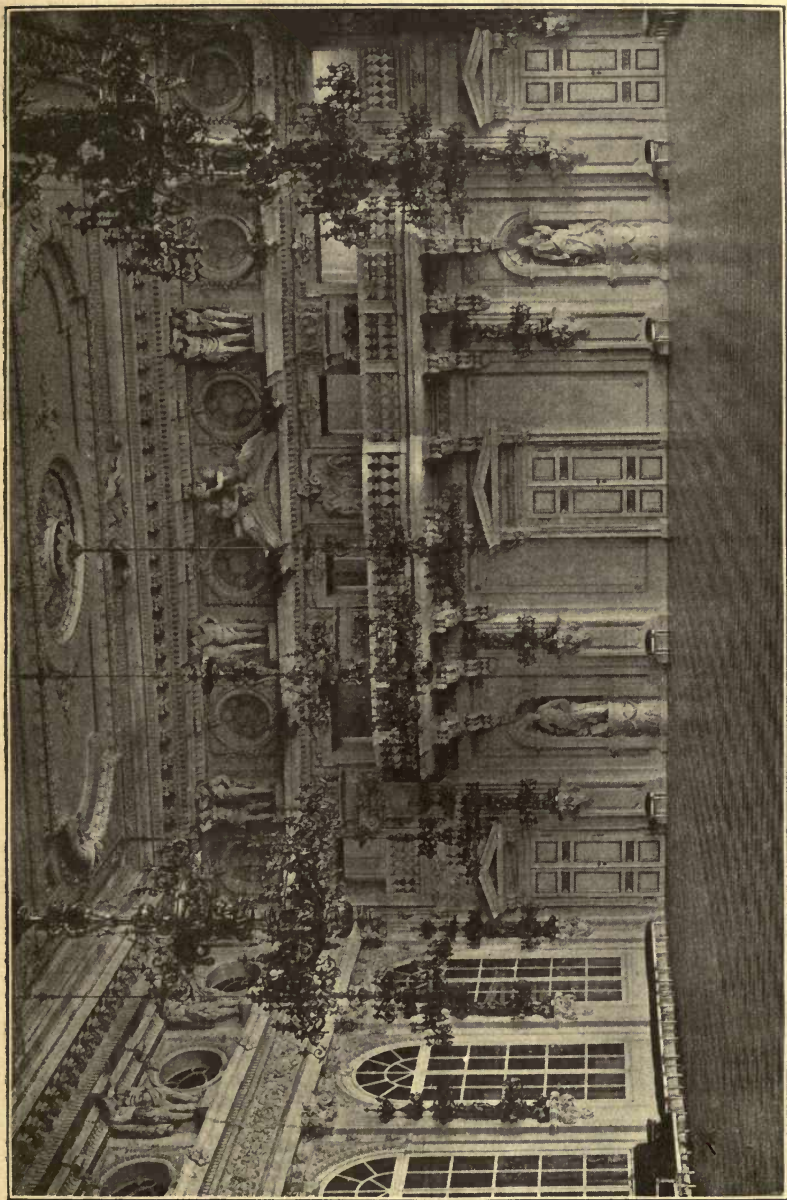
collection of ancient armor and weapons, (now preserved in part at Vienna), a huge Venetian mirror of polished steel, thousands of coins and medals, engraved cameos, oriental porcelains, miniatures, bronze figures, antique vases, alabaster statuettes, marble statues and oil paintings. Perhaps the most famous of the art treasures was the statue of Ilioneus, son of Niobé, bought by John von Achen of a Jew dealer in Rome for thirty-four thousand ducats; it has been ascribed to Scopas; in Rudolph's day it was entire, but through shocking carelessness it became a torso, and in the year 1782, it was pulled out of a dark cellar beneath the Castle and sold at auction for fifty-one kreutzers, a sum equal to about thirteen cents of the money of the United States.

The paintings hanging partly in rooms whose floor-space was crowded with the objects named, and partly in the chambers and salons of the palace, for there was no art-gallery properly speaking, numbered no less than seven hundred and sixty-four canvasses and comprised works by Raphael, Titian, Correggio, Paul Veronese, Leonardo da Vinci, Giulio Romano, and Tintoretto, as well as fine examples of the Spanish and Flemish schools. A number of these had been purchased in 1580 from the Imhoff Gallery at Nuremberg; they comprised a "Saint Bartholomew" by Raphael, a "Bacchus, Diana and Venus" by Paris Bordone of Venice, a painting on wood by von Pentz representing "Abraham, Sarah and Hagar," and Dürer's "Burning of Sodom and Gomorrah," together with a collection of Dürer's drawings and his sketch-book. The Rudolphine gallery was very rich in the works of Albrecht Dürer, no pains being spared to secure them; his "Feast of the Rose-Garlands" (Rosenkranzfest), painted in 1505 for the church of St. Bartholomew in Venice, was bought by Johann von Achen for a prodigious sum and transported across the Alps on the shoulders of

four stout and trusty men, thus reaching Prague without damage.

These magnificent paintings were not arranged according to any system, the names of the artists were seldom attached, though some bore the name of the places where they had been obtained. They were hung on the walls without reference to light, convenience of sight, age or school of painting; when one hall or corridor was filled with curiosities and paintings the adjoining one was opened and the heterogeneous collections stored therein until it in turn became crowded. In justice to Strada, Johann von Achen and other artists, it must be said that this lack of system was due chiefly to the will of the autocratic Emperor who regarded the treasures as his personal property, to be kept strictly private and not designed to promote the study of art. Rudolph had a large number of artists engaged in decorating the palace and in painting easel pictures, but they were of mediocre ability; they profited little by contact with the masterpieces with which they became acquainted and they left no evidence of superior skill. Indeed some of them were guilty of the atrocity of whitewashing over the superb ancient frescoes on the walls of the Castle of Karlstein, and painting on the new surface crude scenes of Biblical history in semi-barbarous style; a life-size figure of the Virgin was beautified (?) by one of the court artists by adding a brilliant sunbeam which covered a portion of the figure in a ridiculous fashion as with a fringed scarf.

The oldest and one of the most eminent of the royal artists was Bartholomew Spranger, born in the Netherlands and trained in Italy. Being recommended to Maximilian in 1575, he executed for his Majesty, and afterwards for Rudolph, important decorative works on the palace walls; the latter monarch enobled Spranger who took the cognomen "van den



GERMAN HALL, ROYAL PALACE, PRAGUE.



Schilden." His best known paintings are the "Allegory on the virtues of Rudolph" (now in the Vienna gallery), "Mars with Venus and Cupid" (also in Vienna), "Diana and Nymphs" (in Stockholm), "Venus served by the Graces" (St. Petersburg), "Cupid and Psyche" (Stuttgart), and portraits of members of noble families.

Johann von Achen, already mentioned several times, was born in Cologne; while quite young he went to Italy and became a pupil of Michelangelo and of Tintoretto, and on his return he secured an appointment under Rudolph. He was noted chiefly for his portraits and historical scenes, as well as for mythological and genre paintings; his canvas entitled "Truth victorious under the protection of Justice" is preserved in Vienna.

Much younger than these artists was the Flemish painter of landscapes and animals, Roelant Savary, who was sent by Rudolph to study for two years in the Tyrolese Alps, an act of liberality which should be remembered to the Emperor's credit. Savary's best works were not produced until after Rudolph's death.

Besides objects intended to please the eye, the imperial museum contained a collection of musical instruments, both wind and string, which were regarded by the court musicians with ill-disguised contempt as of mere antiquarian interest. The most eminent of these musicians, Filippo da Monte and Andrea Mosto, were from Italy, but the musical entertainments of the court were usually intrusted to the Nüremberger, Johann Leonhard Haster, who afterwards distinguished himself at the court of Christian II., Elector of Saxony. The concerts were sometimes given in the large hall used for state balls situated opposite the great "Turnier Haus." In the earlier years of his reign, before hypochondria made Rudolph withdraw from society, the court balls were brilliant pageants,

and quite a retinue of persons were assigned the duty of conducting them under the direction of the imperial dancing-master Alfonso Pasetti of Ferrara.

x For thirty years Rudolph guarded his superb collection of pictures, statuary, antiquities and curiosities with jealous care; its fame attracted many visitors to Prague, but access to the treasures was only obtained through personal friendship with Strada or some of the officers of the court; as the Emperor grew older he protected the collections more closely from the gaze of strangers, and the magnificent masterpieces of art exerted no educational influence on rising painters and sculptors.

Jacopo di Strada received the title of Court Antiquary; he lived in the Castle and dined from the royal kitchen, and received the yearly salary of one hundred gold gulden, a handsome sum at that period. In company with Strada, Rudolph spent entire days in the cabinets, devoting his nights to his astrologers and alchemists. When Strada died in 1585 he was succeeded by his son Octavius, who in turn was followed by Dionysius Miseroni, who had entered the imperial service as lapidary in 1590.

In his later years as his disposition to believe in chimerical problems increased Rudolph paid more attention to the charlatans who imposed on his good nature than he did to the legitimate artists; as has been shown the notorious trickster Kelley, after a few exhibitions of legerdemain, received from him landed estates and a patent of nobility, whereas Johann von Achen, the eminent painter of historical scenes, drew a monthly salary of only twenty-five florins after many years of honorable service; nevertheless von Achen and Spranger were favorites with the Emperor, who often required them to place their easels in his private apartments for the pleasure of watching their work with palettes and

brushes; sometimes too he received from them instruction in their art, for Rudolph himself painted with considerable skill and had the rare faculty of catching the likeness when at work on portraits. History relates that Rudolph's imperial grandfather Charles V., watching Titian at work on a canvas, handed the artist a brush that had fallen to the floor; the eminent painter remonstrated, but his Majesty replied: "A Titian is worthy to be served by an Emperor."

The riches of the Rudolphine "Kunst-Kammer" were well-nigh priceless; the archæologist Jules Cæsar Boulenger, who died in 1628, estimated the gold and silver articles, the precious stones and pearls at seventeen millions of gold gulden. After its founder's death it was sadly neglected and became the prey of the nations at war with Bohemia; the eyes of all Europe were fixed on these treasures, and the final blow of the Thirty Years War was struck with the special object of despoiling them; the Swedish army attacked the Castle on the Hradschin at the very moment of the conclusion of the Peace of Westphalia. A Bohemian writer says the perfidy was undertaken with a view to pillage at the suggestion of Oxenstierna; however this may be, whole ship-loads of precious treasures were sent to Stockholm; the remainder was transferred to Vienna and the other cities of the German Empire, leaving very little in Prague as a souvenir of its former grandeur.

Rudolph's position as an imperial patron of art has been compared to that of the Medici family in Italy, who by liberal orders encouraged the great creative geniuses of the period, but this is giving the German monarch too great credit, as the artists in Prague were mainly mere copyists and exerted little influence on the progress of art.



CHAPTER VII.

SEEKING THE PHILOSOPHERS' STONE.

"The mischief a secret any of them know, above the consuming of coals and drawing of usquebaugh! Howsoever they may pretend, under the specious names of Geber, Arnold, Lully or Bombast von Hohenheim, to commit miracles in art and treason against nature! As if the title of Philosopher, that creature of glory, were to be fetched out of a furnace."

Ben Jonson's Masque.



ALBRECHT VON BOLLSTADT, commonly known as Albertus Magnus, the great oracle of savants in the Middle Ages, enumerated the conditions to be observed by persons seeking the Philosophers' stone; in the treatise *De Alchimia*, written in the thirteenth century, he says:

- I. The alchemist should be discreet and silent, revealing to no one the results of his operations.
- II. He should reside in a private house, in an isolated situation, containing two or three rooms set apart for the experiments.
- III. He should choose his days and hours for labor with discretion.
- IV. He should have patience, diligence and perseverance.
- V. He should perform according to fixed rules trituration, sublimation, fixation, calcination, solution, distillation and coagulation.

- VI. He should use only vessels of glass or glazed earthenware.
- VII. He should be sufficiently rich to bear the expenses of his art.
- VIII. He should avoid having anything to do with Princes and Noblemen.

Much sound advice is contained in these words of wisdom, but unfortunately for the students of hermetic lore they seldom obeyed the last two injunctions, but plunged into the fascinating pursuit of wealth without counting the cost, and were generally very eager to secure the favor of powerful and opulent patrons. A notable exception to this was seen in the case of a Westphalian, whose name has not been preserved, and whose skill in transmutation aroused the cupidity of Rudolph. The Emperor sent a trusty messenger to invite the alchemist to his court, but the man resisted every inducement offered, saying: "If I possess the Philosophers' stone I have no need of the Emperor, if I do not possess it the Emperor has no need of me." The messenger returned to Prague without this witty coiner of epigrams, and Rudolph had to content himself with correspondence with the recalcitrant adept.

Throughout Rudolph's reign intense activity in alchemical research prevailed not only in Bohemia, but in all Europe; nor was the German Emperor the only potentate who coquetted with the enticing and elusive damsel. Frederick, Duke of Wurtemberg, was devoted to the pseudo-science; journeymen alchemists were always welcomed at his palace, and he incurred in futile experiments such enormous expenses that the Chamber of Deputies passed restrictive resolutions. Augustus, Elector of Saxony, not only employed salaried adepts, but worked with his own hands in his private laboratory built in Dresden, known to the citizens as the "Gold-House." He seems to have attained to the wonder working

"tincture," for in 1577 he wrote to an Italian alchemist, Francesco Forense: "I have now reached such perfection in transmutation that I can make daily three ounces of good gold from eight ounces of silver."

One of Augustus' salaried operators named David Beuther was trained in the royal laboratory from his youth, having been taught assaying and employed in the mint. One day when Beuther was working alone in the cloisters that served him for sleeping room, salon and workshop, he saw a cord jutting out through a break in the wall; on pulling it hard some plaster fell down and disclosed a small square hewn stone behind which he found a silver box containing a large supply of the Philosophers' stone. Having tested its virtues and found it powerful in transmutation of base metals and multiplication of precious ones, he neglected his master's work and began to lead a careless, spendthrift life, idling with boon companions. When in need of gold he used a little of the "magistry" in projection; these operations he kept secret for some time, but finally he admitted two of his intimates to witness "the great work" under promise of secrecy. These young men became envious of their friend's good fortune and reported Beuther's discovery to the Elector, who at once arrested him and ordered him to make gold for the royal treasury and to teach him (Augustus) the secret process for manufacturing the tincture. The unfortunate man, being in prison, was unable to satisfy the greed of his despotic master and attempted to escape, but was caught in the act and sent to Leipsic where he was formally indicted and tried. The court sentenced the alchemist to suffer question by torture, to have the middle finger of each hand cut off and to be returned to prison lest he should disclose his secret to some other crowned head or nobleman. Augustus, however, felt sympathy for the young man who had been seven years in



Augustus
Churfürst zu Sachsen



his employ, and sent him a letter beseeching him to reveal the secret process; for reply Beuther wrote on the walls of his prison cell: "Caged rats catch no mice." When this was reported to the Prince he gave Beuther his liberty, but set him at work in the laboratory under a watchful guard; seeing no hope of pleasing the Elector the unhappy alchemist committed suicide in his laboratory during the momentary absence of the guard.

The wife of Augustus, Anna of Denmark, affectionately called "Mother Anna" by the common people on account of her piety and benevolence, was also a zealous seeker after the Philosophers' stone and constructed on her own estate, Annaberg, two splendidly equipped laboratories in which great and small furnaces were continually glowing; one was devoted to the manufacture of substances used in medicine and the other to experiments in alchemy. In the first Paul Luther, the son of the founder of Protestantism, is said to have worked, in the latter labored David Beuther and Sebald Schwertzer, of whom more will be learned presently.

From this neighboring state of Saxony, as well as from Denmark, Italy and the Orient came frequent reports of successful transmutations which became staple topics of discussion at the conferences in Gold Alley, in the court assemblies and in the private apartments of the Emperor. The courtier Martin Rutzke, the poet de Delle, and the physician von Hayek retailed to Rudolph the current gossip of the day, and never obtained a more interested auditor than when they reported the latest success in the hermetic art; thus the Emperor lived in an alchemical atmosphere inhaling with every breath new intoxicants. He rewarded too his faithful gossips more generously than that other great patron of science and art, Pope Leo X, of whom the following anecdote is related:—Having been presented by Aurelius Augurelli with an epic poem in

three books written in praise of alchemy, the Pope gave the poet an empty purse with the remark that he who knew so well how to create gold would have no difficulty in keeping it full.

The character of the tidings communicated to Rudolph can be conveniently surveyed by a study of the policy and craft of contemporaneous alchemists. These wily pretenders to occult power and knowledge of processes for creating at will precious stones, universal panaceas and silver and gold, were usually poverty stricken wanderers who preyed on rich men willing to listen to their captivating claims; they were certainly industrious and some had a blind hope of eventually attaining the goal that they believed others had reached, but the larger number were downright swindlers who resorted to stratagems to bolster up their pretensions. They generally maintained that the small amount of "tincture" in their possession had been given them by a mysterious stranger who appeared and disappeared with equal unconcern, or had been discovered in some secret hiding-place, the half-ruined wall of an abbey or the crypt of an ancient church, where it had been concealed for centuries. To give statements an air of mystery, those possessing the secrets of alchemy were said to have derived their knowledge during sojourn in oriental countries, or through the sheer philanthropy of an Eastern sage encountered in travel.

"A Turkish priest happened to enter a copper foundry where great kettles were being cast; in the furnace were three hundred pounds of molten copper into which he threw a small package containing a powder, and then he immediately withdrew. On cooling the metal was found to be pure gold." No place, no date, no responsible names are given by the writer, and yet this bold assertion is typical of the statements made in support of the art of Hermes.

Descriptions of the Philosophers' stone are not wanting; Paracelsus represented it as a solid of the color of a dark ruby, transparent and flexible, yet as brittle as glass; Berigard of Pisa attributed to it the color of a wild poppy and the odor of melted salt. The power of this protean object to accomplish transmutation was variously estimated; some alchemists boasted of a "magistery" so perfect as to transform one hundred times its weight of mercury into gold; Roger Bacon claimed for it a multiplying power of one hundred thousand, Isaac Hollandus, one million, and the artificial gold thus obtained was itself endowed with equal power. The life-prolonging properties claimed for the "Elixir" were confirmed by the occasional appearance of persons boasting extraordinary age; the adept Trautmansdorf reached the age of one hundred and forty-seven years, living the life of a hermit in the wilderness of St. Michael. Visitors to this secluded habitation were sometimes allowed to see and to handle the precious elixir that had prolonged the old man's vigor, and which he treasured in a golden box; it was about as large as a bean, of a garnet-red color and much heavier than gold, but its most notable property was its emission of light in the dark.

Formulas for the artificial preparation of the Philosophers' stone abound in alchemical writings but without an exception they are clothed in such obscure language as to be incomprehensible; a single example will suffice. Richard Carpenter of Worcester in 1477 wrote thus: "Take the clear light of Titan magnesia, and the bright red green which is the *sulphur vive*, or Philosophers' gold; join them with the water of light, let no vapor escape and keep the fire like the sunbeams in summer. In three hours you will see marvelous colors, black, white, red and citron; let not your vessel be open until you have created the blessed stone."

Secrecy was an important condition of success, secrecy as respects the ingredients and preparation of the "tincture," its usage and the very possession of it. Injunctions to silence often occur, none are better expressed than the following:

"Trust not thy friend too much, wheresoever thou goe,
For he that thow trustest best sometyme may be thy foe."

Pater Sapientiæ.

Augustus, the Elector of Saxony, died in the month of February 1586, leaving a fortune of seventeen million thalers, sufficient evidence in Rudolph's eyes of success in transmutation. In the last years of his reign, Augustus had been much interested in the labors of one of his hired alchemists, Sebald Schwertzer by name, who appeared at Dresden with a rare manuscript as his certificate of learning and an appeal for an opportunity of exhibiting his proficiency. On the fifth of May, 1585, in presence of the Elector and a select company of his friends, three marks of quicksilver were converted into gold, a portion of which the Elector presented to the Countess Hallach. The director of the treasury calculated that the tincture had transmuted 1024 times its weight of metal. Schwertzer, encouraged by this projection, proposed to manufacture ten marks of gold daily, but the death of Augustus interrupted the undertaking; the alchemist removed to Prague where he was cordially welcomed by Rudolph, who appointed him Director of the imperial mines at Joachimsthal and raised him to the rank of noble.

During Doctor Dee's sojourn at the court of Rudolph, news arrived from Rome of a wonderful feat accomplished by Leonhard Thurneisser, son of a Swiss goldsmith and a disciple of Paracelsus. This arrant knave began his adventurous career in his youth by selling to a Jew dealing in silver and gold some gilded bars of lead, a speculation that led to the flight of the "confidence man" from prosecution in the courts



LEONHARD THURNEISSER.



of justice. He then journeyed through England and France, associating with alchemical charlatans from whom he learned the tricks of the profession; returning to Germany as a proficient, he had the good fortune to secure the confidence of the Archduke Ferdinand, who generously defrayed his expenses of travel throughout the Orient in search of the secrets of Hermes. Thurneisser did not find the great magistrery, but acquired some knowledge of medicine which he practiced with immense success; he entered also the service of the Elector of Brandenburg, becoming director of the laboratory founded by the Elector's wife. His medical practice gained for him great wealth which he squandered in luxurious living; he became the most popular physician in Berlin, the oracle of the rich and the friend of the poor, to the great displeasure of the old established practitioners, who combined to expose his quackery so successfully that he left the city in haste. Resuming a wandering life he reached Rome where he was invited to dine with Cardinal Fernando di Medici, who afterwards became Archduke of Tuscany. At the dinner table he transmuted half an iron nail into gold, delighting and astounding the distinguished company; the process was simple, he warmed the nail, dipped it into an oily liquid, and on withdrawing it one half was found to be of gold. This probably means he was provided with a nail made of gold cemented to iron, from which the solvent removed a black varnish and disclosed the yellow metal. This bi-metallic nail was long preserved in the castle accompanied by a certificate signed by the Cardinal, and dated Rome, November 20th, 1586. Thurneisser afterwards died in poverty in a cloister, scarcely meeting with his deserts.

The events taking place in the laboratories of the palace, the failures and successes of the residents of Gold Alley, as well as of the journeymen alchemists visiting Prague, were

made known to the Emperor through the Director of the imperial laboratories, Dr. von Hayek, and by the gossiping poet laureate, Mardocheus de Delle. (The Italian favorite, who was more successful as a jester than as a writer of rhymes, reported how Benedict Töpfer, commonly known by his Latinized name "Benedictus Figulus," had made the important discovery that gold could be made out of Jews. He had found by experiment that 24 Jews yielded by proper treatment one half ounce of gold, so that by repeating the process daily with 100 Jews, making due allowance for holy-days, 624 ounces of gold could be made in twelve months!).

Doctor von Hayek gave his Majesty particulars of a crafty scheme played on the residents of Gold Alley by an unknown Arabian who made a brief sojourn in Prague. He appeared unannounced, coming direct from the Orient; after establishing himself in grand style on the Hradschin and making the acquaintance of the better sort of hermetic students, astrologers and occultists, the gorgeously apparelled and polished Arabian invited four and twenty of them to a sumptuous supper at his residence. When the feast and much wine had been consumed, the foreigner proposed making an experiment of the "multiplication" of gold in the laboratory adjoining his apartments; this being agreed to, he suggested that each one present should contribute one hundred marks to the enterprise, a perfectly safe proceeding inasmuch as the process would increase the weight of metal ten-fold. Each one present eagerly paid in his quota, some sending home for their purses, and the richer ones loaning to the poorer the sums necessary to equalize the shares; the Arabian received the golden coins, added his own contribution, and apparently put them into a large crucible, together with salt, *aqua fortis*, copperas, eggshells, mercury, lead and dung. The crucible was then placed in a furnace already glowing, and the whole company

watched it with intense excitement and high hopes, the practical alchemists pressing the Arabian to let them assist in maintaining the fire. Suddenly a frightful explosion took place scattering live coals and filling the room with vile-smelling, suffocating gases that quickly drove most of the experimenters out of doors. Great confusion ensued, one or two men had been burned by coals, more had been nearly asphyxiated by the poisonous fumes, and those who were uninjured sought to relieve the sufferings of their friends; for a short time the experiment was forgotten, as well as the Arabian who seemed to have disappeared. Finally lights were obtained and the boldest of the company penetrated the laboratory still reeking with noisome vapors, only to discover that the clever Arabian had indeed fled, and had taken with him the twenty-four hundred marks; a broken crucible smothered in coals lay before the half-ruined furnace, and an open window leading to a side-alley showed the manner of his departure. Needless to say this wearer of a fez was never again seen in Prague.

At the time when Sir Edward Kelley was in high favor at Rudolph's court, the Emperor summoned from Vienna a Greek alchemist who called himself "Count" Marco Bragadino, but whose real name was Mamugna. He had made many dupes in Italy by his skill in transmutation-tricks and in conjuring evil spirits, as well as in the Austrian capital where he created a great sensation. Settling in Gold Alley, he never went through the streets without being accompanied by two huge and fierce black mastiffs, which the common people regarded as his familiar spirits. "His Excellency the Count," as he liked to be called, met with no great success, however, because he was quite overshadowed by Kelley then in the zenith of his fame, and he soon left Prague for Munich where he swindled the Duke of Bavaria out of a large sum. Being

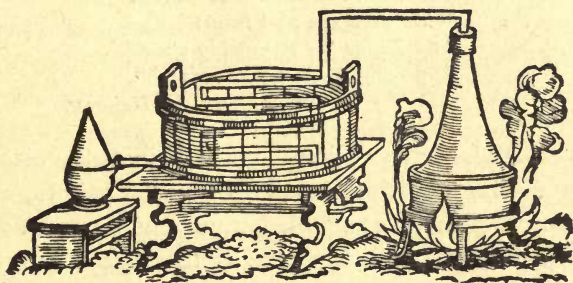
detected, however, he was arrested and condemned to death, and his execution was carried out in a peculiar way as a warning to all alchemical imposters: the Count was clothed in garments decorated with tinsel and hung on gallows covered with shining brass by the aid of a yellow rope. His two ferocious dogs were shot to death at the foot of the gibbet, and their bodies were thrown into the same grave as that which formed the resting-place of Bragadino.

This took place in 1591, and six years later George Honauer, a youth of twenty-four years, who rejoiced in many high sounding titles, was caught in attempting to cheat the Duke of Wurtemberg, and executed in a similar manner.

In midsummer, 1590, the citizens of Prague were startled by the ostentatious appearance of an adventurer known as Alessandro Scotta; he paraded the streets in a magnificent coach lined with red velvet, followed by three carriages full of retainers and servants, besides outriders and an armed body-guard; more than forty richly caparisoned horses were required for his suite. He rented a superbly furnished dwelling in Old Prague, and gave out that this opulence was a small matter to one possessing the Philosophers' stone. Noblemen and courtiers hastened to make his acquaintance, and he soon got an introduction to Rudolph who gave him the use of a chemical workshop. He met with little success, however, for two years later he was reduced to exhibiting sleight of hand and common jugglery to a gaping crowd in the public streets of the city. His subsequent career in Coburg, where he duped the young wife of the Duke, and in Italy, the land of his birth, brought him no credit and less affluence. Scotta seems to have died a natural death, but many of the unprincipled charlatans paid a terrible price for their treachery; some, after suffering horrible tortures, committed suicide in a prison cell; Sebastian Siebenfreund, a contemporary of

Thurneisser, having indiscretly shown his skill in transmutation before "lewd fellows of the baser sort," was murdered in a shocking manner and robbed of his treasure; and Anna Maria Ziegler, whose sex did not save her, was executed in a horrible way by the cruel Duke Julius of Brunswick-Luneburg, being roasted alive in an iron arm-chair.

"Sechs Stück thun aus Alchemy folgen,
Müh, Rauch, Hunger, Gestanck, Frost und Galgen!"





CHAPTER VIII.

THE MAN WITH A SILVER NOSE.

“Then he his eye erected
Into the night so far,
And keen the course inspected
Of every twinkling star;
The stars his fame transported
Wide over sea and land;
And Kings his friendship courted,
And sought his islet’s strand.”

Heiberg.



SHORTLY after sunrise on a brilliantly clear day, a distinguished company of philosophers, noblemen and princes assembled upon the broad summit of a hill that formed the central point of the little island of Huen off the coast of Denmark; it was the fifth of August, 1576, just two months before Rudolph II. ascended the throne of Germany after the death of his father Maximilian. The immediate surroundings of the Danish party were most picturesque; the island, six miles in circumference, was covered with a bright green sward “as trim as any garden lawn,” on which browsed horses, cattle and sheep; under cover of the woods sported deer, hares, rabbits and partridges in abundance, and the only other inhabitants of the sea-girt islet were the forty souls who inhabited a hamlet on the water’s edge; from the top of the hill which terminated in a

plain, views were had of the coast of Zealand six miles away, and of the broken mainland of Sweden only half that distance.

The company had not been drawn to this beautiful spot for the purpose of hunting, nor for the enjoyment of the beauties of nature, but solely in the interests of science; they stood near the foundations of a great building, only the ground plan of which was visible, while nearby lackeys in rich liveries arranged a substantial breakfast of which foreign wines formed an agreeable part.

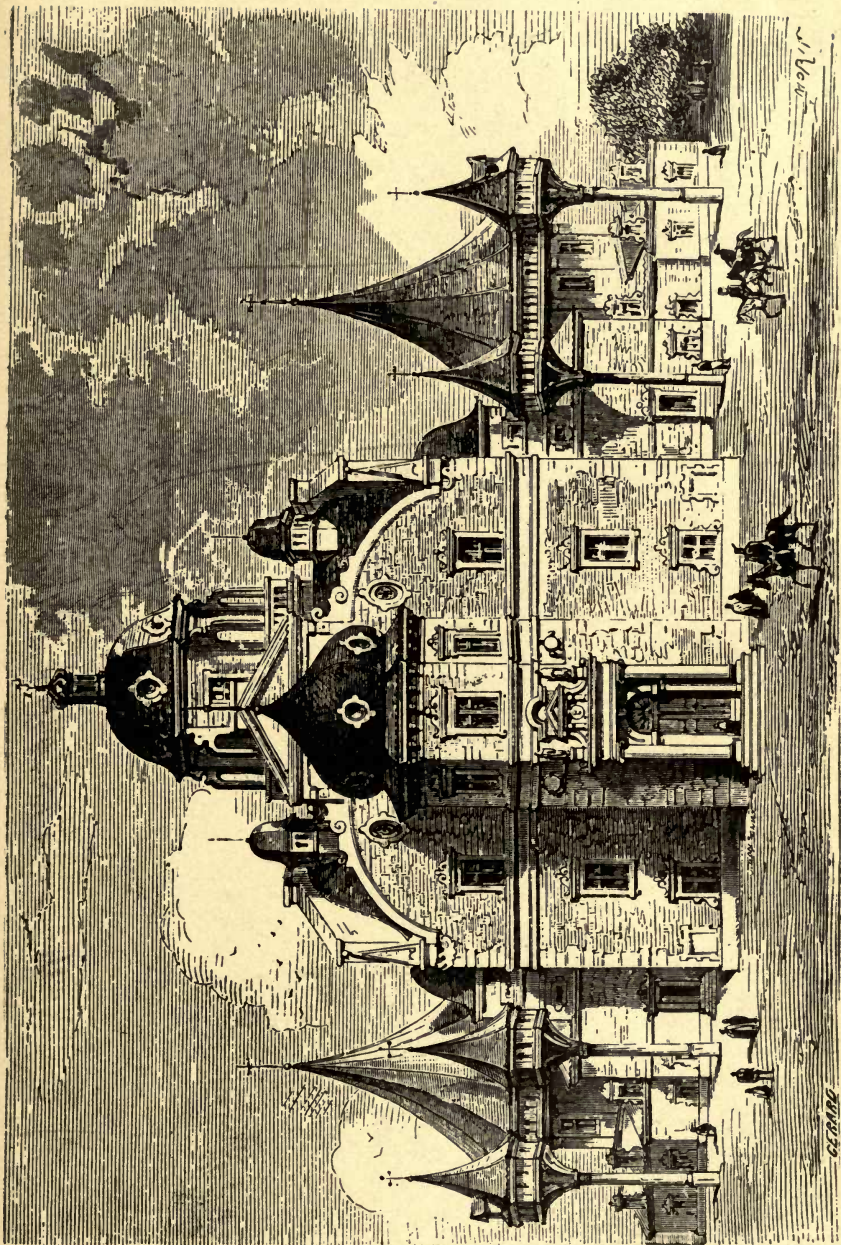
The principal personages in this group were Frederick II. King of Denmark and Norway, then in the prime of life, and the celebrated astronomer Tycho Brahe, together with Charles Danze, the French Ambassador, and members of the Danish court interested in the advancement of science. The occasion was the laying of the corner-stone of the magnificent structure known as Uraniborg, or "City of the Heavens," destined to become under Tycho Brahe the centre of astronomical learning. Brahe was then just thirty years of age and had already gained an enviable position in the scientific world; a native of Knudsdorp, near Helsingborg, he was sent by his uncle and guardian to study philosophy and rhetoric at the University of Copenhagen with a view to entering the profession of law, but an event occurred on the 21st of August, 1560, after the young student had been sixteen months at College, which aroused in him an interest in astronomy that changed his whole career. This was the long predicted eclipse of the sun, a phenomenon believed at that time to exert direct influence on the destiny of nations and the fortunes of individuals, and it is thought that Brahe was attracted to the study of celestial bodies by the claims of astrology quite as much as by the scientific aspects of astronomy. While dutifully reading law all day with a preceptor, at night he secretly

observed the movements of the planets and stars, and studied mathematics with intense ardor.

On the death of his uncle, Brahe inherited a fortune and found himself free to follow his cherished plans. While travelling in Germany an unhappy incident nearly cost him his life; a quarrel with one of his own countrymen at Rostock led to an appeal to the sword; they fought the duel in total darkness, and Brahe's antagonist cut off the whole front of his nose producing a horrid disfigurement which was only partly remedied by cementing to his face an imitation nose cleverly constructed of gold and silver; youthful folly thus earned for him the soubriquet of "The Man with the Silver Nose."

Two years later Tycho Brahe settled temporarily in Augsburg where he secured the friendship and financial assistance of Paul Hainzel, burgomaster of the city and a devotee of astronomy; they constructed a huge quadrant for the purpose of determining the altitude of celestial orbs, a sextant for measuring their distances, and other instruments superior to any then extant, with which many excellent observations were made.

Returning to Denmark, Brahe established a new observatory at his uncle's castle and advanced greatly the knowledge of astronomers; his reputation secured for him an invitation from the King to give a course of lectures on astronomy, which he accepted and he greatly interested his auditors by defending the superstitions of astrology. He then visited southern Germany, Switzerland and Venice intending to select a permanent residence; on his way northward he passed through Ratisbon just in time to witness the brilliant ceremonies at the coronation of the Emperor Rudolph II, on November first, 1575. He made the acquaintance of the monarch, was invited to dine with him, and on that occasion cast his horoscope, from a study of which he advised the



URANIBORG.



Emperor not to marry as his sons would bring him only misfortune, a prophecy that was destined to be fulfilled. Had the astrologer been truly able to foresee his own destiny by observation of the stars, he would have known that his attendance at these festivities in honor of Rudolph formed the first link in a chain of events which was to terminate with his death at his Majesty's court.

Soon after his return to Denmark, Frederick II, appreciating the claims of science, summoned Brahe to Copenhagen and offered to give him a grant for life of the Island of Huen, and to construct and supply with astronomical instruments an observatory on a scale of liberality previously unknown, also to furnish a residence for his family and his assistants. The next twenty-one years of Brahe's life were passed in the study of the heavenly bodies at the superbly equipped and palatial Uraniborg; his patron, King Frederick, gave him a pension and productive property, which he did not use selfishly, for he entertained with great hospitality the visitors who sought to greet the first astronomer of the age, and he educated and supported numbers of young men under his own roof, training them to observe, to think and to reason. At Uraniborg his skill and assiduity as an observer, his vast collection of notes on the planets and his improvements of the lunar theory, won for him a position unsurpassed by any astronomer of ancient or of modern times.

The Danish poet Peter Andreas Heiberg has pictured in verse the Uraniborg observatory:—

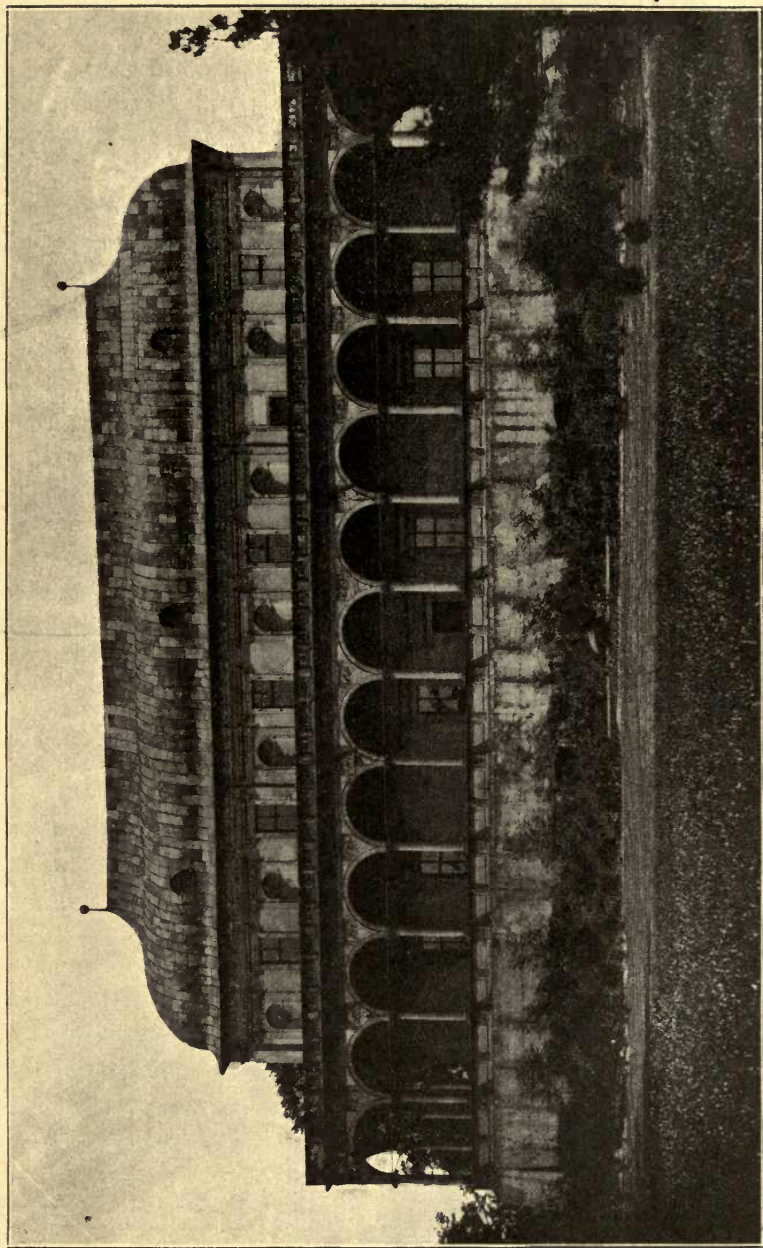
"A gate in the wall eastward
Showed like a mighty mouth;
There was another westward,
And spires stood north and south.
The castle dome, high rearing
Itself, a spirelet bore,
Where stood, 'for the wind veering,
A Pegasus, gilt o'er."

"Towers which the sight astounded
In north and south were placed,
Upon strong pillars founded,
And both with galleries graced.
And there they caught attention
Of all who thither strolled.
Quadrants of large dimensions
And spheres in flames that rolled."

Unhappily Brahe's generous patron, King Frederick, died in 1588 and was succeeded by his son Christian IV, a boy of eleven years of age; the Danish courtiers, jealous of Brahe's pension and privileges, gradually undermined his position in the kingdom, poisoning the mind of the youthful sovereign against the scientific establishment at Huen and its Director. Brahe was deprived of his pension and his estate; and after suffering many indignities at the hands of the influential noblemen surrounding the infant King, he resolved to forsake his ungrateful native land. Accordingly in 1597 he removed his instruments, library and chemical apparatus from Huen and put them on board a ship hired for the purpose; then, with his wife, five children, servants, several assistants and pupils, including his future son-in-law Tengenagel and the mathematician Longomontanus, he set sail from Copenhagen and landed at Rostock, the scene of his early folly that had resulted in a silver nose.

Being thus cast adrift with limited resources and expensive responsibilities, he found need of a wealthy patron and sought the favor of the Emperor Rudolph whose scientific court was the admiration of all Europe. Knowing of Rudolph's fondness for machines and for chemical experiments, Brahe dedicated to him his newly completed work on the mechanics of astronomy, and added to it an account of his labors in chemistry; the date of the dedication is January 1598, but the book was first published four years later.* Accompanying this

* *Astronomiæ instauratæ mechanica. Norimbergæ, 1602.*



THE BELVEDERE.



manuscript was a copy of his catalogue of 1000 stars. These proofs of his attainments in science were hardly necessary, however, to secure the goodwill of the German monarch who had long watched the career of the Danish astronomer. Coroducius and Dr. von Hayek had corresponded with Tycho Brahe, and the latter influenced the Vice-Chancellor Curtius in his favor; an invitation to the Hradschin was extended to Brahe by the Emperor, through his private secretary Barvitijs, promising the Dane every facility for prosecuting his astronomical studies, as well as a stipend and a residence for his family.

Rudolph's invitation was the more cordial on account of Brahe's reputation as an astrologer and of his predilection for alchemical pursuits, which beliefs and practices were not inconsistent at that period with learning. The astrological studies of the illustrious Dane led him to attribute the great plague that devastated Europe in 1566 to the conjunction of Jupiter and Saturn in August three years before; he prophesied that a lady of high rank would be killed by a horned beast, and one year later a Countess was murdered by her jealous husband; and when he calculated that Frederick II of Denmark would die in the year 1593, and his Majesty actually passed away in 1588, Brahe said that the demise occurred simply because "death was too previous." This astrological gammon did not prevent Brahe from holding a pious belief in an over-ruling Divine Providence.

Tycho Brahe was also a practical alchemist working with crucibles, athanors and alembics at what he called "terrestrial astronomy," the planets and the metals being closely allied, as indeed their present names show. During his brief residence at his uncle's castle of Herritzvold he fitted up a laboratory and conducted experiments on gold and silver, satellites of the earth that promised pecuniary rewards. And afterwards

at Uraniborg a laboratory was constructed in the crypt beneath the building, in which no less than sixteen furnaces were disposed for every degree of heat desired. He never published the results of his researches in alchemy, giving as a reason one frequently alleged by others; "on consideration," he wrote, "and by the advice of most learned men I thought it improper to unfold the secrets of the art to the vulgar, since few persons are capable of using its mysteries to advantage."

As most physicians were astrologers, astronomers also practiced medicine; Copernicus had done so, and it is not strange to find that Brahe had invented an Elixir which was widely sold as a remedy against the epidemics then ravaging Germany. The Emperor Rudolph having heard of this precious panacea sought of Brahe the secret of its preparation, whereupon the latter addressed a long letter to his Majesty communicating the formula, and begging him to keep the secret and to reserve to himself the curative power. The prescription called for Venetian treacle, which was subjected to several chemical operations, and to which was added either tincture of corals, or of sapphires, or of hyacinths, or a solution of pearls, or best of all a solution of potable gold; but to make the nostrum of universal application for all diseases that could be cured by perspiration, it was necessary to combine it with a preparation of antimony.

In 1599 soldiers and refugees from the seat of the Turkish war on the borders of Hungary, brought back to Bohemia the seeds of the dreaded plague, and soon the city on the Moldau was a victim of this frightful epidemic; Rudolph, who always had a superstitious fear of death, fled with a small part of his court to Pilsen where he remained more than nine months. Tycho Brahe, on his way to Prague, received alarming reports of the mortality in Bohemia and lingered in

Germany until the pestilence ceased; he had left his wife and daughters with his hospitable friend Count Henry Rantzau, at the Castle of Wandenberg near Hamburg, and he had with him his sons, his pupils, together with a selection of the more portable astronomical instruments. On arriving at Prague he was kindly received by the Emperor who placed a handsome residence at his disposal, granted him a yearly stipend of three thousand crowns, promised him an estate, and gave him the use of the picturesquely situated Belvedere, the "Lustschloss" of Ferdinand, for an observatory. It was in the spacious halls of this beautiful building that the cabinet of curiosities was placed, and Svatek says the ever increasing collections crowded Brahe out of the palace; at all events the place was found unsuitable for an observatory and the Emperor granted the astronomer the choice of several castles, and he selected Benatek, situated about seven leagues from Prague, built on a hill and commanding an unobstructed view of the heavens.

Before settling in his new surroundings, Brahe sent Tengel to fetch his wife and family from Hamburg, ordered the rest of his instruments, and wrote to David Fabricius, Longomontanus, John Kepler, and some students known to be good computers, inviting them to assist him in founding a school of astronomy and of chemistry.

The Castle of Benatek was soon bustling with a number of people from afar; Tycho Brahe's large family, a retinue of servants, pupils, assistant observers, old friends of the astronomer eager to share in his renewed good fortune, as well as Professors from Universities desirous of making the acquaintance of the first astronomer of Europe; all these guests sat at the table with the hospitable master, enjoying the bountiful supply of good things to eat and fine wines to drink.

Work was planned for each one; the youthful George

Brahe, an earnest student of chemistry, was to supervise the construction of a laboratory; Longomontanus was to observe the moon and its phases; Kepler to study Mars; while Tenggengel, the fiancé of Elisabeth Brahe, naturally busied himself (as von Hasner wittily remarks) with an earthly Venus. Unfortunately Brahe was of a sanguine temperament, quite obstinate, and inclined to be irritable; moreover he was in his fifty-fourth year, whereas Kepler, his brilliant assistant, was but twenty-nine, and the peace of this complex household was broken up by a quarrel which led to a withdrawal of the younger from the establishment, as it proved, however, only temporarily. Another serious blow to the plans at Benatek fell when the Emperor commanded the illustrious Dane to remove to Prague and to reside nearer his imperial person, for consultation on astrological matters as well as to obtain greater insight into astronomical labors. After the removal of the instruments to the royal gardens on the Hradschin, and of his household to the dwelling of his friend Curtius, recently deceased, Brahe resumed his observations, but notwithstanding the liberality of the Emperor and the kindness of his friends, he felt that he was a stranger in a foreign land; ignorant of the language of the people, experiencing many inconveniences and some disappointments, his disturbed mind enfeebled his body and he fell a victim to disease which terminated fatally on the twenty-fourth of October 1601. By order of the Emperor the body of the illustrious astronomer was buried with great pomp in the principal church (Teynkirche) of Prague, where a full length brass is still to be seen.

The great collection of books and instruments left by Brahe was bought of his heirs for twenty thousand thalers, of which only four thousand were paid down, and twelve years later twenty-three hundred more were paid to the now



MONUMENT TO TYCHO BRAHE.



impoverished family, who left Bohemia under very different circumstances from those attending their entrance. At the capture of Prague by the Elector Palatine, eighteen years after the death of Tycho Brahe, the astronomical apparatus was in part destroyed and in part carried off or devoted to other uses.

Among the relics of Brahe long treasured with utmost care was one of his silver noses; one of them, I say, because an accident obliged him to provide several for emergencies. Waking one morning from a sound sleep he found to his consternation that his only silver nose, which he had laid on a table at his bedside, has been broken to pieces by one of his pet dogs whose unconscious play caused his master much annoyance. After this catastrophe he had a little provision of noses manufactured, fourteen in number, which he used interchangeably as one does a handkerchief. A Bohemian historian relates, more in jest than in earnest perhaps, how Brahe bequeathed one of his silver noses to his Majesty Christian IV, King of Denmark, who gave it to his favorite Christine Munk, from whom after many wanderings it passed into the possession of Voltaire, who took it to Potsdam for the pleasure of Frederick the Great; but after Voltaire's death it was secured for the museum of art at Vienna, where it was treasured with great care, even as Galileo's finger was preserved in alcohol at Florence.





CHAPTER IX.

ASTRONOMICAL WISDOM AND ASTROLOGICAL FOLLY.

"Into death's hidden hour ye mortals are prying,
Searching what is the way ye shall come to your end.
To interpret the teaching of planets ye're trying,
Which star is man's enemy, which is his friend."

IN THE same year in which Rudolph ascended the throne of Germany, a poor little five-year old boy living with his grandparents in Wurtemberg, was attacked with small-pox; his father was with the army in the Netherlands, his mother had followed her husband into the field, and the boy was nursed through the horrid disease to convalescence by his grandparents. After recovering his strength a year later, John was sent to school, but the poverty of his father, who had returned from the war, obliged him to leave the school in two years time in order to do the work of a servant at home. While so engaged he prepared himself for the University and in spite of a frail body, weakened by serious illnesses, and notwithstanding pinching poverty and family dissensions, John Kepler completed his studies at Tübingen. At the University he distinguished himself by an essay in favor of the Copernican system, which led to an invitation to take the chair of astrono-



Nil dat, quod ritul est!
J. Kepler



my at Gratz, and although he had no strong predilection for this science he applied himself industriously to its study, and his genius was soon manifested by brilliant discoveries and ingenious speculations. Galileo and Tycho Brahe both praised his "Cosmographical Dissertations" published in 1596.

In the following year he married Barbara Müller, who was a widow for the second time at the age of twenty-three, and to whom he had been attached for five years, but whose parents had opposed her marriage. She brought him less dowry than he had expected and his salary at Gratz was very small; moreover disputes with his wife's relations, and attacks made by the Catholics on Protestants, to which party Kepler avowed adherence, made his position untenable and he withdrew into Hungary. A year later Kepler returned to his professorship, but he failed to secure the peace he loved, and anxious to consult the eminent astronomer at the court of Rudolph II., he accepted the invitation to Benatek, where we first encountered him. During his visit to Brahe arrangements to secure him a salaried position at the court failed, but when he returned in 1601 the Emperor appointed him imperial mathematician and assistant in the observatory.

Brahe and Kepler then undertook to compute a new set of astronomical tables to be called the "Rudolphine Tables" in honor of their liberal patron; after the death of Brahe, Kepler succeeded him as chief mathematician and was promised a good salary, but the depleted imperial treasury prevented prompt payments; during the nine years that Kepler remained at the court he struggled with the miseries of poverty, and finally after passing through a severe illness, losing his favorite son by small-pox and his wife by typhus fever, his cup of sorrow overflowed. The death of Rudolph in 1612 did not sever Kepler's connection with the court, for Matthias, who succeeded his brother, reappointed him imperial

mathematician, allowing him at the same time to accept the professorship of mathematics at Linz.

Perhaps the greatest service rendered to science by the Emperor Rudolph was bringing about the association of the two astronomers Tycho Brahe and John Kepler; they were unlike in disposition and mental gifts, yet their cooperation proved most fruitful. Brahe had clung to the Ptolemaic astronomy that made the earth the centre of the celestial universe, but Kepler early accepted the theory of Copernicus that placed the sun in the centre; Brahe had gathered an immense number of careful, systematic observations with a view to overthrowing the Copernican system, and Kepler used these very facts to establish it.

While in the service of Rudolph, Kepler wrote some of his most valuable works; in the treatise on "Optics and Dioptrics" (1604) he explained the physics of the eye and the action of lenses; in his "New Astronomy" (1609) he determined the elliptical orbit of the planets, since called Kepler's First Law; in the same year he announced his discovery of the rate at which the planets move (Kepler's Second Law); but the third law, on the relation between the distances of the planets from the sun and their periods of revolution about it, was not promulgated until 1618, after the death of Rudolph. These three laws have remained unchallenged as absolute scientific truths and form the foundation of the modern system of astronomy. The telescope, in the hands of Galileo was marking a new era in astronomy, and Kepler greatly improved it by inserting two convex lenses which yielded a much larger field of view. The Rudolphine Tables were not published until 1628, at the expense of Ferdinand, who succeeded Matthias after his brief reign of seven years.

Pecuniary embarrassments obliged Kepler to cast nativeties for his friends, but his heart was never in the business

of fortune-telling; when not fearful of giving offense he declined to encourage this delusion. In his "Principles of Astrology" (1602), he railed against the vanity and worthlessness of astrology as ordinarily practiced and he denied the influence of the stars and planets over nations and individuals. The appearance of a brilliant comet in 1607 (since known as Halley's comet) greatly alarmed the citizens of Prague and threw the credulous court of Rudolph into consternation; the Emperor sent for his astronomer, and from the balcony of the Belvedere they studied the celestial wonder with the aid of a powerful telescope, while the man of science and faith communicated to the man of superstitious fears his own belief based on mathematical knowledge. He ventured to say to his Majesty that the comet was not called into existence for the weal or the woe of the German Emperor, and he reminded him that the same comet had been seen in the year 44 B. C., on the occasion of the funeral procession of Julius Caesar, had appeared at regular intervals of 75 years since without witnessing the burial of a new Caesar, and it would again appear in 1680. In passing through its path of many millions of miles on strictly mathematical lines it did so unconcerned about the fate of any individual on the insignificant earth, or of the human race, and Kepler urged Rudolph to lay aside senseless fears. "Each of the myriad stars," he added, "is a shining witness of the incontestible truth that every thing in nature is in motion, progress is life, rest is death." Kepler regarded as absurd the sentiments soon to be expressed in vivid language by the "divine William":

"Meteors fright the fixed stars of heaven;
The pale-fac'd moon looks bloody on the earth,
And lean look'd prophets whisper fearful change:
These signs fore-run the death or fall of kings."

Although Kepler rejected the crude views of his contemporaries, he admitted his belief in a modified form of astrology;

he conceived that certain harmonious configurations of suitable planets have the power of exciting the minds of men to certain general actions or impulses, so that the only effect of these configurations is to operate along with the vital soul in producing results which would not otherwise have taken place. Kepler regarded his own zeal for study as a result of his birth under a triple configuration (Brewster). Though holding these notions he felt obliged to apologize in his writings for the drawing of horoscopes, saying:—"Ye overwise philosophers, ye censure this daughter of astronomy beyond her deserts; know ye that she must support her mother by her charms. The scanty reward of an astronomer would not provide him with bread, if men did not entertain hopes of reading the future in the heavens." To support his growing family he published what he called "a vile prophesying almanac, which is scarcely more respectable than beggary," and when he sent a copy of his *Ephemerides* to Professor Gerlach he wrote they were nothing but worthless conjectures.

"Thou damned mock-art, and thou brainsick tale
Of old astrologie." . . .

"Some doting gossip 'mongst the Chaldee wives
Did to the credulous world thee first derive;
And superstition nurs'd thee ever since,
And publish't in profounder arts pretence;
That now who paires his nails, or libs his swine,
But he must first take counsell of the signe."

Hall, *Virgidemarium*.

Although gifted with extraordinary ability in mathematical deductions, Kepler indulged in singular vagaries as to the tides; in his "System of Harmonics" (1619) he claims that the earth is an enormous living animal, and that the tides are waves produced by the animal spouting out water through its gills; and the effects of the sun and moon on the tides result from the alternate sleep and waking of the terrene monster. This bizzare conception was allied to the philosophy

of the macrocosm and the microcosm, found among the Greeks as early as the fourth century and current in Rudolph's reign. It taught that the physical universe, or macrocosm, is an organized being endowed with a soul and analogous to man the microcosm, and that an intimate correlation exists between them, the former controlling the destiny of the latter and the latter having power over the fundamental laws of the former. This view of man as the physical and spiritual epitome of the universe was well set forth in the "Epistle of Isis to her son Horus," a writing on the "sacred art" of obscure origin:—"Hermes calls man the microcosm because the man or the small world contains all that which is included in the macrocosm or great world; thus the macrocosm has small and large animals both terrestrial and aquatic, man on the other hand has fleas and lice, these are the terrestrial animals, also intestinal worms which are the aquatical animals. The macrocosm has rivers, springs and seas; man has internal organs, intestines, veins and channels. The macrocosm has aerial animals; man has gnats and other winged insects. The macrocosm has volatile spirits such as winds, thunders and lightnings; man has internal gases and *pordas* of diseases. The macrocosm has two luminaries, the sun and moon; man has also two luminaries, the right eye representing the sun, and the left eye the moon. The macrocosm has mountains and hills, man has a head and ears. The macrocosm has twelve signs of the zodiac, man has them also from the lobe of the ear to the feet which are called the fishes."

These singular and meaningless analogies were accepted by all learned men in the sixteenth century; Paracelsus founded on them a special science, which he called *Astronomia*, teaching that man is a microcosm in comparison with the earth and a macrocosm as compared with an atom of matter. The noted English physician Robert Fludd, "who was not

wholly a quack," wrote at length on the macrocosm and microcosm, and it entered into the philosophies of the mystics Jacob Boehme and Emmanuel Swedenborg.

Allusion is made in the last paragraph of the quotation from the "Epistle of Isis" to the twelve signs of the zodiac and their supposed influence on the anatomy of man; this too is a very ancient feature of astrology and played an important rôle in the practice of Rudolph's fortune-tellers. Its foundations were laid by Chaldean astronomers, Hebrew sages and Greek philosophers; Christian mystics adopted it and mediaeval astrologers magnified it so that it became a persistent popular superstition. The first step in the evolution of this conception was taken more than four thousand years ago, when the star-gazers of Babylon observed the circular zone through which the sun appears to pass in the course of a year, and divided it into twelve constellations, creating what is known as the zodiac. To these twelve divisions symbols were given some of which are said to be Babylonian ideographs of the months. The astronomers of Egypt adopted this system and their lively imaginations peopled the constellations with genii; thus arose a symbolism in which each group of stars is likened to a given animal or human character. The twelve constellations and their anatomical associations are quaintly set forth in the following lines:

The Head and Face the Princely *Ram* doth rule,
The Neck and Throat falls to the sullen *Bull*.
The lovely *Twins* guide Shoulder, Arm and Head,
The slow pac'd *Crab* doth Breast and Spleen command.
The *Lion* bold governs the Heart of Man.
The modest *Maid* doth on the Bowels scan.
The Reins and Loins are in the *Ballance* try'd.
The *Scorpion* the Secret Parts doth guide.
The *Shooting Horse* lays claim to both the *Thighs*;
The Knees upon the Headstrong *Goat* relies.
The *Waterman*, he both the Legs doth claim,
The *Fishes* rule the Feet and meet the *Ram* again.

Moore's *Vox Stellarum*, 1721. X

The pictorial representation of the influence of the zodiac on human anatomy, well-known to every reader of modern patent medicine almanacs, was familiar to the astrologers and occultists of the Hradschin, having appeared as early as 1496 in the famous encyclopedia "Margarita Philosophica" of Gregor Reisch, and being frequently copied into works on medical astrology, and into almanacs.

Just two years before the death of the Emperor Rudolph, William Shakespeare was writing the play of Coriolanus; in this he alludes to the picture of a nude man surrounded by signs of the zodiac. Menenius says to Sicinius: "If you see this in the map of my microcosm, follow it that I am known well enough too?"

Tycho Brahe was of a singularly superstitious nature, producing timidity; if on leaving his house he met an old woman he was accustomed to return home at once, regarding the encounter as an evil omen; if he met a hare in the fields he thought it a dangerous sign; more unlucky still were swine, and on meeting them he used to spit, in the same way as did many superstitious Jews, to ward off evil influences. An inverted slipper, salt spilled at table, or three lighted candles on one table, caused him great anxiety, while to sit down thirteen at a meal was simply tempting Providence. He used to relate to those willing to listen, and this embraced every one, that if a twig was broken from a cherry-tree on Saint Barbara's day and watered daily, it would bear blossoms on the succeeding Christmas; to be lucky in gambling as well as in love he carried part of a hangman's halter and a *lapis alectorius*, a stone about the size of a bean sometimes found in the stomach of a fowl.

"For worthless matters some are wondrous sad,
Whome if I call not vaine I must terme mad.
If that their noses bleed some certain drops,
And then again upon the suddaine stops,

Or, if the babbling foule we call a jay,
 A squirrel, or a hare, but crosse their way,
 Or, if the salt fall towards them at table,
 Or if any such like superstitious bable;
 Their mirth is spoiled, because they hold it true
 That some mischance must thereupon ensue."

According to the Danish astronomer, two and thirty days
 in every year were particularly unlucky, these were:—

January 1, 2, 4, 6, 11, 12, 21.

February 11, 17, 18.

March 1, 14, 15.

April 10, 17, 18.

May 17, 18.

June 6.

July 17, 21.

August 20, 21.

September 10, 18.

October 6.

November 6, 18.

December 6, 11, 18.

A child born on either of these days would certainly die
 in infancy; a man taken sick on these days would seldom
 recover; a man married on these days would experience
 poverty and misery; whosoever moves from one house to an-
 other, or changes his service, or travels from one country
 into another on any of these days will have trouble; to buy
 or to sell, to begin any new enterprise on these days is very
 unlucky, and he who goes to court will lose the judgment.
 To these 32 unlucky days must be added the 52 Fridays,
 making 84 black and 281 white days in each year.

"Beside they give attention to blinde astronomers,
 About th'aspects in every howre of sundrie shining stars;
 And underneath what planet every man is born and bred,
 What good or evill fortune doth hang over every hed."

Naogeorgus.

Tycho Brahe is said to have abandoned belief in judicial astrology in the later years of his life, while the younger philosopher Kepler died in the position of professional astrologer to the wealthy and powerful General Wallenstein, Duke of Mecklenburg, at his residence in Silesia (1629).

Rudolph was very well acquainted with the mechanic arts and fond of collecting curiosities of mechanism, such as automata, peculiar clocks, and novel instruments for measuring distances, models of machines for raising water, of windmills, and of devices for facilitating the transportation of persons and goods; some of these were made by the celebrated mechanic Christopher Schissler of Augsburg, one of whose quadrants is now preserved at Oxford. The Emperor had a collection of models that would interest and amuse a modern Patent Office examiner; among them were two odometers of unusual construction that not only indicated the distance travelled but recorded it on paper. One of these is said to have been invented by the Emperor himself; they are described by De Boot in his "*Gemmarum et Lapidum Historia*," and one of them is figured by Athanasius Kircher in his "*Magnes, sive de Arte Magnetica*," 1643.

Rudolph was always on the lookout for novel inventions that he thought could be turned to practical uses, and when he learned that the problem of perpetual motion had been solved by a Hollander named Cornelius Drebbel, of Alkmar, he conceived that a machine endowed with self-producing energy might be useful in the imperial quarries and mines. Although Kepler and others tried to convince his Majesty of the absurdity of perpetual motion, Rudolph invited Drebbel to visit Prague.

Drebbel was a skilled mechanic and an experimenter in optics; in a letter addressed to James I. of England, written during his sojourn in London, he boasted of having determined

the secrets of the movements of the heavens, of the stars, of the planets and of the waters. "I have discovered," he wrote, "why the earth floats in the air, why the waters make a circle around the earth, and why all things except fire tend towards the centre of the earth; I have discovered the causes of thunder, lightning, rain, wind and the tides." And he offered to show the King proof of his discovery of "*Primi mobilis*" in the shape of a ball that revolved every twenty-four hours, and would continue to do so for a thousand years; and he referred to other instruments "made with weights, springs, running waters, wind and fire that would move perpetually, without expense, and furnish much power." It was a report of this letter that aroused the interest of Rudolph.

Drebbel has also been credited with the invention of the thermometer, but this is a mistake based upon faulty interpretation of a simple experiment described by him in a treatise + on the "Elements," published in Dutch in 1608. This experiment was the heating of an empty retort, the neck of which was plunged under water, and observing the bubbles rising due to the expansion of the air within the heated vessel; he did not even use the phenomenon as a thermoscope. Drebbel, however, is said to have discovered the beautiful carmine-lake formed by the action of tin-salts on cochineal.

After Drebbel's arrival in Prague, Rudolph soon found that the *perpetuum mobile* was useless, though he did not believe it fallacious, and in one of his ill-tempered moods he ordered the imprisonment of the unlucky inventor. From his dungeon Drebbel wrote a pleading letter to the Emperor begging for freedom and promising to show him a remarkable musical instrument described in these words:

"As soon as the sun shines the curtains hanging before the Clavicymbal will be withdrawn automatically and the sweetest of music will be heard; when the sun sets or goes

behind a cloud, the curtain will close of themselves. At the same time a fountain will spring up in two streams, and when the sun shines more than one hundred streams. Neptune, with sea-goddesses, and tritons, will emerge from a cavern and wash in the fountain; and when the sun ceases to shine they will return to their concealment. Phoebus will come out of the clouds and seat himself in a chariot drawn by four horses who will advance by the aid of their wings."

Other extraordinary phenomena were promised and so aroused the curiosity of the Emperor that he released Drebbel from prison; the Hollander continued to reside in Bohemia²⁶ long after Rudolph's death.





CHAPTER X.

RUDOLPH'S PHYSICIANS.

"With us was a doctour of physike;
In al the world was ther non hym lyk
To speke of physik and of surgerye,
For he was grounded in astronomie.
He kept his pacient a ful gret del
In hourys by his magyk naturel;
Wel couth he fortunen the ascendant
Of his ymagys for his pacient."

Chaucer.

THE PHYSICIANS attached to Rudolph's court, had great influence over the hypochondriacal Emperor; several of them were eminent botanists and some were astrologers and alchemists who were admitted to especial intimacy with their royal patient.

When Rudolph succeeded his father Maximilian he inherited, as it were, the physicians of the dead Emperor, and when he took up his residence in Prague they followed the court. One of them, Pietro Andrea Matthioli, a Siennese by birth, was skilled in botany and renowned for his commentary on Dioscorides' work on *materia medica*, a book that passed through many editions and was translated into several languages; Matthioli died, however, within a year and was succeeded by Adam Huber von Riesenbach. Another of Maximilian's physicians, Dr. Johann Crato von Kraftheim, had an interesting history; he began his literary career as a



DR. MICHAEL MAIER.



theological student at Wittenberg, where he became a pupil and friend of the reformer Martin Luther as well as of Melanchthon. He then dropped theology in favor of medicine and studied the latter at Verona and Padua; becoming eminent in his profession he received the appointment of private physician to the Emperor Ferdinand I., and though a staunch Protestant served three successive Roman Catholic rulers of Germany. After the short reign of Ferdinand, Kraftheim continued with Maximilian, and on the death of the latter he was retained by Rudolph whom he served ten years. He died in 1587 at the age of sixty-seven.

Rambert Dodoens, sometimes called the "Theophrastus of the Netherlands", was very eminent in ancient literature, mathematics and astronomy, but his favorite study was botany. He had been one of the physicians at the Viennese court for four years, but shortly after his arrival in Prague he had a violent quarrel with his colleague Dr. von Kraftheim, and became so disgusted with court life that he withdrew from Rudolph's service and returned to his native land, where he became Professor of Medicine at the University of Leyden.

Three other physicians were conspicuous at the imperial court: Dr. von Hayek, whose acquaintance has already been made, Dr. Christopher Guarinonius and Dr. Michael Maier. Guarinonius was a Veronese by birth and in his youth filled the post of physician to the Duke of Urbino; at Rudolph's court he was Imperial Councillor as well as personal physician and received a high salary. The Doctor was an ardent student of occult philosophy as embodied in the teachings of Henry Cornelius Agrippa, of whom many supernatural tales are told; Agrippa had died sixty years before but his writings were held in high estimation. In his medical practice Guarinonius was a zealous disciple of Paracelsus, and he had a

great reputation for elixirs and panaceas that he administered with impressive magical ceremonies under favorable aspects of the heavenly bodies. Never suffering from ill health himself he ascribed his vigor to the amulets and powders of sympathy that he wore on his body at the waxing and waning moon, the only remedies, by the way, he was ever known to prescribe gratis. He had the good fortune to be entirely exempt from headache while his colleague Dr. Maier was frequently tortured by this affliction; this circumstance led Guarinonius to speak boastingly, whereupon Maier jocosely remarked that headache only attacked persons who were not quite without brains, a cheap witticism that the proud Doctor never forgave.

✕ Dr. Michael Maier was a younger man and much better educated; he held the office of private secretary to Rudolph, as well as physician, and rejoiced in the titles Doctor of Medicine, Doctor of Philosophy, Imperial Palatine Count and Knight of the Holy Roman Empire; he was a philosopher of the Rosicrucian stamp although that mystical fraternity had not yet disturbed the scientific and literary world by its extraordinary assumptions and claims; he was also a master in theosophy and attempted to give a hermetic interpretation to the mythologies of ancient Greece and Rome. Maier was especially intimate with the Emperor and remained in his service until the death of his Majesty; later in life he published a series of incomprehensible theosophical books, now highly valued by bibliophiles for their singular engravings and rarity.

Of similar intellectual bias was Dr. Oswald Croll, of Hesse, who held the post of physician in ordinary to Christian, Prince of Anhalt, before he joined the corps attached to the palace on the Hradschin. He too was a disciple of Paracelsus and adopted his views on astral virtues,

signatures, physiognomy, chiromancy, gnomes, sylphs and parallels of celestial and terrestrial bodies, all of which influenced his medical practice; yet Croll described many chemical substances and reactions with comparative accuracy and showed admirable knowledge of human nature when he wrote: "It is the principal part of a physician that would cure the sick first to comfort the heart and afterwards to assault the disease".

Anselm Boethius de Boodt, of Bruges in Flanders, the favorite physician of Rudolph in his later years, was especially esteemed on account of his great learning in gems and precious stones; his "History of Gems and Stones," published in 1609, is still recognized as an important treatise and very creditable for the time. Boethius had another claim to Rudolph's appreciation being an advocate of the verity of transmutation, a belief acquired in the following manner: when still a young student of medicine he accidentally found among his father's books an antique manuscript entitled "Cymbalum aureum," written on parchment and covered with two half-broken, thick boards; wishing to re-cover the book he removed the boards and discovered in one a cavity containing a small piece of paper folded tight; on examining this he perceived a few grains of a red powder and some hieroglyphical words on the inner surface of the paper. By hard study the young man deciphered the writing and found that it explained the process of using the powder in transmutation; he made an experiment on mercury heated in a crucible and the red powder changed the metal in one quarter of an hour into fine gold. Unfortunately he used the whole amount of the powder at one operation, but this experience served to convince him of the verity of alchemy. 12

Although Boethius de Boodt was really learned in precious stones, crystals, corals and shells, he shared the super-



stitution of the day respecting their value as remedies in disease; he regarded the sapphire as efficacious in ague, gout and nose-bleeding, the topaz as a cure for lunacy, the cornelian as mitigating the "heat of the mind and qualifying malice," and doubtless prescribed many a dose of lapis lazuli for the melancholia to which Rudolph was subject. Pieces of blood-red jasper were highly prized for their power of stopping hemorrhages, and Boethius relates how he cured a maid in Prague of a hemorrhage of six years standing (for which she had often been bled), by merely hanging a jasper around her neck. If she neglected to wear the stone the hemorrhage would return, and this continued to be the case for many months until the disease eventually left her.

Dr. Christopher Guarinonius died in September 1601, and Gottfried Steegius, the physician of Bishop Julius of Würzburg, was invited to the imperial court; he was distinguished for being one of the first to write in praise of the mineral waters of Kissingen; Rudolph became much attached to him and had his portrait engraved on copper by the court artist Gilles Sadeler.

The physicians connected with the court received large salaries at a time when the profession was but poorly recompensed; dressed in their long, velvet-trimmed, silken doctor's robes, and in fur pelisses, they commanded great respect which was enhanced by their air of mystery and pompous assumption of secret learning. Outside of the court officials their practice was chiefly among noblemen, rich merchants and burgesses of Prague, while the common people resorted to vagabond charlatans, priests, barbers, itinerant drug-peddlers and hangmen (!), or, from economical motives they depended upon appeals to the saints. The prodigious army of quack-doctors, and the mischief they wrought, led to the adoption of an ordinance in the city of Nuremberg

forbidding the practice of medicine by "Empirics, peddlers of theriaca, tooth-drawers, alchemists, distillers, ruined tradesmen, Jews, dealers in the black art and old women accustomed to attend the sick."

A superficial survey of the condition of the healing art



PREPARATION OF THERIAC.

From Brunswick's "Destillirbuch," Strassburg, 1500.

in the sixteenth century would fill a volume with a painful exhibition of ignorance, superstition and folly. Pliny long ago wrote that medicine was born of magic, was fortified by astrology and acquired all its splendor and authority from religion, associations that exerted malign influence on mankind in civilized countries for centuries and still inflicts misery

among savage races. It may be that Ashmole was right when he wrote: "Incredulity is given to the world as a punishment," but it would seem that credulity has proved a still greater cause of unhappiness.

The association of astrology with medical practice had been regarded as essential since the days of Galen and Hippocrates; the former declared that physicians ignorant of astrology were no better than murderers; "So far are they distant from the true knowledge of physic which are ignorant of astrology, that they ought not rightly to be called physicians but deceivers; for it hath been many times experimented that that which many physicians could not cure or remedy with the greatest and strongest medicines, the astronomer hath brought to pass with one simple herb by observing the moving of the signs." Medicinal plants were gathered at the appropriate age of the moon, distillations were carried on under the proper conjunctions of the planets, and the medicine thus concocted was given to the patients only under suitable astronomical conditions. Magical healing power was attributed not only to the greatest variety of objects belonging to the mineral, vegetable and animal kingdoms, but to purely mental operations as well; physicians prescribed:—

. . . "Divers verses of St. John
Which, read successively, refreshed the soul,
But, muttered backwards, cured the gout, the stones,
The colic and what not."

Some insight into the character of the healing art as practiced in the sixteenth century may be obtained by examining the methods of treating a single disease, epilepsy, that distressing malady which still baffles the wisdom of modern science. Rings composed of diverse substances were worn to prevent the attacks; a ring made of three nails or screws that had been used to fasten a coffin, or one made of five



PARACELSUS.



silver coins collected from five bachelors and forged by a silversmith himself a bachelor, were especially efficacious. An elk's hoof was also recommended, but much depended on the way the hoof was obtained, for the virtue resided in only one of the four legs; the animal was knocked down and watched until he lifted a leg to scratch his ear, that leg was then lopped off with a scimitar, and in its hoof lay the remedy.

The elder-bush was another specific against the "falling sickness" as epilepsy was appropriately called. In the month of October, a little before the full moon, a twig of the elder was plucked, cutting a portion between two knots into nine pieces, and these pieces were wrapped in a piece of linen and hung by a thread about the neck so as to touch the "spoon of the heart or the sword-formed cartilage;" these pieces were held in place by a silken bandage around the body until the thread broke of itself, they were then removed without touching them with the hands, but with tongs or pincers only, and buried in a secret place.

Another amulet worn on the person as a preventive against epilepsy contained the names of the three Magi who came from the East to worship the Divine Babe at Bethlehem.

"Jasper brings myrrh, and Melchior incense brings,
And gold Balthazar to the King of Kings;
Whoso the names of these three monarchs bears
Is safe, through grace, of Epilepsy's fears."

As chemical medicines came more into vogue nauseous concoctions were administered for this disease of which the following is a good example:— "Calcine vitriol until it becomes yellow, add mistle-toe, hearts of peonies, elk's hoofs, and the pulverized skull of a malefactor; distill all these dry, rectify the distillate over castoreum and elephant's lice, then mix with salt of peony, spirit of wine, liquor of pearls and corals, oil of anisseed and oil of amber, and digest on a water-bath one month."

The climax of credulity in medical practice seems to have been reached in the cure of disease by "transplantation," a system which originated with Paracelsus and found ready acceptance in Germany, France and England for more than a century. The singular power of the lodestone to attract particles of iron was thought to be magical, that is supernatural, and analogous occult power was attributed to artificial magnets capable of drawing to themselves diseases and of transplanting them into animals, plants and the soil. These magnets were prepared in several ways usually with most disgusting ingredients, often including some excretion of the patient; they were buried in the earth or given to some animal and thought to transfer the malady. Other simpler methods of magnetic healing were also employed; thus toothache was to be cured by rubbing the gums until they bled, with the root of a certain plant which then was buried again in the earth, thus the blood carried off the cause of the pain and transferred it to the earth. A cucumber laid by the side of the sleeping infant suffering with fever, would wither and dry up while the child would recover.

These cures were said to be accomplished sympathetically and one of the most interesting developments of the theory was the "sympathetic ointment" for curing flesh wounds; this remarkable salve was compounded as follows:—

Take of the moss that had grown on the skull of a thief.....	2 oz.
Of man's grease.....	2 oz.
Of mummy.....	½ oz.
Of man's blood.....	½ oz.
Of linseed oil.....	2 dr.
Of oil of roses.....	1 dr.
Of bole-armoniack.....	1 dr.

Beat them all together in a mortar until they make
a pure and subtil ointment and keep it in a box.



PREPARATION OF GUAIAK REMEDIES AND THEIR ADMINISTRATION.
Etching by Stradanus, 1570.



This salve was applied to the weapon. bludgeon, sword or axe, with which a wound had been made, and the weapon thus anointed was wrapped up in a clean linen cloth and put aside in a cool place. A carpenter cut himself with an axe; the cutting instrument was sent for, cleansed of the blood, besmeared with the weapon-salve, covered with linen and hung up in a closet; the workman was immediately relieved, and all went well until one day the wound became exceedingly painful, when it was found that the axe had fallen from its place and become uncovered: the axe was restored to its place and the man was restored to health. Nothing was done to the patient except to wash the wound and this allowed nature to perform the cure; surgeons employ the same method to-day barring the care of the weapon.

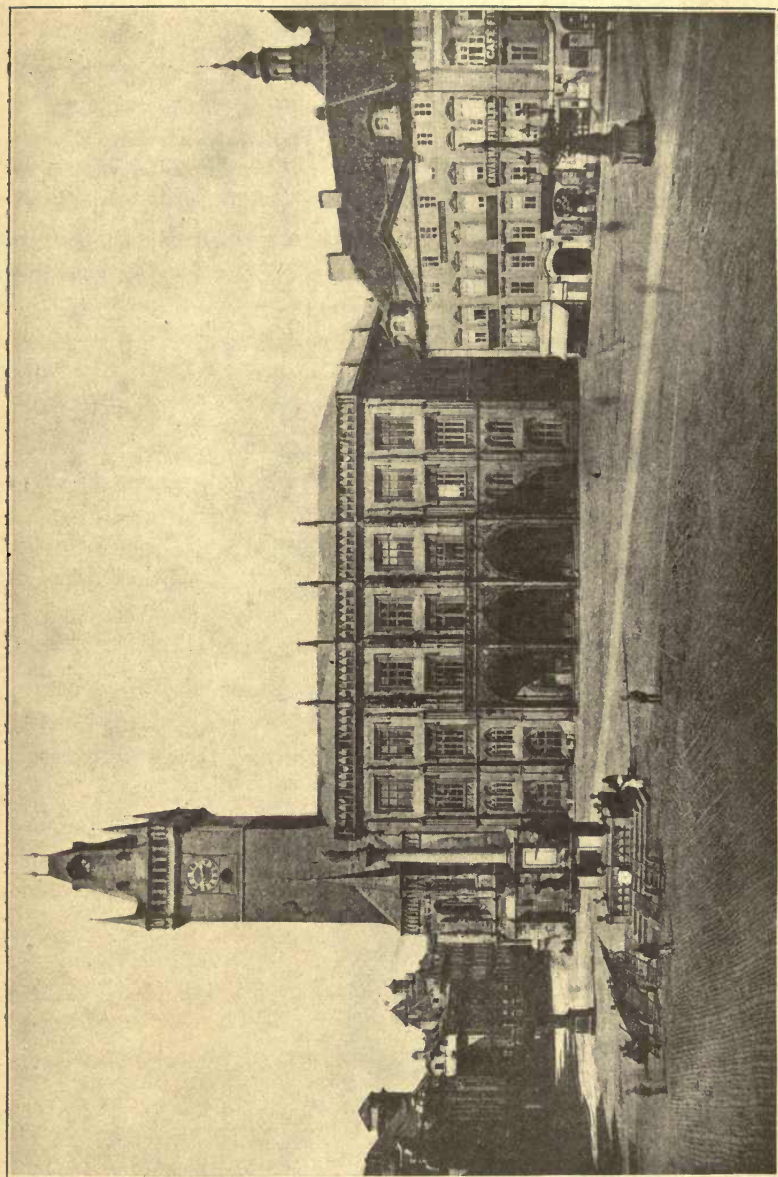
“But she has ta'en the broken lance
And washed it from the clotted gore,
And salv'd the splinter o'er and o'er.”

Notwithstanding the degradation of medicine by magic, astrology and superstitious practices, the sixteenth century saw an upward movement towards a rational system; medicine began to cast off the shackles of blind authority under the influence of free investigation, overthrowing Galen, the “Medical Pope of the Middle Ages”, and the Arabian school, and to replace these tyrannical masters by Hippocratic doctrines and independent methods. This advance was made in spite of the conservative universities instead of through them, for the curriculum of medical students embraced little more than discussions and explanations of certain works of the Greeks and Arabians, with no opportunity of practical, experimental methods. Even anatomy was studied as taught in Galen's writings, although the golden age of the great anatomists, Vesalius, Fallopius and Eustachius was close at hand.

Failing to find in the universities advanced thought and new methods, those who were determined to gain superior acquirements substituted for their conservative teachings long and distant travels, extending through years and to Oriental countries, whereby the wanderers came in contact with learned men of different schools, and became acquainted with the newest discoveries and improvements in medicine, pharmacy and the natural sciences. There was no periodical press in those days, and like the Athenians and strangers of old they assembled in the market-places of many cities to tell or to hear some new thing. Pierre Belon, a French physician, travelled for three years in Asia Minor, Greece, Egypt and Arabia, and brought back with him a fund of knowledge concerning medicinal plants and useful drugs.

Paracelsus, that "strange and paradoxical genius," regarded by some as a most unprincipled quack and by others as a beneficent reformer of medical art, acquired most of his unquestioned knowledge by travelling in many parts of the world and consulting monks, conjurers, barber-surgeons and empirics reputed to possess secret remedies; becoming aware of the virtues of opium and mercury he effected many astonishing cures, but this vain-glorious, self-styled "monarch of physicians," clothed his really original ideas in "fantastic boasting and superstitious rhodomontade"; moreover his doctrines were imbued with theosophy, kabbalism and neoplatonic philosophy, and his disciples failed to separate the wheat from the chaff. Nevertheless under their influence the pharmacopœia began to improve, especially by the introduction of inorganic chemical preparations; "Chemistry," said Paracelsus, "is not designed to make gold but medicines." Nevertheless his practices gave Butler occasion to write:

"Bombastus kept a Devil's Bird
Shut in the pommel of his sword
That taught him all the cunning pranks
Of past and future mountebanks."



RATHHAUS, PRAGUE



Paracelsus united in his person the functions of physician and surgeon, a rare combination at that period; surgery in a very crude form was practiced by barbers and was regarded as a disreputable handicraft even in the eyes of the law; to raise it to an honorable calling Charles V., seven years after the death of Paracelsus, promulgated an edict to dignify the standing of surgeons, a law which was renewed by Rudolph in 1577.

Another important influence was at work in the sixteenth century hastening the overthrow of the slavish devotion to ancient authorities; physicians educated in the classical languages took up the study of the early writers on medicine and translated them and edited them with commentaries, often proving the current interpretations to be false; so great a role did this play that a recent historian has claimed that "Philology is the mother of modern medicine."

Dr. Pettigrew has summarized the situation in these words:—"The errors in medicine have usually originated in the speculative conceits of men of superior capacities; the blunders of the weak are short lived, but a false theory, with a semblance of nature, struck in the mint of genius, often deceives the learned and passes current through the world."





CHAPTER XI.

THE RUDOLPHINE ACADEMY OF MEDICINE.

"Here dwelleth the physician
Whose most infallible nostrum was at fault;
There quaked the astrologer, whose horoscope
Has promised him interminable years;
Here a monk fumbled at the sick man's mouth
With some undoubted relic . . . a sudary
Of the Virgin."

Browning.



DOCTOR Christopher Guarinonius, though admittedly a man of great learning, was in the habit of prescribing the nauseous remedies characteristic of medical practice in all countries at the close of the sixteenth century. He was especially fond of an *Elixir vitæ* prepared under his directions, and was always boasting of the wonderful cures it had accomplished; the fame of this panacea extended far beyond the "coasts of Bohemia," and when Pope Clement VIII. was attacked by a dangerous malady messengers were sent in haste to summon the eminent physician of Prague, who, with the Emperor's consent, accepted the call and made the journey to Rome. As the Pope lived for many years after Guarinonius' visit, the elixir was presumably:

"A perfect medicine for bodies that be sick
Of all infirmities to be relieved,"

and it becomes of interest to learn its composition, which happily has been recorded.

Elixir Vitae Guarinonii.

Cinnamon	10 drachms.
Ginger	5 do.
Zedoary	4 do.
Nutmeg	3 do.
Elder-root	2 do.
Calamus	1 do.

Dissolve in a decoction of lemon-juice mixed with strong spirits of wine. A half pint before meals, the moon in Cancer, Leo or Virgo.

Guarinonius was delighted at the opportunity of visiting Italy as it permitted him to fulfil a vow to thank in person the inventor of his Elixir, who was no less than the wooden statue of the Madonna di Loretto. This highly-revered image, carved by St. Luke and brought by angels from Bethlehem with the Casa Santa, is still exhibited to the faithful,

“and in a curled white wig looks wondrous fine.”

The Virgin of Loretto had appeared to the physician in a dream and dictated the composition of the all-healing concoction; perhaps the surmise may be hazarded that the “beloved physician” St. Luke, the sculptor of the statue, was the original discoverer. The religious fervor of Dr. Guarinonius was also manifested by his repairing at his own expense the oratory of Saint Notburga which had been constructed in her honor out of her little bedroom in Castle Rottenburg, where she had lived nearly 400 years before. This pious act was accomplished in 1600; the peasant Saint is still highly venerated in the Tirol, her remains being preserved in a little chapel on the borders of the beautiful Achensee.

On his return to Prague, Guarinonius, now called “Doctor Elixirabilis,” assumed a conspicuous place by founding a

Academy of Medicine which was appropriately named in honor of the Emperor Rudolph. Its membership embraced the physicians of the court and of the city, a few of the residents of "Gold Alley," the astrologers, magicians and other learned men surrounding the Emperor, and the retainers who worked in the imperial laboratories. The presiding officer and moving spirit of the society was Guarinonius himself, and the secretary was Chevalier Adam Zaluzansky, the Bohemian naturalist who is said to have anticipated Linnæus in his discovery of the sexual system of plants. Prominent members were the physicians Maier, Croll and Boethius; Martin Ruland, author of a *Lexicon of Alchemy*; the Vice Chancellor Jacob Curtius; Hans Hayden; Johann Marquard Kürbach; Hieronymus Makowsky, all Gentlemen of the Privy Chamber; Hippolytus Guarinonius, the young son of the president, who afterwards distinguished himself by a huge folio on "The Evils that Waste Mankind" (*Gräuel der Verwüstung menschlichen Geschlechtes*, Ingolstadt, 1610); also the court poet and jester Mardocheus de Delle and the favorite valets of Rudolph, Philip Lang von Langenfels and Kaspar Rucky von Rudz. Dr. Thaddeus von Hayek had died in 1600, protomedicus of Bohemia, a short time before the founding of the Academy. Tycho Brahe and John Kepler were occasional attendants and their attainments in astronomy made them most welcome; the journeymen alchemists visiting their colleagues in "Gold Alley" were often present at meetings as invited guests; Dr. Steegius joined the society later.

At one of the largely attended meetings of the Rudolphine Academy of Medicine the secretary Zaluzansky read a report on the wonderful elixir discovered by Antonio Michele, a protégé of the wealthy William von Rosenberg. This Italian alchemist was first employed as an architect, but soon developed latent talent for hermetic labors, and von Rosenberg



MATERIA MEDICA.

From Brunshwig's Destillirbuch, Strassburg, 1500.



built for him a well arranged laboratory in the rear of his magnificent castle at Krumau; Michele required for his experiments large sums of money and promised his lordship splendid results. The renowned elixir was compounded as follows:

Elixir Michellii.

Colcothar	6 oz.
Fused salt	5 dr.
Myrrh of Alexandria	4 oz.
Sugared Aloes purified	4 oz.
Mastic	3 oz.
Saffran	½ oz.
Flour of Sulfur	1 & ½ lb.

Pulverize well in a mortar, mix finely and heat twelve hours in an alembic at a moderate heat.

One drachm of this elixir administered in syrup of lemons or honey-water is most efficacious against the plague, fevers, pleurisy, colic, pain in the lungs, and diseases of the liver.

At the close of the report the president of the Academy said he hoped the members would test this simple remedy and bear witness to its virtues at a future meeting.*

Doctor Michael Maier then addressed the society on the antiquity and nobility of medicine; "it is," said he, "a divine science, even God's theology, for the Almighty wrote His

* Chinese physicians of the present day have made little advance beyond those of the sixteenth century. A Chinaman who has a large practice in San Francisco among highly respectable Americans prescribed the following abominable decoction as a panacea for a variety of dissimilar diseases:—

Chinese Panacea.

Dried lizard
Saffron
Rubber bark
Peppermint
Lovage
Liquorice
Beans, a peculiar species,
Dried locusts
Water bugs
Silk worms
Pith of a Chinese tree
Elm bark

A pinch of each boiled in one quart of water down to the volume of one pint. Dose a teaspoonful as often as required.

Scripture in that language before He made Adam to read it. The ten Fathers before the Flood and those that followed, together with Moses and Solomon, were the great physicians in former ages, who bequeathed their heavenly knowledge of naturall helps to those they judged as well worthy in honesty and industry as capable thereof; and from their piercing beams all nations lighted their tapers. Abraham brought it out of Chaldea and bestowed much thereof on Egypt, and thence a refulgent beam glanced into Greece." Continuing to sketch the early history of medicine, Dr. Maier introduced an original interpretation of the passage in the book of Genesis running thus: "And the Spirit of God moved upon the face of the waters; and God said 'Let there be light' and there was light." This he said was a prophetic announcement by the Almighty of the light of alchemy, the blessed effulgence destined to illumine the world.

Maier's learned address led to a brief discussion, introduced by Ruland, as to the best edition of the "Practical Chemistry of Miriam," Moses' sister, and not one of the Academicians dreamed of questioning the authenticity of the mythical writings. Dr. Ruland, having the floor, stated he had received a letter from Dr. Jacob Horst, Professor of medicine in the University of Helmstädt, describing a wonderful prodigy, a boy in whose jaw a golden tooth had developed. The Professor considered this miracle as a result of the constellations under which the boy was born, the sun being in conjunction with Saturn in the sign Aries. He also regarded the golden tooth as prognosticating the expulsion of the Turks, those barbarous enemies of Christendom, from Europe, and the near approach of the millenium.

At the mention of the Turks, Dr. Oswald Croll half rose to his feet, but a severe look from the president obliged him to resume his seat. As soon as Ruland ceased speaking, Dr.

Croll arose and said that the terrible plague which had been introduced into Bohemia by the Turks was a difficult disease to combat; he had found, however, that the "Tincture of mummy" was of signal service, and he would communicate to the Academy its preparation under pledge of secrecy:—"Select the fresh cadaver of a red-haired, spotless malefactor, twenty-four years of age, killed by hanging, or by being im-



APOTHECARY SHOP OF THE SIXTEENTH CENTURY.

paled or broken on the wheel, upon which corpse the sun and moon had shone but once; cut it in slices, sprinkle it with myrrh and aloes, then macerate the pieces in spirit of wine for several days. In desperate cases the efficiency of this tincture can be strengthened by mixing it with salt of pearls, salt of coral, olive and musk, the mixture being digested in a water-bath one month, stirring it every day."]

Kaspar von Rudz remarked that his wealthy father-in-law, with whom he lived, was very low with periodical fits of ague and he had tried many remedies in vain; he had hung three spiders about his patient's neck, he had given him a bag to

wear containing chips of the gallows, and he had tried to charm away the fever by writing

F E B R A F U G E

on a piece of paper and cutting off one letter each day beginning with the last one. He, the speaker, would be glad for suggestions as none of the remedies had been successful.

Several Academicians rose together each desirous of making suggestions, but the chairman recognized first Dr. Maier, who recommended the following: "Take a new-laid egg one hour before the cold fit is expected, paint on the shell three crosses, one in red and two in black, bury it at the nearest cross-road in strict privacy not letting any one know of the procedure." Doctor Guarinonius said the remedy was unscientific and he knew an infallible one, to wit: "Take two handfuls of bay-salt, the same quantity of fresh hops and a quarter of a pound of blue currants very diligently beaten into a brittle mass; spread this without the addition of anything moist upon linen and apply it to the wrists of the patient. This never fails to expel the fever."

Doctor Boethius de Boodt begged permission of his fellow members to exhibit an *abraxas* patterned after that of the heresiarch Basilides, being a small figure carved in jasper representing the Prince of the Eons, or the angels of the three hundred and sixty-five heavens; it was intended for the Emperor's use, being a perfect talisman against evil spirits. After this had been examined, Dr. Croll showed his *zenexton* which protected the wearer from the plague, sorcery, poison, and malign astral influences, and described its manufacture in two steps, the preparation of the magical tablets and the construction of the instrument with which they are stamped. "Take about eighteen live toads and having closed their nostrils dry them in the sun very perfectly and powder them; if not well dried they will have an offensive odor and cannot

be pulverized; take of this powder two ounces, of white arsenic and orpiment each one half ounce, roots of *Diptanus albus* and *Tormentilla erecta* of each three drachms, small pearls one drachm, red corals, pieces of oriental hyacinth and emerald each one half drachm, oriental saffron two scruples, and to impart fragrance add a few grains of musk and amber. Pulverize these ingredients fine and make a paste out of the mixture with rose-water and gum tragacanth; this must be done when the moon is in the sign of Scorpion. With the instrument to be described cut out tablets of this paste and dry them well, then cover them with red silk and hang them about your neck by a red string, but do not let them touch your bare skin. The instrument referred to consists of two steel punches on the inner surface of which are engraved respectively a scorpion and a snake, so that the tablets when stamped out shall have impressions of these animals.

Dr. Guarinonius testified to the value of the zenexton and described another form, saying it was a favorite amulet of the great Swiss physician to whom all looked for inspiration—Paracelsus. [He then related the peculiar case of a Viennese nobleman on whom a Tagliacotian operation had been performed. The eminent surgeon Gasparo Tagliacozzi, at Bologna, had demonstrated that when either the nose or the ear were cut off by a quick stroke of a clean blade, as of a sabre, it could be made to adhere to the stump if immediately replaced in a perfectly clean condition and bound firmly to remain undisturbed; and it had been found possible to graft the skin from one person on to the wound of another; such operations were often performed with entire success. The Venetian nobleman, who was also a Colonel in the army, lost the tip of his nose in a duel with swords and Tagliacozzi was sent for to use his skill; by offering a large reward, a healthy Italian, a porter by trade, was persuaded to permit removal from

his arm of sufficient skin to form a new nose on the nobleman's face. The surgical operation succeeded admirably, a new nose of creditable appearance soon formed and the Colonel was delighted; the porter also recovered and returned to his home in Italy. From time to time the Colonel's nose became very red and swollen, giving him the appearance of a drunkard; this disfigurement passed away and a few months later the nose would again assume the tell-tale state in spite of the owner's abstemious habits. By exchanging letters with Tagliacozzi the nobleman found that these unfortunate attacks coincided with periodical drunken fits of the porter. Finally, after enduring this inconvenience about six years the worst came to pass; the Viennese officer was attending a court ball when to his alarm the tip of his nose grew colder and colder and very soon dropped off in a shriveled condition. On making diligent inquiry he ascertained that the porter had died that very evening at Bologna.]

Tycho Brahe, who had listened with great interest to this narrative, smiled broadly as the speaker concluded and looked as if he thought his silver nose was preferable to a Tagliacotian. Dr. Guarinonius then added that Tagliacozzi always claimed that his operation produced a nose having a more acute sense of smell than the natural one; and that during his recent travels in Italy he had seen at Bologna the statue erected by the citizens to Tagliacozzi, in which he was represented holding a human nose in his hand.

The meetings of the Rudolphine Academy of Medicine were not always so lively as the one just described, at some there was less diversity of topics and prosy speakers consumed the time without communicating any novelty. Several months later an extraordinary meeting was convened in honor of the renowned physician Andreas Libau, of Coburg, who was passing through Prague on his way to Vienna, and had

consented to read to the Academy an essay on *Aurum Potabile*. On that occasion the assembly hall was crowded with members and their friends eager to see and to hear the distinguished speaker; in introducing him Dr. Guarinonius reminded the Academy that Dr. Libau never allowed his official duties as Director of the Gymnasium at Coburg to interfere with his scientific pursuits, and that he had recently published a folio volume entitled "Alchymia" that was destined to immortalize him in the annals of medicine and of chemistry. His earlier treatises on the "Testing of Mineral Waters" and on "Assaying Ores" are of course well known, and he now honors the Academy by an original essay on Potable Gold.

Doctor Libau, whose Latinized name "Libavius" is more familiar, began the address by remarking that gold is not capable of being destroyed and possesses inestimable qualities that adapt it to restoring health and prolonging life, and the problem to which he had given attention was to discover the best form in which to administer it. The authority of antiquity endorses gold for medicinal use; one of the earliest records being found in the Holy Scriptures: "And Moses took the (golden) calf which they had made and burnt it with fire, and ground it to powder and strewed it upon the water and made the children of Israel drink of it." Pliny in his Natural History extols the medicinal virtues of gold, and recommends its outward application as a cure for green wounds in form of a liniment; prepared with honey, it gently loosens the belly if the navel be anointed therewith; if the skin be stroked with a gold ring warts will fall off. The Arabian physicians also recorded the virtues of gold as a remedy for diseases; the eminent chemist Geber wrote 'Gold is a medicine rejoycing the heart and conserving the body in youth.'

The full benefit of this metal as a medicine can, however, be realized only when in a potable, innocuous solution, and

the preparation of this "heavenly viaticum," or "alchodon," is of prime importance; it was known as early as the thirteenth century to Raymond Lully of Majorca, as set forth in the following lines written by Sir George Ripley:

"An Oyle is drawne owte in colour of Gold,
Or lyke thereto out of our fire Redlead
Whych Raymond sayd when he was old,
Much more than Gold wold stand hym in stede.
For when he was for age nygh dede,
He made thereof *Aurum Potabile*
Whych hym revyvyd as men myght see."

In the same century, Friar Bacon, writing to his Holiness Pope Nicholas IV., states that an aged peasant found some yellow liquid in a golden flask when plowing on his farm in Sicily, and supposing it to be dew he drank it off, and was immediately transformed into a hale, robust and highly accomplished youth. On examination of the few drops remaining in the flask the liquid was found to be *Aurum Potabile*; the laborer abandoned his agricultural tasks and being admitted to the service of the King of Sicily served him eighty years.

Passing modern attempts to prepare this panacea, Dr. Libau said that after testing in vain nearly one hundred recipes for the "food of angels," he had succeeded in devising a new process that yielded most advantageous results; it is as follows:

"Put foliated gold into a vessel well-sealed with Hermes' seal; put it into our fire till it be calcined to ashes, then sublime it into *flores*, leaving the *caput mortuum*, or black *terra damnata*, in the bottom. Then let that which is sublimed be with the same degree of fire united to the same *caput mortuum*, that all may be reduced to an Oyle which is called *Oleum Solis*."

As thus obtained the dose for an adult is two or three grains. With it a diaphoretic powder can be made that is a

specific for intermittent fever, the dose being eight to twelve grains in a glass of wine.

This condensed report of the addresses of Libavius conveys no idea of the elegant, flowery diction in which it was clothed, which, however, becomes evident in his peroration:—

“O mystery of mysteries, most secret of all secret things and healing and medicine of all things! Thou hast made discovery in earthly natures, last best gift to Patriarchs and Sages, greatly desired by the whole world! O desirable knowledge, lovely above all things beneath the circle of the moon by which Nature is strengthened, heart and limbs are renewed, blooming youth is preserved, old age driven away, weakness destroyed, beauty in all its perfection preserved, and abundance ensured in all things pleasing to men! O thou wondrous power, strengthening all the world, that wakest the dead, expellest diseases, restorest the voice of the dying! The Almighty be praised for having revealed this art to God-fearing men. Amen!”





CHAPTER XII.

FORTUNES AND MISFORTUNES.

“Que la chimie est admirable
Dans ses effets prodigieux,
Ellé nous rend égaux aux Dieux
Par l’elixir et l’or potable.

Que l’art chimique est admirable,
Que son pouvoir est merveilleux.
La pauvreté si mesprisable,
L’infirmité la moins curable,

La veillesse qui nous accable,
Même la Parque inexorable,
Sentent l’effet miraculeux
De notre Pierre incomparable.”

Chilliat, Les Souffleurs.

IN 1603, the official alchemists of Rudolph’s court and the residents of Gold Alley were much excited by rumors of successful transmutations at Strassburg, and when the news reached the Emperor, who just then was in great need of gold to replenish his treasury and was always ready

“To seek by alkimy greate ryches to winn,” he sent Johann Franke and two other trustworthy messengers to make inquiries, and to fetch to Prague this valuable adept. The story they learned was to this effect:—An humble citizen of Strassburg named Gossenhauer (Güstenhöver in low German) while engaged in his trade as goldsmith was waited

upon by a stranger who applied for work as a journey-man apprentice. The man, who gave the name of Hirschborgen, was employed for a time and on his departure gave Gossenhauer a red powder with instructions for its use in transmutation; the goldsmith made a successful experiment with a portion of the powder and imprudently mentioned his treasure to some friends and neighbors, they in turn told neighbors and friends that Gossenhauer had secured the Philosophers' stone, and soon the news was the gossip of the whole city. The municipal authorities ordered an investigation, and the goldsmith not only made a projection in the presence of three city councillors, but each of them with his own hands performed the same feat.

On hearing this evidence of Gossenhauer's skill the Emperor's ambassadors persuaded him by the use of handcuffs and chains to return to Prague; on arrival he was brought before Rudolph who commanded him to proceed at once with the manufacture of gold. Meanwhile the Strassburger had used up all the red powder and was at his wits' end to satisfy the imperial demands; he assured the monarch that he had no more of the Philosophers' stone and did not know how to make it, but this only irritated the Emperor who refused to listen to the protestations of the unhappy goldsmith; the wretched man was forthwith imprisoned in the White Tower, and never being able to comply with his tyrant's commands, he was liberated from his dungeon only by death.

Rudolph's jester and poet, De Delle, preserved the adventures and unhappy fate of Gossenhauer in the following immortal verses:—

“Gossenhauer, von Offenburg genannt,
Dem Keyser Rudolpho wolbekannt,
Dass er in Alchimia erfahren wär,
Ganz fröhlich war den neuen Mähr.

Sprach: 'Johann Franke, Du musst hin,
 Dass wir der Sachen werden inn
 Und erfahren den rechten Grund.
 Warum säume Dich nicht zur Stund. \n
 Ein Gnadenpfennig mit Demant schön
 Sollt Du ihm verehren thun,
 Und sagen ihm dass Wir begehren
 Seine Kunst gänzlich zu lehren.
 Kan aber dass nit geschiehn,
 Muss er Unser Gefangener sin.'
 Er ist in weissen Thürm gebracht,
 Kam aber weg in einer Nacht.
 Ward zu Strassburg wieder gefangen.
 Der Keyser trug gross Verlangen
 Bis er wieder nach Prage kam.
 Musst im weissen Thurme sitzen
 Und vor grosser Angst schwitzen.
 Und das End wird weisen aus
 Erfahren wir aus des Keyser's Haus."

The lives and experiences of alchemists are almost always shrouded in mystery, everything relating to them is marvelous and magnificent; the heroes of hermetic art are the most fortunate of men who create gold by the ton, heal all manner of diseases supposed to be incurable and attain in some instances immortal youth. But on a closer examination their careers appear by no means so brilliant; they travel from country to country, wandering from town to town, and live from hand to mouth, and though they may for a season enjoy luxurious living at the expense of a credulous patron, they are eventually detected in fraud, suffer imprisonment and torture, and die miserable deaths. Those who chronicle their adventures seldom have a critical spirit and weave into the narratives truth and falsehood, the authentic and the fabulous, making it difficult for a student to distinguish truth from fiction. Such obstacles are met with in attempting to portray the joint careers of a Scotch alchemist named Alexander Seton and of a Moravian named Michael Sensophax,

commonly called Sendivogius the Pole, the latter of whom made a great stir at the court of Rudolph.

Seton, whose antecedents are not known, appears to have had no other object in life than to travel through Europe and to make converts to alchemy by his astonishing skill in legerdemain, or perhaps by superior knowledge of chemistry; not needing money himself he was generous to those who befriended him or who secured his good will, often giving them golden souvenirs of his visits. Seton first appears as a resident of Seton Hall on the coast of Scotland, where he treated with kindness a poor shipwrecked mariner, named Haussen, from the Netherlands. He then pays a mysterious visit to Haussen at the latter's modest dwelling near Amsterdam, where the sailor received him with joy and entertained him for several weeks; on his departure Seton showed his host the secret of transmutation, converting in his presence a piece of lead into gold of the same weight, and giving it to him as a testimony of the verity of alchemy; this transaction occurred on the 13th March 1602.

The following summer Seton converted two opponents of alchemy into adherents by a clever performance at Basel, Switzerland, viz.: Dr. Wolfgang Dienheim, Professor at the University of Fribourg, and Dr. Jacob Zwinger. The three went to the laboratory of a worker in gold, taking with them some sheets of lead, a crucible, and some sulfur bought by the way; Seton handled nothing, but built a fire in the furnace, melted the lead and sulfur together in the crucible and stirred the mixture with iron rods. In a short time Seton asked the doctors to throw into the molten metal a heavy yellow powder contained in a piece of paper. Dienheim describing the affair said: "Though as unbelieving as Saint Thomas we did as directed," and after fifteen minutes the crucible was removed from the fire; on cooling the lead had

disappeared and a button of gold remained which the goldsmith pronounced superior to that of Hungary or of Arabia. It weighed as much as the lead. The two doctors were amazed, and Seton made fun of them saying: "What has become of all your pedantic arguments now? You behold an experiment more convincing than your sophism!" The alchemist then cut off a piece of the gold weighing about four ducats and gave it to Zwinger who kept it as a souvenir.

The next appearance of Seton was at Strassburg where he assumed the name of Hirschborgen and took part in the events that brought so much misery on Gossenhauer. He then took lodgings with a merchant named Koch at Offenbach, near Frankfort, and made a projection in his presence in a similar way; Koch had a shirt stud made from the artificial gold. At Cologne he accomplished several amazing feats of transmutation; at Munich where he next appeared, he did not work at alchemy, but fell in love with a beautiful Bavarian Fräulein and married her. Sometime after the Scotchman, who now assumed the name of "The Cosmopolitan," became involved with the despotic young Elector of Saxony, Christian II., noted for his cruel disposition, and at his command gave him a small specimen of the "red tincture"; this did not satisfy the Prince who demanded the secret of its preparation, which Seton obstinately refused to divulge. Coaxing and threats being all in vain Christian (belying his name) resorted to terrible tortures, placing his victim on the rack, burning him with hot irons and with melted lead; the alchemist resisted desperately and the Prince, reflecting that it was unwise to kill the goose that laid golden eggs, ceased the torture and confined the miserable man in a dark cell guarded by brutal jailors. Here he lingered in agony with dislocated limbs and in mental distress, until a stranger, temporarily in Dresden, became interested in his sad plight

and by the aid of judiciously placed bribes and of strong drink effected his rescue. This stranger was the celebrated Michael Sendivogius, who had inherited property near Cracow and was in consequence supposed to be of Polish origin; being a skillful chemist, who had discovered an improvement in dyeing fabrics, he was also an alchemist, and in hopes of extorting from Seton the secrets of his process aided in effecting



KINGLY GOLD AND QUEENLY SILVER.

his escape. The two fled to Cracow, but Seton survived only a few weeks dying without disclosing his well-guarded secret. Throughout his life he had observed the injunction of Chaucer :

“Make privy to your dealing as few as you maie,
For three may keepe counsell if twain be awaie.”

Not long after these events Sendivogius married Seton's widow, with the object of penetrating the mysteries in which she had presumably shared, but she was only able to give him the small remainder of the invaluable powder and a

manuscript essay on alchemy written by her husband, entitled "Twelve Treatises of the Cosmopolitan." The wily Pole now set out on his travels and by husbanding carefully the powder which he knew not to manufacture, he made several transmutations in public at different cities and acquired great renown. All the crowned heads of central Europe were impatient to receive a visit from him, and Rudolph was among the first to be honored. Sendivogius presented the monarch with a small quantity of the powder and he performed the miracle of transmutation with his own hands; delighted with his success he caused to be placed on the wall of the room in which the projection was made a marble tablet with the inscription:

"Faciât hoc quispiam alius

Quod fecit Sendivogius Polonus!"

"Who'er could do under the rolling sun

What Sendivogius the Pole hath done!"

This *Tabula marmorea Pragensis* was still to be seen in position as late as 1740. Sendivogius was given the title of Counsellor of State and honored with a gold medal of the Emperor, while the court poet Mardocheus de Delle celebrated the event in Latin verses; poor Seton, however, got no credit for his share in the performance.

Sendivogius' reputation as a possessor of the Philosophers' stone placed him in great danger, but Rudolph treated him courteously though he still kept Gossenhauer confined in the White Tower; both these men had worked with the same powder, but it brought to one misery and to the other honor. Being permitted to leave Prague, Sendivogius started for Cracow, but on the journey he was seized by a Moravian Count and imprisoned, the secret of transmutation being the price of his liberty. He secured a file, however, sawed the window bars in two and by tearing up his outer clothing

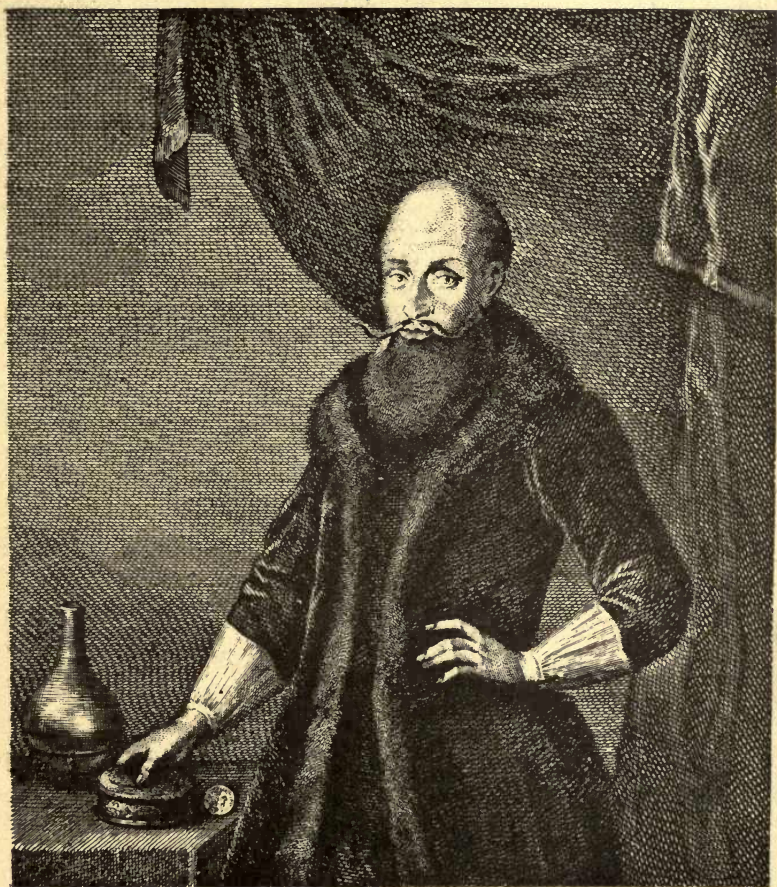
made a rope with which he escaped. Once in safety the alchemist appealed to the Emperor, who confiscated an estate of the Moravian and bestowed it upon the Pole; on this property, "Gavarna," near the borders of Silesia, Sendivogius resided many years exercising a princely hospitality. In memoirs, written by his steward Bodowski, he relates that Sendivogius kept his philosophic powder in a little box of gold, and when on a journey hung the precious box on his neck by a golden chain; but the greater part of the powder was concealed in a hole cut in the step of his carriage. When travelling through a region infested by robbers Sendivogius would exchange clothes with his valet and take a seat on the box by the driver, putting his valet inside. In Warsaw he met with great success in duping Sigismond the King of Poland; at Stuttgart, however, he had a misadventure brought about through the jealousy of a rival alchemist, Johann Heinrich Müller. Müller began his life as a barber's apprentice and learned the secrets and tricks of professional alchemists from Daniel Rappolt when acting as his valet. Thus equipped he presented himself at the court of Rudolph and aroused great admiration by an ingenious stratagem; he announced himself as bullet-proof, and allowed others to shoot at him with bullets made of a soft lead-amalgam which flattened out on striking his coat of mail. In the dwelling of Johann Franke he made fine gold, or rather he got it into the crucible by sleight of hand; the Emperor was captivated with his amusing ways and gave him the title of "Lord von Müllenfels." Being now experienced in duplicity and passing for a nobleman, the knave entered the service of Frederick, Duke of Wurttemberg; the arrival of Sendivogius in Stuttgart, and the reputation he secured by two successful projections filled Müllenfels with envy, and alarm lest he should be displaced, so he planned to ruin his rival. As soon as Sendi-

vogius started on his journey northward, Müllenfels pursued him with armed horsemen, arrested him in the name of the Duke, stripped him of his clothing, bound him naked to a tree and robbed him of his golden box containing the Philosophers' stone as well as of Seton's precious manuscript, a diamond-studded cap valued at one hundred thousand rix-dollars, and the golden medal given him by the Emperor Rudolph. The unfortunate man was released by passing travellers and as soon as possible he made a formal complaint to the Emperor, who demanded of Frederick the person of Müllenfels and his booty. The Duke was alarmed and hanged his alchemist on high gallows erected in the court-yard of the palace; he also restored the valuable cap, the manuscript and the medal, but denied all knowledge of the "tincture." These events occurred in 1607.

Sendivogius, being now deprived of the material with which he had so long duped the wealthy patrons of alchemy, became a low, roving charlatan, selling a pretended cure-all to the country folk, and imitation silver to the Jews, throughout Poland and Germany. He escaped his deserts, however, and died a natural death at the good old age of eighty, at Cracow in 1646. Several hermetic treatises attributed to the Cosmopolitan and edited by Sendivogius were printed early in the seventeenth century in Latin, German and French.

The vanity of alchemy has been strongly pictured in verse by Spenser:—

"To lose good days that might be better spent,
To waste long nights in pensive discontent;
To spend to-day, to put back to-morrow;
To feed on hope, to pine with fear and sorrow;
To fret his soul with crosses and with cares,
To eat his heart through comfortless despairs;
Unhappy wight! born to disastrous end,
That did his life in tedious tendance spend."



MICHAEL SENDIVOGIUS.



It is evident from the events recorded in this and in preceding chapters that in the time of Rudolph's reign belief in

"The subtill Science of Holy Alkimy"

was practically universal among all classes of people, and it is a fact that in the sixteenth century few persons were courageous enough to oppose the highly respectable superstition. At rare intervals enlightened men of advanced views made conscientious attacks on the fallacious theories and exposed the bold impostures by which the promoters sustained the claims of the pseudo-science, but they were regarded as pessimistic croakers, or were entirely unheeded. Had the English poet Chaucer been more widely read, his "Canon Yeoman's Tale" might have opened the eyes of thinking men, but he was in advance of his times.

"'Graunt mercy', quod the preest, and was ful glad,
And couched coles as the chanoun bad
And whyle he bisy was, this feendly wrecche,
This fals chanoun, the foule feend him fecche!
Out of his bosom took a bechen cole,
In which ful subtilly was maad an hole,
And ther-in put was of siluer lymaille
An ounce, and stopped was, with-uten fayle,
The hole with wex, to kepe the lymaille in.
And understondeth that this false gin
Was nat maad ther, but it was maad bifore."

* * * *

"And whyles that the preest wyped his face
This chanoun took his cole with harde grace,
And leyde it up aboue, on the midward
Of the crosslet, and blew wel afterward,
Till that the coles gonne faste brenne."

* * * *

... "He took out of his owen sleue
A teyne of siluer (yuel moot he cheue!)"

* * * *

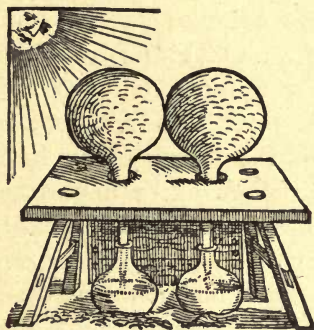
... "In his honde he bar
 An holwe stikke (tak keep and be war!),
 In thende of which an ounce, and namore
 Was in his cole, and stopped with wex wel
 For to kepe in his lymaille every del.
 And whyl this preest was in his bisnesse,
 This chanoun with his stikke gan him dresse
 To him anon, and his pouder caste in
 As he did er."

In the sixteenth century there was a division of opinion among the men of learning; Melanchthon, for example, wrote of alchemy as a work of imposture and fraud, while Martin Luther in his "Canonica" said: "The art of alchemy is a true and genuine philosophy of ancient sages, and pleases me very well not only on account of its virtue and great usefulness shown in the distillation and sublimation of metals, herbs, waters, and oils, but also on account of its admirable and beautiful analogy to the resurrection of the dead at the day of judgement." The only serious attempt made in the sixteenth century to break down the structure erected by the chemists, was the publication in 1572 of a work by Thomas Lieber, better known by his pen-name Erastus, Professor of medicine in Basle.* His main attack was on the absurd medical doctrines of Paracelsus, but he also exposed the worthlessness of the theories of alchemy and the charlatanism of its practitioners by citing instances of notorious frauds. Neither earnest opposition nor ridicule as expressed in facetious epigrams and verses disturbed the status of alchemy; the verses of the Jesuit Grethser of Ingolstadt are good examples of one form of attack:—

"Alchemia est scientia sine arte
 Cujus principium est pars cum parte,
 Medium strenue mentiri,
 Finis mendicatum ire
 Vel in cruce corvos nutrire,
 Quod Paracelsicis solet evenire."

* Explicatio quaestionis famosae illius, ut utrum ex metallis ignobilis aurum verum et naturale arte conflari possit. Basilie, 1572, 4to.

Those who ventured to raise their voices and exert their influence against alchemy were sometimes converted to its support by ingenious stratagems; how this was accomplished in the case of the two learned Professors at Basle has just been shown; another Professor, Cornelius Martini, who held the chair of Philosophy at Helmstädt, was accustomed in lecturing to students to denounce alchemy as a vain speculation, and he too was won over by a master stroke. As he was holding forth on the impossibility of transmutation, a stranger entered the class-room and politely begged permission to argue the matter by a practical demonstration; he asked for a piece of lead, a crucible, and the usual melting furnace; these were obligingly placed at his disposal and he soon produced a small ingot of gold in the crucible, and handed it over to Professor Martini with these words:—“*Solve mihi hunc syllogismum!*”





CHAPTER XIII.

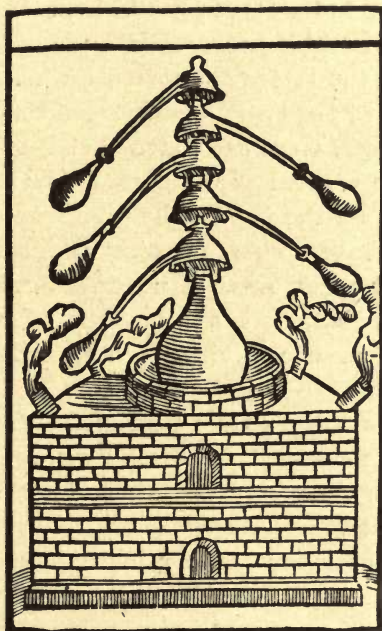
THE SECRET SYMBOLS OF PONTANUS' LETTER.

When fire and water, earth and air
In love's true bond united are,
For all diseases then be sure
You have a safe and certain cure.
I will affirm it's here alone
Exists the Philosophic Stone.
This is fair Nature's virgin root,
Thrice blest are they who reap the fruit:
But oh! where one true adept 's found,
Ten thousand thousand cheats abound.

THE IMPERIAL laboratory on the Hradschin occupied two communicating rooms on the ground floor of an old stone building only one story in height and formerly used for housing the royal coaches; the rudely paved, uneven floor remained as of yore, but on one side of the larger room had been built several flues into which brick furnaces discharged their smoke and soot. These furnaces, great and small, were devoted to diverse uses; one was constructed for smelting ores and the more refractory metals, another furnished the moderate heat required for a huge water-bath, and a third was arranged for the distillation of volatile liquids. This furnace supported a cucurbit capped by five helms, one placed above another, their long necks terminating in recipients for collecting the distillates, the more volatile going to the uppermost. Shelves

hanging against the walls held cucurbits, alembics, descensories, Hippocrates' sleeves, mirrors for reflecting the sun's rays in distillations, and a variety of small phials, covered gallipots, and porcelain jars containing chemicals, solid and liquid.

The floor was strewn with mortars of many shapes and sizes some without their pestles, with fire shovels, tongs and



pokers, wood for kindling and clumsy axes for chopping the same, and in a corner removed from the dust of furnaces, near a window, lay several ponderous folios and smaller books besides manuscripts of hermetic lore, in some of which the crude drawings had been colored to make them more attractive. On wooden pins, driven into crevices of the stone walls at convenient spots, hung utensils identical in shape

with those used in culinary operations, but the fragments of red saffron of Mars, blue vitriol, and verdigris, together with patches of brown lutes, gave them an aspect far from appetizing.

The centre of the smaller room was almost filled with an apparatus conspicuous from its great size and eccentric shape; it consisted of a hollow, metal pipe nearly nine feet high pierced with ten round holes through which passed the lengthened glass necks of alembics below and the shorter necks of receptacles above, the latter supported on brackets fixed to the wall. The necks of the two alembics, connected with cucurbits resting on furnaces, were bent into S-shaped curves so that they entered the central pipe at each of the five openings; water poured in at the top of the pipe was drawn off by a spigot near the base. This imposing apparatus for distilling brandy had been made after a pattern devised many years before by Brunswick, but at the time of which we write was no longer in use having been abandoned for simpler contrivances.

Suspended from the smoke begrimed rafters was a stuffed crocodile and a rare bird of Asiatic origin, whose brilliant plumage was now entirely concealed by the dust and dirt of years of neglect.

In the long corridor leading into these rooms lay piles of charcoal, earthenware crucibles, boxes of materials for fire-resisting lutes, and coarser chemical substances, together with utensils of iron, copper and brass, most of them in sad need of scouring. Throughout an air of disorder and carelessness prevailed; the murky atmosphere was scarcely pierced by the sunbeams admitted through the windows cut at irregular elevations opposite the furnaces. Of furniture properly speaking there was very little; a few stools, one chair of comfortable aspect in front of a still, and a massive table of rude

construction, on which lay a sandglass, sieves, knives, scissors, and so littered with broken funnels, scraps of paper, fragments of alembics and earthen jars, as to prevent a legitimate use of the table.

Near the door of the corridor leading without stood two covered barrels of water. Along the side was a series of low steps on each of which was a cucurbit, or bowl, arranged



B. Audren sculp.

AN ALCHEMIST'S LABORATORY.

Teniers.

so as to make a self-filtering battery of ancient style; a wad of lampwick hung in each vessel like a siphon through which the liquid trickled slowly.

Several alchemists and physicians, assisted in manual drudgery by their servants, were at work in this laboratory. Dr. Leonhard von Erbach was distilling from glass a quantity of dew that he had collected at early dawn when the Moon was in Sagittarius; after twenty-nine distillations it would furnish the physician with a precious panacea for


















divers maladies, and would be prescribed to patients able to pay in golden ducats. Two apprentices were occupied in chopping bark from a small tree-trunk and in pulverizing the elastic woody fibre; another was preparing a furnace for the preparation of *Crocus Veneris* which required varying degrees of heat. Apart from observation von Hirschberg was compounding a philtre having aphrodisiac powers, destined to fetch a golden harvest from a credulous lady of the Emperor's household.



Seated on a stool near a window Dr. Michael Maier was intently examining a manuscript containing numerous secret symbols, the exact meaning of which he was writing between the lines. The few leaves of this modern manuscript constituted a short epistle addressed to Emperor Rudolph by Dr. Johann Brückner, Professor of Medicine at Königsberg, and referred by his Majesty to Dr. Maier for interpretation. Rudolph lacked esoteric knowledge of the hermetic characters and believing it to contain the secret of the Philosophers' Stone he had commanded his learned Secretary to decipher it; this Maier finally completed and the document sent to Rudolph greatly pleased him.





The letter from Brückner, or Pontanus, as he generally called himself, was in part as follows; Maier's explanations are also given.

"TO MY most gracious and exalted Master, the most Potent Lord of the Holy Roman Empire, King of Hungary and Bohemia, RUDOLPHUS II., greeting. I, John Pontanus, have travelled through many countries that I might know the certainty of the Philosophers' Stone; and passing through the universe I found many deceivers, but no true Philosophers, which put me on incessant studying, and making many doubts, till at length I found out the truth. But when I had








attained the knowledge of the matter in general yet I erred at least two hundred times before I could attain to know the singular thing itself, with the work and the practice thereof.

First, I began with  of the  which I continued for 9  together and obtained nothing. I then for some certain time proved a , but in vain. After that I used a  of  for 3  space and still found myself out of the way. I essayed all sorts of  and  and  as the  Geber, Archelaus, and all the rest of them have prescribed, and yet found nothing. In sum I attempted to perfect the whole work of alchemy by all imaginable and likely means, as by    and other heats of divers kinds all of which are found in the books of  yet without any success. I yet continually for 3  together studied the books of , that chiefly in Hermes whose concise words comprehend the sum of the whole matter, viz. the secret of the Philosophers' Stone, by an obscure way of speaking, of what is superior, and what is inferior, to wit, of heaven and earth. Therefore our

operation which brings the  into being in the first,
matter
 second and third work, is not the heat of a  nor of
bath


 nor of  nor of the other  which 
horse-dung ashes fire philosophers
 excogitate in their books. Shall I demand then what is it
 that perfects the work, since the wise men have thus con-
 cealed it? Truly, being moved with a generous spirit, I will
 declare it, with the complement of the whole work.



The *Lapis Philosophorum*, therefore, is but one though
 it has many names, which before you conceive them will be



very difficult. For it is of     it is 
water, air, fire, earth; salt,
  and phlegm; it is sulfurous, yet is *argent vive*;
sulfur, mercury



it has many superfluities which are turned into the true
 essence by the help of our fire. He which separates anything
 from the subject or matter, thinking it to be necessary,
 wholly errs in his philosophy. That which is superfluous,
 unclean, filthy, feculent, and in a word, the whole substance
 of the subject is transmuted or changed into a perfect, fixed
 and spiritual body, by the help of our fire which the wise
 men never revealed.

* * * * *

Now the practical part is this: let the  be taken
matter

and diligently  with the contrition of , put it
ground philosophers

upon the  with such a  that it only excite or
fire degree of heat

stir up the ; and in a short time that  without


matter

fire

any laying on of hands will  the whole work because


complete

it putrefies, corrupts, generates, and perfects, and makes the three principal colors, viz., the black, white and red to appear. And by the means of this our fire the medicine will be multiplied (by addition of the crude matter not only in quantity but also in quality or virtue. Therefore, seek out this fire with all thy industry, for having once found it thou shalt accomplish thy desire, because it performs the whole work,


and is the true key of all the  which they never yet

philosophers


revealed. Consider well of what I have spoken concerning

the properties of this , and thou must know it, otherwise it will be hid from thine eyes.

fire

Being moved with generosity I have written you these things, but that I might speak plainly, this  is not trans-

fire

mutated with the  because it is nothing of the matter,

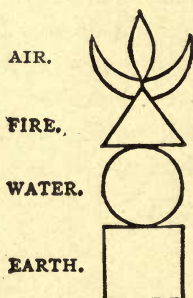
matter

as I have before declared. And these things I thought fit to speak as a warning to the proudest sons of art that they spend not their money unprofitably, but may know what they ought to look after; for by this only they may attain to the perfection of this secret, and by no other means.

Farewell.

Before transmitting this letter with the interlineations to the Emperor, Maier added a note on the general subject of secret characters; he stated that "the well known symbols

for the seven metals were naturally those of the planets associated with them; the universal primordial elements, earth, water, air and fire, are designated by signs so well known that secrecy is no longer a feature of their use. Their antiquity is very great for they are found sculptured with slight modifications on Hindoo monuments in China of unknown age."



"Secrecy is sometimes secured by using entirely dissimilar characters for one article, or one operation, as a crucible for example; still more perplexing is the use of a single character for several unrelated objects. The arbitrary nature of these symbols has necessitated keys explaining them; of those in print one of the clearest is appended to Heinrich Eschenreuter's Treatises. These were discovered on the 6th of May 1403 in the walls of the cloister connected with the Church at Schwartzbach by an adept in alchemy who again hid them in the Cloister Marienzell, Thuringia. There they were re-discovered 10th October 1489. The best modern editions contain a key to the numerous characters found therein; the key is doubtless in the possession of the imperial Librarian, nevertheless, I, Heinrich Maier, transmit a copy, by means of which all inscrutable mysteries may be revealed and problems solved."

A portion of this key is here reproduced; in the original the defining words were in Latin and spelled backwards the greater to mystify the uninitiated.

To Distil. Aqua Fortis. Aqua Regalis. A Brick. To Calcine.

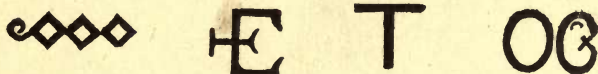


Camphire.

Ashes.

Cerusse.

Lime.

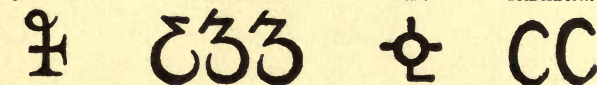


Quicklime.

Cinnabar.

Wax.

Hartshorn.



A Crucible.

Crystal.

A Gum.



Oil.

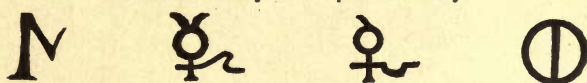
Steel Filings.

Litharge.



To Lute. Sublimated Mercury. Precipitated Mercury.

Nitre.



Realgar.

Sand.

Soap.



KEY TO SYMBOLS.



CHAPTER XIV.

A TRAGEDY IN THE ROYAL MEWS.

"In my shop of drugs are stored
Many things of sweet accord;
Spices with sugar I combine,
Enemas and purges I divine.
To strengthen the weak and the sickly,
Refreshing draughts I furnish quickly;
All these with utmost care,
On prescriptions, I prepare."

Hans Sachs.



ON A sultry evening in midsummer a group of peasants were busy weeding the plants and trimming the shrubs in the stiffly designed pleasure garden of the Emperor, that formed such an agreeable feature of the low ground bordering the north side of the Hradschin. Directing their labors with taste and skill was a fair-haired, comely young man of attractive presence, whose intellectual physiognomy stamped him as a man superior to those working with spade and pruning-knife. In the admirable disposition of the blooming plants and in the grouping of the small trees, the young florist showed the taste of a landscape artist; and his close inspection of the parts of a rare blossom that he picked off the ground from beneath a foreign-looking plant, showed that he had acquired the scientific method of looking at flowers characteristic of a botanist. He separated the leaf-shaped, brightly colored parts of the

flower, examined the central axis and the delicate filamentous stalks surrounding it, noting the minutest details with the aid of a bean-shaped piece of glass; as he threw down the fragments of the flower one by one, he was watched by one of the older peasants who sighed and drew his hand across his low forehead with a significant gesture to indicate to his fellow-workmen that their superintendent was mentally unbalanced.

The sun was getting low and the young man dismissed the gardeners, and turned his steps down the hill towards the river; passing near the animal cages the savage beasts showed by their antics that they regarded the florist as a friend, Ottakar, Rudolph's pet lion, uttering a gentle growl of greeting. Following the winding path to the riverside, Jacob Horcicky, for that was the name of the embryo botanist, crossed the dwindling Moldau on the old stone bridge built by Karl IV; here he was overtaken by a trim young army officer, whose costume and decorations proclaimed him a lieutenant of cavalry, and who shortened his stride to accost Jacob in a cordial, almost affectionate manner that met a like response. Together they threaded the ill-paved, narrow streets of Old Prague; the Officer talked about the splendid horses in the royal stables where he was on duty and called them by endearing names; Jacob chatted about domestic affairs and both made frequent mention of a certain lovely Fräulein Sofie whose capricious ways seemed to distress the Lieutenant.

Skirting the ancient Jew's cemetery, the two friends reached Gypsy Street and soon entered the archway of a well-kept double house; on the right hand side of the passage was a door over which a sign "The City Pharmacy" indicated the nature of the business conducted within; alongside of the door a window having a sill breast-high and extra

broad permitted would-be customers to communicate with the apothecary without entering the shop. Glancing through this window, Jacob pushed to one side the sliding sash, greeted filially the elder of the occupants, and then taking the Lieutenant's arm the two entered the living rooms on the opposite side of the passage.

Almost at the same moment there emerged from the shop one of the apprentices whose dark eyes and regular features betrayed his Italian parentage; limping slightly he went through the passage towards the laboratory in the courtyard, and noticing a silver spur with a broken buckle on the pavement, he furtively picked it up and concealed it on his person; as soon as he reached the laboratory he drew forth the spur and noted with a grim smile that the letter "S" was engraved on it; looking towards the family apartments with a hideous leer of jealous anger that entirely transformed his handsome face, he murmured under his breath two words — — "Sofie", and "vendetta"!

The pharmacy of Christian Horcicky was the best appointed in the Capital of Bohemia and was noted for the purity of its medicines as well as for the accuracy with which the most complex prescriptions were compounded. Persons entering the front shop saw against the walls on two sides a double row of drawers, some shallow and some deeper, above which ran wooden counters and shelving reaching nearly to the ceiling; on the stone floor stood heavy tables, a mortar mounted on a pedestal made of a tree trunk, and some stools; across one end, under the window opening into the street, ran a counter on which the work of mixing powders, rolling pills, making salves, and compounding the simpler prescriptions was performed. Above the counter, hanging within convenient reach, were two pair of scales; alongside of the window was a hanging shelf carrying meas-

uring jars, bottles of many shapes and sizes, horn spoons and other paraphernalia required in pharmaceutical operations. Fastened against the wall so as to attract the eye of a customer entering, were the diploma of the proprietor and his license to keep a pharmacy. From the ceiling hung a small stuffed crocodile, the carapace of a tortoise and bundles of dried aromatic herbs.

The drawers, shelves and cupboards of "The City Pharmacy" were well stocked with the substances dispensed for external and internal remedies by the apothecaries of the period. Alum, salt, sulfur, white arsenic, spermaceti, salt-petre, vitriol, sal ammoniac, Armenian bole, coral, mother-of-pearl, crocus martis, crocus veneris, amber, antimony, turpeth mineral, album Graecum, crab's eyes, wax, were on hand, as well as the highly esteemed bezoar stone, ambergris, human skull, asses' hoofs, dried toads, and the cast-off skins of vipers, so useful in dropsy. In large wooden boxes were stored the dried leaves, flowers, seeds, bark and roots of many aromatic herbs, including saffron, ginger, elder, wormwood, borage, rhubarb, aloes, jalap, rue, Abyssinian myrrh, Solomon's seal, and St. John' wort, gathered on St. John's day, and much in demand for expelling evil spirits from sick persons.

Trefoil, vervain, John's wort, dill,
Hinder witches of their will."

The little explored New World across the Atlantic had begun to contribute its valuable remedies, notably china root, cosa, sarsaparilla and tobacco. Spenser enumerates other medicinal plants in the following lines:

"The mournful cypress grew in greatest store;
And trees of bitter gall, and ebon sad.
Dead sleeping poppy, and black hellebore,
Cold coloquintida, and tetra mad;
Mortal samnitis, and cicuta bad;
With which th' unjust Athenians made to die
Wise Socrates."

On the shelves stood gallipots of earthenware containing lard, marrow, goose-fat and other greasy substances; in boxes of horn, china, zinc and even of silver (for costly materials), were ointments, salves, unguents, balsams, confortatives and extracts of the more solid kind. Besides these the shelves were crowded with boxes of plasters, clysters, ataplasms, liniments, electuaries, and favorite remedies, such as "oppodeldoch" and "panchymagog."

In glass bottles, grouped on another row of shelves, were the strong acids, oil of vitriol, spirit of salt, and aqua fortis; spirits of wine, turpentine oil, petroleum, mercury, essential oils, besides elixirs and "aquae" without end, of which the most popular were "aqua benedicta" and "aqua mirabilis." The apothecary kept on hand also quantities of tinctures, essences, quintessences and ready made pills; of the latter the "hiera picra Rhasis," "the pillulae alephanginae Mesuae," and "pillulae pestilenciales Ruffi" were in constant demand. Among the frequently prescribed remedies were the "diambar," the "diamargariton calidum," "thryphera," the expensive "collyrium of Danares," and the complex mixtures called "theriac" and "mithridat." Theriac was compounded of from sixty-five to ninety-seven ingredients belonging to the mineral, vegetable and animal kingdoms, and included such nauseous things as troches of vipers, and portions of wild animals not named in fastidious society. The great expense attending the preparation of a medicament embracing so many and so rare ingredients caused physicians to devise simpler ones for the poor; thus the sixty-three substances of the famous "theriac of Andromachus" were reduced in number to four and in this form was sometimes called "diateson"; its composition was roots of gentian, of birthwort, and of bay-laurel, with myrrh mixed with honey to form an electuary. The "mithridat of Damocles" was compounded of

forty-nine ingredients, some of which were complex in themselves.

A liniment used in sciatica affords a good example of the prescriptions sent in to the City Pharmacy: "Take three little new-born dogs and three living moles, one pound of earthworms, leaves of laurel, rosemary, mint, sweet marjorem, lavender, thyme, St. John's wort, of each a handful; boil these ingredients in three pounds of oil mixed with common wine until the latter is consumed; then pour out and express the liquid from the solids, add to the liquid yellow wax and goose-fat each ten ounces. Good for rheumatism and sciatica; apply it to the skin heated before a fire, and repeat as often as required."

Such nostrums were not peculiar to Central Europe, the English poet Chaucer wrote two centuries before Rudolph began to reign;

"A day or two ye shall have digestives
Of wormes, 'ere ye take your laxatives
Of laurel, centaury and fumetere,
Or else of elderberry that groweth there.
Of catapuce, or of the gaitre berries,
Or herb ivy growing in our yard that merry is."

Some of the prescriptions sent in to Christian Horcicky called for ingredients that required time and trouble to secure; as for example the oil of frog's spawn (used for chilblains), and the liver of a mad dog (or of a wolf) washed with wine and dried in an oven, a specific for hydrophobia. Perhaps the delay in supplying such concoctions permitted the patients to gain enough strength to withstand the nauseous doses.

A full supply of hair-dyes, hair-invigorators, insect-powders, eye-washes and cosmetics were constantly on hand; among the substances used to beautify complexions was an unguent made of white wax, spermaceti, borax, alum and

oil of cole seed which was spread upon a cloth worn as a masque at night. A favorite face-wash was made by macerating two young pigeons with bread, almonds, and peach kernels in goat's milk and then adding borax, camphor, candied sugar, and powdered alum, the liquid being exposed three days to the sun, kept fifteen days in a cellar and filtered. The wild cucumber was held in esteem as a preventive of wrinkles, and bull's gall for removing freckles. The cosmetics formed a lucrative branch of the business of the pharmacy, hardly less so was the sale of love philtres; of these the most important constituents were the East Indian resin called dragon's blood, mandragora, cantharides, vervain and other aphrodisiacal herbs; but the most highly esteemed contained the gall of a man, the eyes of a black cat, or the blood of a bat.

"Strait to the 'pothecary's shop I went
And in love-powder all my money spent;
Behap what will, next Sunday after prayers,
When to the ale-house Lubberkin repairs,
These golden flies into his mug I'll throw
And soon the swain with fervent love shall glow."

Philtres were made not only for exciting amorous passions, but also for quenching them:—

"If so a toad be laid
In a sheepskin newly flaid,
And that ty'd to man, 't will sever
Him and his affections ever."

Allied to the philtres were the charms superstitiously worn or carried on the person to ward off the evil eye, pestilence and malignant diseases; moles' feet fastened to one's garters and worn continually were a recognized charm to ward off gout; the leaves of shepherd's purse worn in shoes next the skin was a specific against toothache. Horcicky's shop kept all these innocent charms in stock, but the master

declined conscientiously to deal in abrunes, or images carved out of mandrake roots which were consulted as oracles, in order not to countenance such impious superstitions.

A profitable class of substances commonly sold in pharmacies of the sixteenth century remains to be mentioned; these were cane sugar (generally kept in cones and cut off as wanted), treacle, honey and varieties of syrups, conserves, lohocks, confections and robs, of which the basis was sugar or honey. The apothecary also dealt in spices, cordials, distilled waters and fumigating pastilles, as well as sealing-wax, paper, ink and pens.

Jacob's knowledge of botany was of great assistance to Christian Horcicky in the collection and identification of medicinal plants, both indigenous and exotic; together they had invented a toilet-water that was in great demand as a medicine and perfume in court circles and among the wealthy aristocrats of all Bohemia. This prototype of the modern Eau de Cologne was made by distilling essential oils of plants cultivated for the purpose, and was sold under the name *Aqua Sinapii*, Sinapius being the Latinized form of the Bohemian name Horcicky, which by the way signifies mustard (*Sinapis*).

Aqua Sinapii was manufactured at the laboratory in the court-yard, where also all operations requiring intense heat, such as fusion and sublimation, were carried on; there too, distillations were conducted and secret arcana were prepared by the hardworked apprentice Carlo Malombra, a Venetian, assisted by Ferdinand Horcicky, Christian's younger son. The laboratory was a stone building so placed on sloping ground as to have two stories on the front and but one at the back; in the lower room, almost as dark as a cellar, were several furnaces, some furnished with artificial blasts and some built for gentler fires, besides water-baths, filtering

sleeves, pelicans and mortars; without the door were piles of charcoal.

“And sundry vessels made of earth and glass,
Our urinals and our descensories;
Phials and crosslets and sublimatories,
Cucurbits and alembikes eke
And other such, dear enough a leek.”

In the upper room was kept a large stock of dried herbs, also casks of wine and small kegs of oil. In one corner, on a table under a window, lay several herbals and a good selection of the most valuable pharmacopoeias; these included Otto Brunfels' "Reformation of Pharmacy" (Mayence, 1536), Ryff's "Book of Confections" (Strassburg, 1548), and the latest edition of the admirable work by Valerius Cordus, published at Antwerp in 1580 under the title "Pharmacorum conficiendorum ratio, vulgo vocant Dispensatorium."

All day and late into the night the apprentices labored mightily with mortar and pestle, with coals and bellows, cucurbits and stillatories, preparing the monstrous remedies dispensed in the front shop; to the upper room repaired also Christian himself when he was engaged in uroscopy, another regular and lucrative source of income.

When alone Carlo Malombra brooded over unrequited love for his master's lovely daughter, and cursed the day that brought Lieutenant Maximilian Swoboda into the family circle of the Horcickys; he, Carlo, was well born, being the nephew of the Venetian artist Pietro Malombra, and he felt indignant at the menial position he filled. He had been clerk to one of the Professors of medicine at the University of Padua, but an awkward event, in which the deadly Aqua Toffinia had been too freely used and with which his name was connected, caused him to bury himself, as he thought, in the wilds of unpolished Bohemia.

On a beautifully, clear, refreshing morning in the month

of September, after a sleepless night, caused by overfeeding and insufficient exercise, the Emperor Rudolph left his private rooms, accompanied by a valet, to take a stroll through the pleasure garden and to visit the well-stocked stables; he remembered with a half melancholy smile that he had ordered the name of the snow-white Arabian stallion changed from "Kelley" to "Sendivogius," but events had proved that the latter was no more desirable than the former. As he approached the royal mews he saw a group of officers and men gesticulating and talking in agitated tones as if of some calamity, and on inquiry of the imperial Master of the stables, Colonel von Podebrad, he learned the cause of the disturbance. During the night several of the horses had been taken ill, two of them in fact, "Eva" and "Clelia," Rudolph's pets, were already dead, "Gilles Sadeler" and "Magdalena" were in a critical condition, and "Johann von Aachen" was convalescent; the obvious cause was poisoned oats introduced into the mangers by some unknown person; two clues to the criminal had been found, viz:—a peasant's basket in the shrubbery below the stables, and a silver spur marked "S" in one of the stalls.

The usually impassive Emperor became enraged almost beyond the limits of dignity, and summoning the Vice Chancellor, who came in all haste, he placed in Curtius' hands the investigation, urging him to spare no pains to discover the guilty miscreant. The men on watch the preceding night were arrested at once, and the Colonel was warned of similar danger.

News of the tragedy in the royal mews spread rapidly, and when the citizens of Old Prague and the residents of the Hradschin heard that Lieutenant Maximilian Swoboda had been arrested on good grounds and confined in Daliborka Tower, they were moved with indignation, amazement and

pity. Those who did not know of the tell-tale spur were disposed to accuse members of a band of gypsies who had encamped on the hills in the outskirts of the City, especially as



A PHARMACY IN XVI. CENTURY.

one of their number was known to have failed in his attempt to sell to the master of the stables a splendid horse brought from Hungary, and had been heard to threaten vengeance;

the entire band of seventeen persons, representing four generations, was arrested and confined in barracks, where they were destined to linger many a weary month, forgotten of their captors.

In the Horcicky household consternation raged; Christian, his wife Dorothea, Jacob and Ferdinand were overwhelmed with grief, Sofie was prostrated, and Carlo Malombra was voluble in sympathetic inquiries and protestations of distress. Two days passed and they seemed like so many months to the friends of the Lieutenant who was not allowed to communicate with a living soul; at length, however, Fräulein Sofie recovered her composure and pointed out to her brother Jacob the total lack of a motive on the part of her fiancé, and spoke of his great affection for and devotion to the mute animals under his care; Jacob then waited on the clerk of the tribunal having charge of the case and made a strong impression on him in favor of Swoboda.

On the morning of the third day Dr. Michael Maier called at the City Pharmacy to purchase for his own use a bottle of Aqua Sinapii, and expressed surprise at the dejected appearance of the Horcickys, father and son; on hearing from them the tragedy of the mews and of the arrest of his young friend Maximilian, he said that he believed he could clear the officer from suspicion. The Doctor and Jacob hastened to the Vice Chancellor, who admitted them at once to his private chamber; there Doctor Maier made the following statement: On the night of the equine catastrophe the moon was in Aries, which was favorable for gathering human skull to be used in a magical potion for which he was gradually securing the ingredients; accordingly he started about two o'clock in the morning to collect the material in the old Jews' cemetery, and as he passed through the royal gardens he encountered a man creeping along, screened by the shrubbery

and trees. Concealing himself, the Doctor watched the man who was dressed like a peasant, carried a basket in his hand and stealthily approached the stables. After collecting the bones in the graveyard he was returning to the Hradschin when he met a messenger from Baron von Zelewski summoning him to the bedside of his wife; he drove to the Baron's residence in Wyschehrad, a suburb of Old Prague, and there he had been professionally detained two nights; thus it happened that he first heard of the sad affair that agitated the whole City when he called at Horcicky's Pharmacy.

Questioned by Jacob, who began to see daylight, Dr. Maier said the peasant was short and stout and walked with a limp as if one leg was shorter than the other. Horcicky then explained to the Vice Chancellor how the Venetian apprentice, jealous of the Lieutenant's betrothal to Fräulein Sofie, had probably sought to inculcate him in the dastardly deed; the description of the supposed peasant's appearance and halting gait tallied exactly with that of Carlo Malombra.

Then Curtius dismissed the physician and the botanist, ordered the Italian put to the question and soon extorted from him a full confession. On reporting these facts to the Emperor, his Majesty decreed that the wretched man should be confined in the uppermost room of the Hunger Tower, and that he should be supplied with a plenty of delicate food and drink, all impregnated with the poison "aqua Toffnina" that had proved fatal to the royal animals. The decree was carried out with refined cruelty, and the horrible fate of Malombra can be guessed.

Swoboda was promoted to be Captain of the Royal Dragoons and Jacob Horcicky, now better known as Sinapius, was made Director of the Imperial Botanic Gardens.



CHAPTER XV.

RUDOLPH'S DREAM.

"I asked Philosophy how I should
Have of her the thing I would;
She answered me when I was able
To make the Water malliable;
Or else the way if I could finde
To mesure out a yard of Winde;
Then shalt thou have thine own desire,
When thou can'st weigh an ounce of Fire;
Unless that thou can'st doe these three,
Content thyself, thou get'st not me."



ABBI BEZALEL LOEW the erudite philosopher, like all his co-religionists, lived in the Ghetto of Prague, but his house in "Broad Street" was distinguished above those of his neighbors by a lion carved in stone placed over the doorway. This symbol of his family name commemorated an incident that had caused unending wonderment among the inhabitants of the Jew's quarter, a visit from the occupant of the imperial throne of Germany, who had condescended to penetrate the sombre streets of the despised Ghetto and to enter the humble dwelling of his Hebrew subject, in order to express in this conspicuous way his admiration for the learning and the virtue of the tenant.

The common folk of the Ghetto, as well as of the rest of the City, attributed to the benevolent Rabbi supernatural powers, but never accused him of using them for evil purposes; his learning extended not only to the mysteries of the Kabbala but to many branches of natural philosophy as well, and his knowledge of the camera obscura, experiments with which had been shown to a few privileged friends, formed a fairly substantial basis for their belief; he was popularly supposed to have transferred to his dwelling in the Ghetto by magic spells, the hundred-windowed palace on the Hradschin and to have exhibited the marvel to Rudolph on the occasion of his memorable visit. Had the modest philosopher been known to Gabriel Naudé, the Frenchman would have included him in the list of honorable men defended in his "*Apologie pour les grands hommes soupçonnez de magie*," written a few years later.

The gifted Rabbi was believed to have surpassed the achievement of the English Bare-foot monk of the thirteenth century, called by scolastics "*Doctor Mirabilis*," on account of his prodigious learning; according to tradition Roger Bacon had made a human head out of brass and had endowed it with the power of speech, and rumor reported that Loew, by the aid of kabbalistic formulae and supernatural gifts, had formed of clay a dwarf possessing attributes far more marvellous than those of the brazen head. The "*Hebrew Roger Bacon of Prague*" by touching the forehead of the inanimate dwarf with his consecrated finger and impressing thereon the mystical letters

G O L E M

had communicated to it life, willpower and intelligence. This automaton long served his master with cheerful obedience; on the Sabbath and on Holy days of the Israelites, the dwarf

cleansed the sacred candlesticks, prepared the table for meals, and did all the house-work necessary to the comfort of the orthodox Rabbi and his daughter, but forbidden them by authority of the Hebrew fathers.

Not content with this extravagant tale, rumor noised abroad further details of the experience of the Bohemian wizard with his home-made servant. The dwarf, though requiring no nourishment, grew in size gradually, becoming a huge giant bigger than Goliath and stronger than Samson; such superhuman strength did he possess that he snapped trunks of trees like wheat-straws, and lifted enormous weights as easily as a child raises a loaf of bread. One Friday evening as the pious Rabbi was about to offer thanks for the supper spread upon the table, the giant presuming on his strength dared to resist the will of his gentle and yet powerful master and refused to obey the order to polish the brass candlesticks; he forgot himself so far as to threaten the Hebrew sage and proposed to crush him between two of his artificial fingers like an unconscious egg, unless he was permitted to sit at the table and to share in the evening meal. Being stoutly refused, the giant then broke into a great rage and threatened to destroy every movable thing in the entire house; thereupon his master spoke to him as follows: "You seem to have forgotten that notwithstanding your immense strength of arm you are but a miserable lump of clay which shall retain life and power only so long as you obey my wishes and serve me faithfully; since in your silly bravado you dare to oppose your will to mine, I will show you that the weakling Bezalel Loew is nevertheless stronger than an unthankful, senseless lump of clay; kneel and humbly beg my pardon!"

The giant, however, broke into a demoniacal laugh so boisterous that the windows of the apartment were shattered.

"You cowardly brute, do you still think to oppose me who can destroy you by a thought!"

The foolish giant replied: "Destroy me if you can," and attempted to raise his right arm to crush his master, when he felt a numbness creeping throughout his limbs that deprived him of strength as well as of vain confidence. "What is it?" he cried.

"Your punishment and annihilation," said the Rabbi, who then rose from the table and with a stroke of his finger erased from the swelling forehead of the giant the kabbalistic letters

G O L E M,

and at the same instant the automaton, deprived of vital energy, fell to the ground and broke into a thousand pieces.

"Er war gewesen," quietly remarked the Rabbi, who gave thanks to Jehovah for his mercies and proceeded unmoved to finish his evening meal.

The innocent subject of these wild and uncontroverted legends sat in an easy chair one stormy winter night, before a blazing wood fire that lighted the room more brilliantly than the highly ornamental lamp on the table at his side. On his knees lay a recently published book entitled "*Symbola divina et humana*," written by his friend Jacques Typot, a Fleming who held the post of librarian to the Emperor; the book was a collection of mottoes and emblems of Popes, Emperors and Kings, and was sumptuously illustrated with copper plates engraved by Gilles Sadeler. Low, however, was not thinking of the volume but of the singular history of the author.

Jacques Typot, after studying jurisprudence in the most celebrated schools of the Netherlands, as well as at Padua and Bologna, was invited to Stockholm by Sigismund III.,

King of Sweden and Poland, who appointed him royal Councillor. He rose rapidly to great eminence and thereby excited the envy and hatred of the Swedish Fieldmarshal Pontus de la Gardie, and after publication of a history of the Kingdom of Sweden that displeased those in power, the army officer accused him of treason and secured a judgment of death against him; by the intercession of his brother Matthias, however, the penalty was reduced to imprisonment for ten years and subsequent banishment from Sweden. The miserable decade ended in 1595, Typot then went to Germany where his works "De fortuna" and "De fato," attracted the attention of Rudolph who appointed him royal historian at a large salary. In Sweden Typot had been sentenced to be beheaded, and Rudolph with a rare humor always called him "the headless."

Loew and Typot had become warm friends and it was merely a trifling coincidence that the historian, accompanied by Dr. Michael Maier, was announced just as the Rabbi awoke from his reveries; the two were cordially received, their snow-covered garments were laid aside, and their host ordered hot mulled wine to be prepared for their refreshment. Dr. Maier, who had Hebrew ancestors on his mother's side, was no stranger at the Lion House; he and the Rabbi were wont to discuss cosmology, pneumatology and theosophy sometimes far into the small hours of the night. The learned Doctor was a plain featured man, having high cheek bones, a long nose, square jaws, a chin beard and mustache tapering at each end; his rotund body with square shoulders was supported by slender legs that seemed inadequate for the purpose. He affected fashionable and luxurious garments and habitually wore a wide linen collar shaped like a yoke; from his neck was suspended a decoration. He called on Loew with Typotius to have a triangular conference about

the illustrations to be used in his forth-coming book "Atalanta fugiens, or New Emblems of the Secrets of Nature."

The three philosophers were soon in deep consultation; Dr. Maier exhibited a beautifully drawn sketch of the illuminated title-page of his book. On the left side and upper part appeared the Garden of the Hesperides, Hercules, clad in a lion's skin and carrying a club over his shoulder, was plucking the golden apples; the two sisters Aegle and Arethusa were in friendly conversation, the third sister Hesper-tusa looking on; beneath the trees the many-headed monster Ladon was vainly guarding the fruit. On the right hand side and below, Venus was handing golden apples to the youth Hippomenes, who appeared again below running a race with the fair Atalanta, and dropping the precious fruit which the damsel stooped to pick up, thereby losing the race; in the corner was the sanctuary of Cybele, and near by a lion and a lioness promenading, into which animals the enraged goddess had transformed the guilty pair.

Both Loew and Tygotius declared the symbolic drawing could not be improved and the three turned to another emblem depicting "Mother Earth;" a nude woman stood erect in a fertile landscape, her neck, shoulders and trunk being drawn so as to represent the terrestrial globe furnished with feminine paps; she was giving suck to an infant supported on her right arm. Below on her right, Jupiter was being suckled by a goat, on her left Romulus and Remus were nursed by a wolf; in the background were castles and mountain peaks; above was the legend "Nutrix ejus terra est," a phrase occurring in the Emerald Tablet. Examination of this emblem directed the thoughts of the Rabbi to the genesis of the world, and having secured the attention of his guests, he lay back in his easy chair, closed his eyes and discoursed as follows:

“Jehovah created all things by his word, saying: “Be,” and they were made; together with the four elements, earth, water, air and fire, which He coagulated, and contrary things were commingled, for we see that fire is hostile to water, and water hostile to fire, and both are hostile to earth and air. Yet Jehovah united them peacefully and out of them all things are created—heaven and the throne thereof; the angels; the sun, moon and stars; earth and sea, with all things that are in the sea, which indeed are various, for their natures have been made diverse by Jehovah. Now this diversity exists in all creatures, because they were made out of different elements; had they been created out of one element, they would have been agreeing natures. But diverse elements being here mingled, they lose their own natures, because the dry being mixed with the humid and the cold combined with the hot become neither cold nor hot; so also the humid being mixed with the dry becomes neither dry nor humid. When the four elements are comingled they agree, and thence proceed creatures that never reach perfection except they be left by night to putrefy and become visibly corrupt; Jehovah further completed His work by imparting life and government.”

Rabbi Loew paused long enough to drain a glass of wine and proceeded:—

“In the disposition of these four elements is a secret arcanum; two of them are perceptible to the sense of touch and vision viz: earth and water the virtue of which is well known; but the other two are neither visible nor tangible, which yield naught, whereof the place is never seen, nor are their operations and value known.”

Dr. Maier replying to his friend said: “Your characterization of the genesis and nature of the four elements is plausible, but we must remember that our great master Paracelsus taught us otherwise.” “When creation took

place," he wrote, "the Yliaster divided itself and developed out of itself the Ideos or Primordial Essence; this is of a monistic nature and manifests itself not only as a vital activity, a spiritual force, an invisible, incomprehensible and indescribable power, but also as vital matter of which the sub-



stance of living beings consists. In the Limbus, or Ideos of primordial matter, the matrix of all created things, the substance of all things is contained. As creation took place and the Yliaster dissolved, Ares, the differentiating power of the Supreme Cause began to act; all production took place in con-

sequence of separation, and out of the Ideos were born the elements of Fire, Earth, Water and Air." These facts by the way are represented in my "*Atalanta fugiens*" by four nude men bearing in their hands the substances they symbolize; this, and each of the other emblems, fifty in all, is explained by Latin verses set to music, which you will all admit is a novel feature."

Having thus cleverly turned the conversation away from the philosophy of genesis, the examination of the sketches prepared for illustrating Maier's book was resumed and occupied the three friends for a long time.

Jacques Typot, who had listened intently while Loew and Maier were talking, then addressed them as follows:—"Being a historian and not a philosopher I am not learned in the things whereof you have been speaking, but I have long held an opinion as to the primordial elements that differs from any hitherto advanced; you speak of four elements, whereas I find the number may well be reduced to two;—viz: earth and water; the first is fixed and indestructible and out of it comes forth fire; water is volatile and vaporous, and is easily changed into air, as every one knows who boils a kettle."

This theory was not favorably received by the conservative Rabbi, and he and Dr. Maier were arguing the proposition of Typotius, when another visitor was announced, no less a personage than Dr. Gottfried Steegius. The new-comer was made welcome and refreshment was offered; Loew perceiving that he had news to communicate urged him to speak at once; the Doctor then stated that he had just been consulted by his Majesty, the Emperor, who sought to have a singular dream interpreted that had disturbed his slumbers on the preceding night; he, Steegius, being unable to explain it, had been commissioned by the Emperor to confer with

the learned Hebrew. The Rabbi, the physician and the historian manifested great curiosity to hear the dream; Dr. Steegius said he would relate the dream in the Emperor's own words.

"In the midst of a peaceful sleep I thought I stood in a forest of trees, six of which were nobler and taller than the rest, and formed a circular grove; they were marked with obscure symbols that I could not comprehend. The first tree was humid and white like tin, the second was dry and white like lead, the third was humid and black like iron, the fourth was hot, dry and red like copper, the fifth was dry and black like silver, and the sixth was hot and humid like yellow gold. In and through the grove moved swiftly a figure like that of mercury; as I was watching his eccentric movements the vision changed, the trees disappeared and I found myself in a splendid palace having fifteen rooms, on a lofty throne sat a King of noble mien, his brow encircled with a diadem and his hand grasping a sceptre of power. Before the King kneeled his son and five servants dressed in robes of different colors, and the servants implored the King to bestow on the son and on themselves shares of his power, but he did not deign to reply. Infuriated at the King's nonchalance, the son, incited by the five servants, stabbed the father as he sat upon the throne; he then caught his father's blood in his robe. Without, the servants dug a grave two handbreadths in depth and four inches in width; into this tomb the son endeavored to throw his father, but fell in himself also and was prevented from getting out by an Aquastor. The King and his son were in the tomb a very long time, and in my dream I saw their bones which were divided into nine parts by an angel who cast one part of them upon whitened and purified earth. Meanwhile the servants prayed to the Almighty to restore their King, and a second angel was sent

who cast the other eight parts of the bones on the earth where they became white, transparant and firm, while the earth became as red as rubies. A shadow passed over the scene as if a curtain of gauzy material fell before my eyes, it then rolled away and I saw the King risen from his tomb in great majesty, splendor and power. I imagined he would punish his guilty son and the wicked servants, but to my surprise the King placed crowns of gold upon their heads and proclaimed them princes in his kingdom."

Just as Dr. Steegius ceased speaking, Typotius pointed out of the window, and the others saw with surprise the sun rising unobscured by clouds; Loew instantly exclaimed: "Behold the interpretation of the Emperor's dream! The regal Sun vanquished by night is liberated from the tomb of obscurity by the aid of the angel Dawn, and rises in undiminished splendor to bestow glorious blessings on unworthy creatures!"





CHAPTER XVI.

MAGIC AND SORCERY.

"Occult Philosophy relates things which God *would* not do, which the Devil *could* not do, which none but a *liar* would assert and none but a *fool* believe."

BOHEMIA, in the reign of Rudolph II., shared with the rest of central Europe an inheritance from bygone time of mystical lore which had attained in the Middle Ages to the dignity of a philosophical system. An extraordinary "medley of fact and falsehood, of enthusiasm and imposture, of profundity and absurdity" which was current among the unlettered, inexperienced, common people, had been accepted as truth by men of superior intellectual attainments and of the highest reputation for probity, and in their hands this volume of superstitious beliefs exerted immense influence on natural and metaphysical philosophy. "Philosophers in the infancy of science are as imaginative as poets," and phenomena now explained by reference to known physical laws were regarded by them as manifestations of supernatural forces, controlled by evil demons or by beneficent spirits. Every branch of thought and learning became imbued with the supernatural; theology, philosophy, science and medicine were entrapped in "superstition's thrice entangled web."

The belief that a continual communion existed between mankind and the spirits of good and of evil, and that man could exercise authority over these celestial and infernal beings was taught by many ecclesiastics and became a part of religion; and the belief that natural objects had occult properties, that such manifestations of physical forces as thunder and lightning, earthquakes, hail, and even the light of the celestial bodies, were directed by spirits over which man had some control, became an integral doctrine of science. After several generations of people had accepted these teachings and views, the force of antiquity was added to that of authority, and "Science, scarcely more than in embryo, was unable to resist the giant spirit of Superstition that then lorded it over the intellectual world."

The investigation of the occult properties of matter together with the nature, influence, and character of spiritual beings, their mode of communication with mortals, and the ways by which their aid might be obtained became the object of Occult Philosophy. Of this there were three principal branches:

Natural Magic, which concerned itself with the occult properties of natural bodies in the animal, vegetable and mineral kingdoms:

Theurgy, or divine magic, which claimed to deal with good spirits and the angels of Heaven, and to train the soul of man to become fit to receive their beneficent gifts, as well as to learn how to see and converse with them. And

Goety, or black magic, which pretended to teach methods for securing the powerful assistance of infernal demons in carrying out evil and criminal designs; those practising it were generally supposed to have made a compact with Satan involving the loss of their souls.

The influence exerted by man over spiritual beings was thought to be consistent with natural laws; Paracelsus taught that the will of man had effect on the behavior of invisible beings, because the latter were inferior, and the lower is always subject to the higher. "The thought of man is as potent to impress a spirit as the spoken word is to impress the mind of man, for spirits have no physical ears to hear physical sounds, and the voice is only needed for those who cannot hear with the spirit." Warrant for a belief in theurgy and in goety was found in the Holy Scriptures; it was pointed out that by the exercise of supernatural powers the magicians of Pharaoh, and of Moses the man of God, changed rods into serpents, that the Hebrew plagued Egypt with bloody waters, frogs, lice, flies, murrain, emerods, hail, locusts and pestilence, parted the Red Sea, and caused water to flow from a rock in the desert. That by the same art Joshua stayed the Sun, that Elijah called down fire from Heaven and raised the dead to life, that Daniel muzzled the lions, and the three children escaped destruction in a fiery furnace. It was confidently claimed that Solomon excelled in magical arts and that his power, wealth, and eminence were secured by their exercise; moreover the experience of King Saul at En-Dor, with the woman that had a familiar spirit, and the appearance of the Eastern Magi at Bethlehem, were accounted incontestable proofs of the highest activity in occult science.

Many of the extravagant superstitions about the magical properties of natural objects that obtained credence in Rudolph's reign might have been traced to the famous writings of Pliny. For example, Pliny stated that the precious diamond placed on an anvil resisted the stoutest blows of a hammer, or put in a furnace withstood the intensest heat, but that if steeped in the blood of a he-goat

it is "forced to yield the gauntlet," and may then be readily broken into pieces. The mere assertion of such an absurdity by so high an authority was sufficient to establish its credibility; the idea of testing the statement by experiment was not deemed necessary nor advisable, that step remained to be taken by another generation under the Baconian philosophy. Pliny's "Natural History" was responsible for a mass of superstitions tenaciously held by the common people; it was gravely maintained that: "There be certain seeds within the eyes of cocks which shining and shooting into the eyes of lions do so pierce and strike their eyelids, and do inflict upon them such pain and grief, that they are constrained to fly from them, being not able to abide or to endure the sight of a cock." It was also asserted that the "eyes of a dragon dried, pulverized and incorporated with honey into a liniment caused those who anointed themselves all over with it to sleep securely without dread of night spirits." In these and similar instances the rarity of the animals, or the scarcity of the ingredients made experimental tests very difficult; this was the case also with the following recipe for a wonder-working amulet: "Take the tail and head of a dragon, the hair growing on the forehead of a lion with a little also of his marrow, the froth that a horse foameth at the mouth who had won the victory and prize in running a race, and the nails besides of a dog's feet, bind all these together with a piece of leather made of a red deer-skin with the sinews partly of a stag and partly of a fallow deer, one with another in alternate courses; carry this about you and it will give you victory." (Pliny.)

Forty-three years before Rudolph ascended the throne of Germany a work was published that did much to elevate magic in the opinions of philosophers, and exerted immense influence on popular beliefs for more than two centuries, this



Henricus Cornelius
Agrippa.
Equus Medicinæ et Juris
utriusque Doctor.



was a treatise on "Occult Philosophy" written by Henry Cornelius Agrippa. This celebrated

"Man of Parts
Who dived into the Secrets of all Arts,"

was Knight of the Empire, Doctor of both Laws, and held the office of Secretary to Maximilian I., and of Councillor to Charles V. He exercised the callings of physician, lawyer, soldier, philosopher, historian, conjurer, astrologer and alchemist at Cologne, Dôle, Pavia, Metz, Freiburg, Brussels, Bonn, Lyons and Grenoble, and in every place he commanded the highest esteem of the learned and the influential. He wrote that "natural magic is the active part of natural philosophy which performs those things that are above human reason. Magicians, the most active inquirers into nature, oftentimes produce effects before the time ordained by Nature, which therefore the Vulgar take for Miracles, when they are notwithstanding only natural operations."

Agrippa combined real erudition with gross superstition; he was acquainted with the electrical properties of amber and of jet, and with the magnetic power of the lodestone, and yet he asserts that the latter power is destroyed by onions. In another passage he exhibits his wisdom and his folly thus: "It is well known that there is a certain virtue in the lodestone by which it attracts iron and that the diamond by its presence doth take away that virtue; so also the stone asbestus being once fired is never extinguished. A carbuncle shines in the dark; the stone ætites put above the young fruit of woman or of plants strengthens them, but being put under weakeneth. The jasper stauncheth blood, the little fish echeneis stops ships; rhubarb expels choler; the liver of the chameleon burned raiseth showers and thunders; the stone heliotrope dazzles the sight and makes him that wears it invisible; the stone synochitis brings up infernal

ghosts; and the stone anachitis makes images of the gods appear."

This prince of occult philosophers gave minute details for invoking good and evil spirits and ingenuously explained why men conjure with demons rather than with angelic spirits; he wrote: "Good Angels seldom appear being only attendant on the commands of God, and not vouchsafing to become known save to upright and holy men; but evil spirits submit themselves more willingly to the invocations of men, falsely assuming to themselves and counterfeiting Divinity, always ready to deceive, and delighting to be adored and worshipped."

Professional necromancers pretended to possess the power of conferring with the spirits of dead persons, and controlling the weather, raising storms at will; they sold potions and philtres enabling the owner to understand the language of birds, to secure love of fair women, to transform their enemies into cattle, (even as Nebuchadnezzar became an ox), and to impart the power of the dreaded "evil eye"; to obtain the disgusting ingredients of these draughts and pills they were accused of strangling infants, of robbing cemeteries of their corpses; they were believed to compound poisonous powders for criminal purposes; and they were always thought to have entered into suicidal compacts with Satan.

Popular belief peopled the earth with hobgoblins, the fire with salamanders, the air with fiends and the water with river and lake spirits. Children were terrified by their nurses with stories of "an ugly devil having horns on his head, fire in his mouth, and a tail in his breech, eyes like a bason, fangs like a dog, claws like a bear, a skin like a nigger, and a voyce roaring like a lion." And young children were so affrighted with "bul-beggars, spirits, witches, urchins, elves, hags, fairies, satyrs, pans, faunes, syrens, Kit-with-the-can-

stick, tritons, centaures, dwarfes, gyants, imps, calcars, Robin Goodfellow, the spoor, the mare, the man in the oak, the hell-wain, the fire drake, the puckle, Tom Thumb, hob-goblin, Tom Tumbler, boneless and such other bugs," that they became fearful of their own shadows.

Superstitions connected with animals and plants were innumerable and amazing in their folly. The imaginary basilisk was thought to be deadly to all serpents and to mankind, killing the former with its breath and the latter with a mere glance of its eyes; persons carrying its black blood about them obtained gracious favors from princes and great potentates, as well as immunity from diseases and from witchcraft. The superstition of the mandrake has been narrated at length by an early writer: "The mandragora, or alrun, is a very rare herb that can be hardly found except below the gallows where a pure youth has been hanged. He who seeks the herb should know that its lower part has the shape of a human being, and that its upper part consists of broad leaves and yellow flowers. When it is torn from the soil it sighs, shrieks and moans so piteously, that he who hears it must die. To find it one should go out before sunrise on a Friday morning, after having stopped his ears with cotton, wax or pitch, and take with him a black dog without a single white hair. The sign of the cross must be made three times over the mandrake, and the soil dug up carefully all around it so that it be attached only by fine rootlets. Then tie it by a string to the tail of the dog and coax him forward by a piece of meat; the dog will pull out the mandrake, but he falls struck dead by the terrible shriek of the mandrake. Then take it home wash in red wine, wrap it in red and white silk, lay it in a shrine, wash it again every Friday and dress it in a white frock. It will reveal to its owner hidden things and future events, and procure for him

the friendship of all men. A silver coin deposited with it in the evening will be doubled before morning; still the coin must not be too large in size. If you buy the mandrake it remains with you, throw it where you will, until you sell it again; if you keep it till your death you must depart with it to hell, but it can be sold only for a lower price than it was bought, therefore he who has bought it with the smallest existing coin is irretrievably lost."

These and similar gross superstitions wielded a disastrous influence on the people, exciting their timidity, and distrust of neighbors and friends; but they were innocent compared with the horrible atrocities that flowed from the deeply seated belief in witchcraft. Supported by the highest authority of the Church, Pope John XXII.; systematized by the diabolical ingenuity of Sprenger and his colleagues in the abominable "*Malleus Maleficarum*," or Witches Hammer; prosecutions were conducted in every town and village, and tens of thousands of wretched persons became victims of indescribable cruelty culminating in death at the stake. Women being more "covetous of the knowledge of secrets" were the especial object of the malevolent persecutions.

Even the members of Rudolph's court were not exempt from the inquisitorial methods of witch-finders, two of them being accused of sorcery and evil designs against the person of his Majesty. In 1611, an imperial chaplain was said to have named his dog Matthias, after Rudolph's brother, who was at that time scheming to displace him on the throne, and that this dog was to be killed in order that a similar fate might overtake the reigning monarch. The second to be charged with exercising witchcraft was an alchemist named Hauser, who had assisted Rudolph in necromantic operations. He was accused of stealing a handkerchief from the Emperor's linen at the laundry and conjuring evil with it to his Majesty's

hurt. The trial of these two men lasted several months, Hauser was tortured on the rack, and although he established his innocence, the judge fined him and banished him from Bohemia.

Early in the first decade of the seventeenth century disquieting rumors reached Rudolph concerning the attitude of his brother Matthias, who began to manifest political aspirations that threatened to undermine the throne. Matthias sought the friendship of Rudolph's bitterest enemies in the Empire, and his name began to be mentioned as a possible claimant for the crown. Rudolph's privy councillors could not, or would not, give the uneasy monarch satisfactory advice, and he sought privately to learn the future from the fortune-tellers attached to his court; the latter warily replied to his inquiries with such oracular sayings as:

"Te digna sequere."¹

or with the couplet:

"Si fortuna juvat, caveto tolli;

Si fortuna tonat, caveto mergi."²

The Emperor cautiously sounded the ecclesiastics, but they offered spiritual consolation and moral advice which only irritated his hypochondriacal temperament and failed to remove the deep-seated anxiety. Ominous reports from Eastern provinces of the Empire seemed to confirm the disloyalty of Matthias, and the superstitious Rudolph intent on penetrating the future turned to the unlawful art of black magic as a last resort. At that time the master in necromancy having the highest reputation was the unscrupulous Doctor Leonhard Vychperger von Erbach, already known to the Emperor as an assistant in his alchemical laboratory. After the Emperor had taken him into his confidence, he dis-

¹ "Follow what is worthy of thee."

² "If fortune smiles upon you, be not elated;
And if she frowns, be not cast down."

cussed with him the advantages of several forms of divination; von Erbach explained that astragalomancy or divination by inscribed tablets, cephalomancy or divination by an ass's head (a method in vogue among the Jews), molybdomancy and alectryomancy were too trifling processes hardly appropriate for the momentous issue at stake; that cossinomancy and clidomancy were designed chiefly to detect common thieves; and that a combination of geomancy, seromancy, pyromancy, and hydromancy, or divination by the four elements earth, air, fire and water, might be efficacious; but he recommended that an appeal should be made through Demonomancy. Of the latter the magician gave an obscure account in mystical language, which aroused the Emperor's curiosity, his fears and his hopes.

On the appointed night, a fortnight after this interview, the Emperor accompanied by a trusted and armed valet-de-chambre, was driven, as directed by the artful pretender in devil's lore, to a secluded spot in the hill country at the far side of a forest well known to his Majesty through occasional hunting expeditions. Having descended a rugged ravine bounded by vertical walls that nearly touched overhead, they alighted near the mouth of a deep cavern, the entrance to which was curiously concealed by natural obstacles, and which the Emperor could not remember having before seen. Most inopportunately a violent thunderstorm broke over their heads, the Emperor took refuge in a dimly lighted, rather frail tent, and awaited a signal from Dr. von Erbach who had disappeared within the cavern.

In about half an hour, which seemed much longer to Rudolph, the unmusical clang of a Chinese gong, an instrument then almost unknown in the country, issued from the cave, and his Majesty fearlessly entered, leaving his attendant in the tent. At the end of a curved gallery, lit by torches

whose smoke already began to befoul the air, the Emperor came suddenly upon a startling scene. The cavern widened out and the roof rose aloft; on its walls hung black banners of coarse material on which were painted in divers colors kabbalistic figures, symbols of the planets, signs of the zodiac, and geometrical designs of goetic power; and in gilt letters were the names of the infernal demons who presided over the seven days of the week, the twelve hours of the day and the twelve hours of the night. Pendant from the roof in front of each banner, a sconce of three tapers threw a lurid light; fastened to the walls between the banners were dried snakes with glittering scales, weird looking stuffed bats with outspread wings, Persian owls, an Ethiopian salamander and an African chimpanzee, as well as skeletons of small rare animals painted white to enhance the ghastly effect.

In one of the foci of the elliptical cave stood upright an Egyptian mummy-case through whose eyesockets shone a red light, and on the top of which rested a grinning skull with cross-bones. In the other focus of the ellipse stood an antique bronze tripod, resembling that of the Pythian priestess at Delphi, supporting a brasier in which were a few live coals. In the space between the mummy-case and the tripod were three small triangular-topped tables covered with red cloth, on which lay tongs and bellows, several strangely shaped knives, a two-edged sword of Oriental manufacture, a silver basin, and a number of stringed musical instruments, some capsules filled with pyrotechnic powders, besides some nondescript little articles whose uncouth appearance did not reveal their design; they were wonder-working talismans and amulets. Beneath one of the smaller tables was a covered basket.

On an elevated dais placed against the roughly hewn wall facing the middle table was an armchair covered with

a bear-skin, the bloody edges of which showed that the animal had been very recently killed; on this the Emperor seated himself and calmly awaited the appearance of the necromancer. Soon the cave resounded with weird sounds, unmusical yet rythmical, punctuated by the beat of an African tom-tom, and the priest of Satan entered from an adjoining passage which had been screened from view by one of the banners; he was clothed in a flowing robe of scarlet velvet embroidered in black with pentacles, abracadabra, and geometrical figures; around his waist was a girdle of yellow silk, and on his head he wore a tall pointed cap of the same color; he carried in his hand a golden rod around which a live green serpent was twined, the head of the hideous animal moving restlessly. He was accompanied by two exorcists in sombre black, their faces hidden by white linen masks surmounted by black cowls; one of them swung an incense burner from which arose dense vapors emitting a very deceptive perfume, at first agreeable to the nostrils, but after a little time benumbing the senses of those not fortified against it by a counterdraught; the other masque bore before him a wooden tablet in a gilt frame, on which was painted a mystical diagram; and on the reverse of the tablet were inscribed the names:

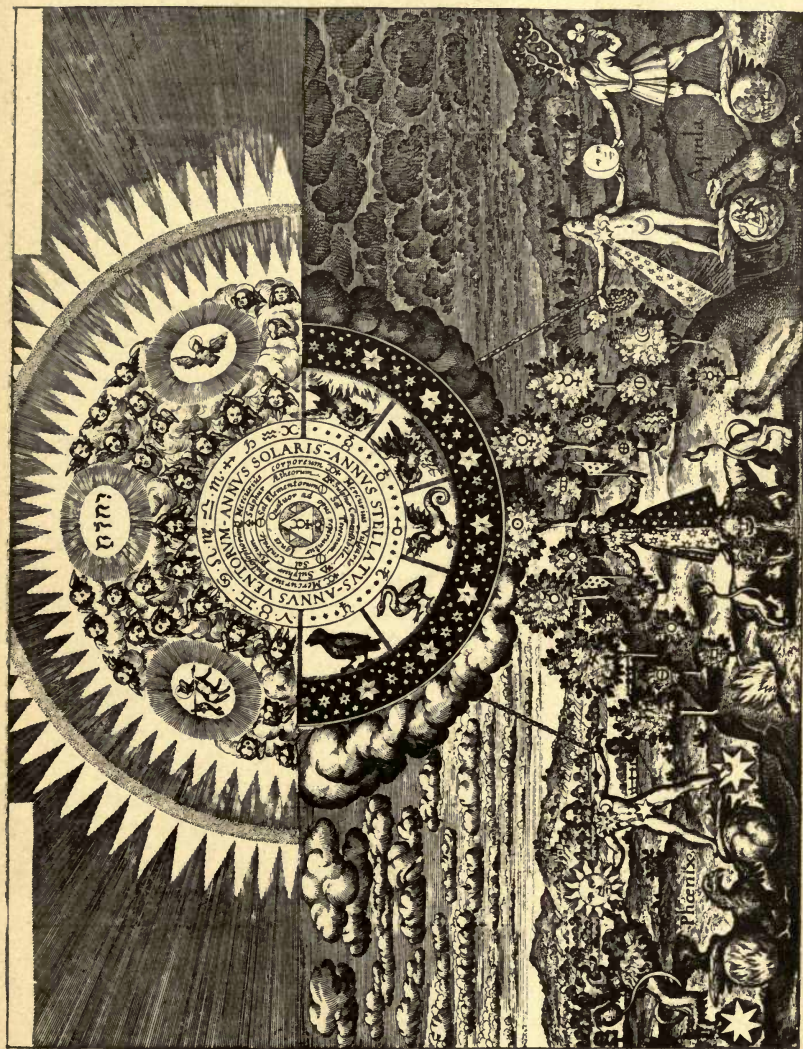
PHUL

ZAPH

NATALON

being those of the demons governing the week, the day, and the hour in which the necromantic ceremonies were taking place.

The three figures advanced silently and slowly towards the Emperor, made a profound obeisance and took their stations, the leader before the tripod, and the other two before the triangular tables. Meanwhile a singular medley of discordant sounds in a minor key pervaded the cavern and the



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two exorcists began to chant with shrill voices and rapid utterance the following adjuration in ancient Sanscrit:

Atakan, patakan, bawan, bichawa,
Khombadi khaw, dir khaw.
Han mat ghode, tayam tūyam,
Sût, lûk, bût, lûk.

To which their leader replied in a deep bass that echoed throughout the subterranean vault:

Ha hoo, ta too!
Pooska, bramina, padala stool!

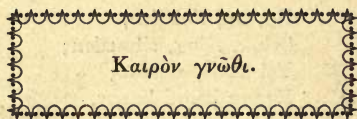
During this recitative, and others that followed, the conjurers threw on to the live coals in the brasier certain secret chemical powders which flashed with green and again with red flames; they touched the strings of the musical instruments eliciting a sort of accompaniment to their chants; and they made many flexions of the body and gestures with the arms, swaying themselves sideways with an ever increasing rapidity that was terrifying to behold.

At a sign from the chief magician, his assistants took from the covered basket a live, black cat with no white hairs, and held it towards him; grasping one of the curved knives, he dextrously plunged it into the animal's quivering body, which he held over the silver basin until it was partly filled with the life blood of the sacrifice; the carcass was dropped into an ashpit at the foot of the brasier, and the bowl of warm blood was placed on the central table.

Again the cavern resounded with the peculiar chant:

Ilp, ilp, ilmeden,
Selug, silug, silmeden;
Yel khos, kepene;
Kepen ichini bazar,
Ichinde ayoo gezer,
Ayoo beni khookhoode,
Khoodakheme, sarghade!
Alaghena akh dedi,
Chalaghena chekh dedi.

More coals and chemicals being added to the fire, it blazed up afresh, illuminating the gruesome scene which was beginning to impress the hitherto impassive Emperor as truly infernal. Suddenly the red-robed necromancer seized the Oriental sword and after making several passes, he stepped quickly to the mummy-case and touched with the point of the blade a secret spring near the top of the ancient coffin; immediately the lid flew open and a diabolical personage sprang forth; his lithe body was covered by a skin-tight suit of mail the scales of which were of a brilliant metallic green, reflecting the red light from the brasier with dazzling effect; his head was encased in a metal helmet of the same greenish lustre; his face emitted luminous rays, like an Aurora, over which played thin white vapors, an effect produced by having anointed his visage with an oil containing phosphorus in solution, a secret preparation quite unknown to the now trembling Emperor. The green demon moved forward with a serpentine, gliding motion, thanks to little wooden rollers fastened to his boots, and slipped both his hands in the bowl of warm, unclotted blood; he then drew near to the shrinking monarch. At this moment the lights in the sconces suddenly became extinguished, the Chinese gong emitted its strident, horrible din without ceasing, and the demon held in his bloody hands up to Rudolph's gaze an ebony tablet, on which he wrote in letters of fire, by the aid of a bit of phosphorus concealed in a hollow wand, these words:



Rudolph at last succumbed to diabolical mummery that was well devised to terrify the most stoical; the noxious va-



TEYN KIRCHE.



pors arising from the censer that disturbed the action of the lungs and heart, the wierd sounds that distressed the ears, and the infernal sights that dazzled the eyes, combined to overwhelm the resolute, cold-blooded man of experience; his eyes drooped, his features blanched, and he fell backward in a semi-unconscious condition. Instantly the performers dropped their robes, tore off their masks, relit a sconce, and rolled the dais out of the cavern into the fresh air at its mouth, supporting meanwhile the Emperor's head with great gentleness. Revived by the cool night air, as well as by a stimulating draught given him to swallow, Rudolph soon recovered himself and as if ashamed of his weakness, assumed imperial dignity, and ordered his valet-de-chambre to drive him back to the Hradschin. The storm had passed, the moon and stars shone brightly, and the return was accomplished without incident, the gate keepers and sentinels prudently keeping to themselves their surprise at the small escort with which the monarch arrived; as he alighted the clock in the steeple of St. George's Church struck two.

Rudolph never afterward alluded to his adventure.



CHAPTER XVII.

RUDOLPH AT WORK.

"The business that we love, we rise betimes
And go to it with delight."

Shakespeare.

HIS "Sacred Cæsarean Majesty," looking uncommonly genial and alert, sat in a wooden, straight-backed chair by a table near a window, in a small, plainly furnished apartment of the royal palace; at a desk piled high with papers was his private secretary, Doctor Michael Maier, preparing to present to the Emperor for his consideration reports, petitions, and decrees of national importance. Rudolph had that morning informed his secretary that he felt inclined to dispose of some of the accumulated business, and the Doctor was only too happy to take advantage of so rare a frame of mind.

The imperial secretary laid on the table before his Majesty several papers of minor importance, the contents of which he had previously approved and which only required the official signature of the monarch to become laws, but Rudolph brushed them aside and remarked, he was not quite prepared to attach his name and seal. The secretary then proposed to submit some reports from army officers of high rank stationed on the Turkish frontier, and began to read one of the papers, when Rudolph quietly said "Enough," and ordered

the report filed. Appeals from the Burgomasters of several cities in the Eastern provinces asking compensation for property destroyed by riotous soldiers, requests for privileges from noblemen holding high offices, complaints by Catholic dignitaries of encroachments by Protestants, protests from Lutheran bodies against oppression by the Jesuits, decrees proposed by the Imperial Chamber and requiring the Emperor's consent, were successively brought to the attention of Rudolph, who showed impatience, nonchalance and irritation according to the subject involved. He would neither sanction nor reject any document; some were too weighty for present consideration, others were too trifling, others still were not appropriate to the occasion, and the secretary began to feel discouraged when he mentioned the receipt of a memorial from Hugo Blotius, librarian of the Imperial Library at Vienna; Rudolph's features immediately brightened and he ordered it read.

Dr. Blotius, a native of Delft, an eminent lecturer on jurisprudence at Strassburg, had been appointed Imperial Librarian by Maximilian one year before Rudolph had succeeded to the throne, and was the first to have that title; the Fleming found the library housed in the Cloisters of the Minorites and in a condition showing ignorance and neglect. Under his care the collection of manuscripts and books increased rapidly in number and value, partly through gifts from authors and scholars, and partly by purchase; twenty-six hundred volumes were acquired from the heirs of Johannes Sambucus, the Hungarian physician, historian, archaeologist and poet, and the orderly arrangement of this considerable addition cost Blotius and his assistants much thought and labor.

The address to his Majesty written by Blotius contained suggestions for increasing, beautifying and improving the

library, grouped under three headings. First, means of improving the library without expense. Under this caption Blotius recommended that the law requiring copies of books to be deposited in the library by their authors (an old regulation in Rudolph's day) should be more strictly enforced; also that the custom of presenting to private libraries books belonging to the royal collection should be discontinued; and thirdly, that the return of books loaned to scholars should be insisted upon. The library had lost, he wrote, a great many volumes through the carelessness of borrowers, sometimes the books were retained by the borrowers until death and returned by their heirs, if returned at all. II. Proposals for increasing and improving the library with small expenditure. Of books printed in foreign countries only the most useful and necessary ones by eminent authors should be purchased; many new books ought to be bound and some quite worn out should be repaired. The library building ought to be made attractive by the purchase of canvasses for decorating its walls, and of easel pictures by celebrated artists. These improvements Blotius hoped to accomplish by an annual outlay of three hundred gulden. III. The third heading in the memorial dealt with the qualifications of a librarian. He should hold no other office, he should be skilled in languages, upright, faithful, industrious, enterprising, not poor, not superstitious, and a friend of science and of nature; it would be well also if the librarian was a nobleman and clothed with imperial dignity and authority, so that when travelling on business he could have unrestricted admission to libraries and institutions in every city, for not only the common people, but even the gentry esteem a man in proportion to the splendor of his attire and the dignity of his honorable titles. The court librarian ought to be a Privy Councillor, and if not of a noble family he should be raised to a high rank.

The memorial filled twenty-four folios and the secretary thus condensed its contents with rapidity. Rudolph listened attentively and smiled in a satirical manner at the ingenious way in which Blotius tried by impersonal statements to get himself ennobled; his Majesty, however, ordered that one thousand gold gulden be paid annually out of the imperial treasury for the increase and embellishment of the library at Vienna.

This item having been disposed of, Dr. Maier took the opportunity of making a personal appeal for clemency towards a prisoner in Daliborka Tower, a certain George Popel von Lobkowitz, who had been immured for several years, on suspicion of being the author of a scurrilous pamphlet violently attacking the Emperor. No sooner had Rudolph heard the cognomen Lobkowitz, than his face showed anger and he sternly forbade the physician to again mention the name of his enemy.

Foiled in this well meant effort to secure justice, Dr. Maier next presented the case of the band of gipsies, long time confined in barracks under the charge of Colonel von Podebrad, master of the royal mews. He reminded the Emperor that Wenzel Kubrik and sixteen other gipsies had been arrested on suspicion of poisoning certain imperial horses, and that the real criminal had long ago met his deserts, yet the gipsies were still restricted of their liberty and an expense to the state. Anticipating the wish of his Majesty to be fully informed of the character of the prisoners, he had obtained a memorandum from the distinguished Oriental traveller Christopher Harant von Polzitz, which threw much light on the question; furthermore he had caused the band to be examined and would, if desired, submit a report of the situation.

Having signified his willingness to consider this case Rudolph listened to the memorandum of Harant; this stated

in brief that the people known as Zingari, or Zigeuner, call themselves Egyptians, and say they are condemned to wander up and down the earth because, when the Holy Virgin with the Divine Child fled from the cruel Herod into Egypt, the people of that land refused them hospitality. In every country they are vagrants who occupy themselves in fortune telling, sorcery and mischief of every kind; those in Bohemia are great thieves and are probably Turkish spies. Whatever may have been their origin they fraternize in every land with only the lowest of the rabble, and as the proverb says: "Those who run with wolves must howl with them." Some of the men know how to make superior charcoal and excel in blacksmithing, others are good judges of horses and very sharp at a bargain; the women practice chiromancy, juggling and nonsense that has an evil influence on the people with whom they come in contract; as a whole they are good-for-nothing vagabonds and dangerous to the state. The disastrous conflagration that destroyed many imperial buildings on the Hradschin in 1541, was thought by the authorities to have been started by gipsies at the instigation of the Turks, with whom as enemies of Christianity they sympathize. This calamity and another terrible fire that nearly destroyed Königgrätz, with other suspicious circumstances, led Ferdinand I. to issue a decree forbidding all nobles, knights, cities and people to harbor the vile gipsies, and commanding magistrates to send bands of the vagrants from one district to another under guard until they crossed the borders of the Empire. The latter part of this mandate was not carried out, but the Egyptians were hunted like wild beasts, even women and children were ruthlessly murdered, so that seven years later Ferdinand issued another decree, ordering that the gipsies, especially the women and children, should not be killed by drowning and by other shameful methods, but they

ought to be employed on public works and in the necessary labor of municipalities.

So far the memorandum of Harant, and Dr. Maier added he thought the time had come for a new imperial edict; a stern look from the Emperor reminded the Secretary that his Majesty always resented any suggestion of action which might forestall the imperial will. However, Rudolph called for the testimony secured by questioning the family of Kubrik, and Dr. Maier continued.

Though claiming Egyptian origin this band, which embraced representatives of four generations, had wandered long throughout central Europe and spoke German, Bohemian and Romany; they said they learned the Romany from their elders and found it better than the Bohemian language; for bread they used the word "meno," for God "mrodebl," for glass "gevalin," and curiously enough they say they have no word for thief! Kubrik said the family was Catholic in religion, but this was evidently to please the questioner. Few of them could name their birthplace, one boy of fifteen years, when asked where he was born, replied that only his mother could know that; few could tell their ages, some answered quite falsely and others said they were not in the habit of counting birthdays: A boy who was asked why he was so strongly sunburned, replied: "Because I smear my face with butter and expose it to sun in order to be hardened against frost." Members of the family gave their occupations as rope dancing, gymnastic feats, doctoring cattle and playing comedies; on inquiring about the comedies they said they played "The King of Castile," "The Execution of John the Baptist," "King Herod," and "Two Brothers." The women told fortunes by examining the lines in the hands, but had to confess their art had not warned them against their arrest; one old hag said: "God is the best Prophet," and a young

woman said: "Fortune telling is only a pretense;" all agreed that men could not learn the art.

Doctor Maier ceased speaking and was directed to file the documents; not long after the Emperor issued a decree banishing all gipsies from his dominions, which, needless to say, was not successfully accomplished.

The Secretary then presented a plea for commutation of sentence made by an army officer accused of treason, rather singularly the Emperor instantly acceded and the miserable man was spared his life in consideration of perpetual imprisonment in a gloomy cell.

Rudolph had hitherto showed great patience, but now he turned uneasily in his chair and gazed through the window at the beautiful view of Prague, the closely built houses with the numerous Church spires breaking the roof-line, the noble bridge across the placid Moldau, the fertile fields and the forest preserves beyond; he then arose and walked to the desk before which his Secretary sat, and noticing a rather bulky document from which a seal was hanging, remarked, he would examine that next; during the reading he paced the floor, looking down upon the city at every turn near the window. The paper thus selected by lot as it were, proved to be a report from the magnate Heinrich von Waldstein, who had been appointed by Rudolph magistrate in the district of Jungbunzlau with special authority to discover and prosecute witches; his report, divested of the magniloquent inscription and stilted language, ran as follows:

"That terrible curse of Satan, witchcraft, which has proved so great an evil in the past, still afflicts many districts of Bohemia in spite of the strenuous efforts of the servant of your Majesty; although the rack and the fiery stake have been always at hand to suppress those holding converse with the Devil, many kinds of infernal sorcery

are practiced by these miserable people, who are of both sexes and of all ages; though old women are the most frequently obsessed. In undertaking to carry out faithfully the commands of your Majesty to exterminate this evil, your servant has been hampered by a mischievous book written by the Utraquist pastor Johann Stelcar Zeleyawsky (Kniha Duchovni, Praha, 1588); in this work the impious author denies that human beings have power to raise storms of lightning, thunder and hail, to enchant herds of cattle and flocks of sheep, or to bewitch their enemies, urging, forsooth, that those accused of such diabolic deeds should be treated mercifully and not rigorously as the laws of the kingdom require. Happily these abominable notions have not penetrated very deeply the minds of the ruling classes, and the book is being now suppressed.

Your servant has had the honor to investigate several cases of witchcraft and to bring the guilty principals to trial; thanks to the noble invention of the rack, the sacred truth has been ascertained generally without resort to other permissible tortures, and in every instance justice has been meted out to the devils in human shape.

Your Majesty's loyal subject, the well-born Johann Beschin, who resides on his estate near Swinna, had in his service a pretty maid named Marianne; she fell deeply in love with her handsome young master, and as he showed complete indifference, she undertook to win his love by magical arts. She secured a few hairs from his head, burned some of them and threw the ashes into his wine jug, and she put the rest in her bed, conjuring them also with infernal formulas. These facts came out in the preliminary trial, and she was then examined on the rack, as is customary with witches; confessing her infernal power she was sentenced to the death prescribed by law.

A few months ago the imperial alum-mines at Komotau suddenly began to yield scanty returns and the precious alum-stone diminished also in quality; this was evidently the work of a malign witch, and suspicion being directed to a poor, aged and infirm woman of low estate, she was duly examined and properly executed at the stake. It is believed that the alum-mines will now be more productive; if however they do not improve, your Majesty can rely on his servant to discover other witches and to deal legally with them.

At Chrudim another event of interest required the energy of your indefatigable servant. Frau Dorothea Wanura, being left a widow in her youth, took for a second husband an aged nobleman of great wealth, but in wretched health and of ungovernable temper. Before long, the gay young wife, tired of her nuptial chains, sought release and consulted three old wise-women who advised her how to get rid of her old husband. She placed a piece of fresh bread in the bolster-case of her husband's bed and left it there until it was dry and brittle, but it failed to absorb the man's vitality as had been promised; having been unsuccessful in this and other magical practices, and being urged by a wicked lover to hasten, she resorted to active poison, her husband dying after a few hours' suffering. The affair soon became known and Dorothea was put to the question; confessing all, she was buried alive, and her three companions in witchcraft were burned at the stake; thus bringing the affair to a most satisfactory conclusion.

Instances in which the witches exercise merely malignant mischief, such as drying up a neighbor's cows, preventing fruit trees from bearing, blasting corn-fields, and afflicting cattle with barrenness, are of common occurrence; but the vigilance of your servant never fails to bring the guilty to

justice, in accord with the commands of God and the laws of the Empire. At present he is engaged in an important investigation at Nimburg, the results of which will in due time be communicated to your Sacred Caesarean Majesty."

During the reading of this long report Rudolph paced the floor, and from time to time he quietly said "Good," "Just," and at the close he remarked exultingly: "A noble and honest magistrate; send to him the thanks of the Emperor and promise that his advancement shall not be overlooked."

Dr. Maier was about to select another document to lay before his master, when he was sharply interrupted by Rudolph who said: "No more business to-day, now for recreation," and ordered him to send for Dionysius Miseroni with instructions to bring for his inspection the latest treasure received for the imperial museum.

Rudolph greeted the Curator of the Cabinet of Curiosities with cordiality and was at once immensely interested in the "sepulchral lamp" submitted by him; Miseroni began to explain the origin and history of this great novelty when the Emperor ordered his Secretary to write down the words of the antiquarian, and to place a fair copy in the library. The manuscript after revision read as follows:

"The lamp which I have had the good fortune to secure for the Imperial Cabinet was discovered in 1539 at Rome; it was found in the subterranean tomb of Tulliola, the daughter of Cicero, whose death he laments in his letters to Servius Sulpicius. When the tomb was opened the body of the young woman was found uncorrupted; her flesh was firm and the skin of a natural color; her tresses were bound with a small plate of gold curiously chased and enamelled. On the wall of the sepulchre was carved the inscription:

TULLIOLA FILIÆ MEÆ,

and above the sarcophagus hung this lamp burning brightly. The lamp had been filled with an unquenchable oil and had been lit about fifteen hundred years before; according to some it continued to burn for one hour and three quarters after opening the tomb, but I am privately informed by one of those present at the discovery that it became extinguished the instant that air was freely admitted; the latter statement is more credible because it is evident that the miraculous oil had burned only in the absence of air.

The shrewd dealer in antiquities, who obtained possession of this lamp, thinking to impose on your Majesty, represented to me that this discovery was unique, but my extended researches in archæology have enabled me to prove that sepulchral and perpetual lamps were known to the ancient Romans. That most illustrious and holy Father of the Church, St. Augustine, describes the lamp in the Temple of Venus which burned perpetually; he says, "the flame adhered so strongly to the combustible matter that neither wind, rain nor tempests could extinguish it, though continually exposed to the inclemency of the seasons." St. Augustine conjectures that "the inexhaustible aliment was the work of demons, who wrought the infernal wonder in order to blind the pagans completely and to attach them to the worship of the infamous goddess worshipped in that Temple." But your Majesty has knowledge of the secrets of nature far greater than was possessed by the Saint, and is aware that the skilled alchemists employed in the imperial laboratories could manufacture the wonder-oil used in the sepulchral lamps if such were the imperial will.

My investigations further show that discoveries of perpetual lamps are by no means excessively rare; about 800 A. D. the lamp of Pallas, son of Evander, whose brave deeds were sung by Vergil, was discovered near Rome where it had

burned for nearly two thousand years; Cassiodorus wrote that he himself made perpetual lamps for the use of the monks in his monastery at Viviers; in a tomb opened at Salerno the lamp was missing, having been removed by an earlier explorer, but this inscription was found on the wall:—

“Adieu, Septima; may the earth lie lightly upon you; may a golden soil cover the ashes of him who placed in this tomb an ever-burning lamp.”

Seventy-six years before your Majesty ascended the imperial throne, another notable discovery was made near Padua; some peasants digging to a considerable depth opened a tomb in which two lamps were burning, one of silver and one of gold. An inscription on them explained that they had been prepared with magical skill by Maximus Olybius.

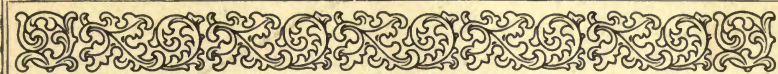
In the reign of St. Louis, the good King of France, there lived in Paris a certain Rabbi named Jechiel, who was regarded by the Jews as a saint and by Christians as a sorcerer; he possessed a lamp that gave out light equal to daylight in brilliancy, which required no oil and burned unceasingly. But its most remarkable property was to indicate to Jechiel the character of his visitors; when honest tradesmen, or people of noble station, came at night to knock at his door, the lamp shone brightly as usual, whereas when tricksters, or persons of evil intent, sought admission the lamp grew perceptibly feeble and thus warned the Jew to bolt his door against the intruders.

The most recent discovery of a sepulchral lamp was made in the dominions of your Majesty. Persons digging a well near Clumec came upon a stone door that opened into a vault; expecting to find hidden treasure the owner of the ground forced open the door and was almost blinded by a sudden blaze of light. The light issued from a beautifully

designed bronze lamp that hung before the statue of a man in armor sitting by a table and holding a truncheon in his right hand. The proprietor had no sooner set his foot within the vault than the statue arose from its seat, and on the man's taking a single step forward, the statue stood bolt upright and raised the truncheon. The man ventured to take a third step when the armed figure, with a furious blow, broke the lamp into numberless fragments and plunged the vault in darkness. The proprietor secured torches and again entered the vault; he found the statue was made of brass and its motions were directed by clockwork connected with levers and springs concealed beneath the stone floor; on attempting to remove the statue the truncheon beat it to pieces.

Of the many sepulchral and perpetual lamps discovered this beautiful specimen, now placed by your faithful curator in your Majesty's museum, is the only one that has survived destruction."

While listening to Miseroni Rudolph forgot his fatigue and as soon as he ceased speaking the Emperor hastened to the alchemical laboratory and gave orders to the chief chemist to manufacture without delay a supply of inexhaustible and unquenchable lamp-oil.



CHAPTER XVIII.

RUDOLPH'S SOVEREIGNTY AND DEATH.

"In Rudolph's Landen, weit und breit,
Wuchs drum die Unzufriedenheit.
Oestreich und Ungarn deshalb gab er
Mathias, seinem Bruder.

* * *

Der Tod nur wahrte ihn davor,
Dass er die Kaiserkron' verlor."



WHEN RUDOLPH succeeded to the throne of his wise and tolerant father Maximilian, he found the kingdom of Bohemia in greater civil and religious peace than it had enjoyed for a century. From very early times the inhabitants of Bohemia had manifested peculiar aptitude for polemic theology; at first the disputes were confined to the ecclesiastics and to the educated nobility, but the common people being naturally religious joined in the prevailing controversies with savage earnestness; the unhappy Hussite war, championed by the brave patriot Ziske, had ceased a whole century before Rudolph's reign began, but the country had never been entirely free from intestine disturbances. Under Maximilian Bohemia enjoyed comparative peace, and had Rudolph understood the claims of justice, and had he listened to reason the country might have prospered, but he "inherited all the ambition of his house without any of the nobleness of his father, any of the vigor

of his grandfather, nor any of the dynastic shrewdness that had elevated his family."

Rudolph's character contrasted strangely with that of his father; "Maximilian was frank, candid and manly; he appreciated the dignity of truth, he was fond of society, cheerful in conversation, systematic in business as well as patient and complacent when troublesome problems required his attention." Of him the Bohemians said: "We are as happy under his government as if he were our father; our privileges, our laws, our rights, liberties and usages are protected, maintained, defended and confirmed."

Such modicum of Maximilian's good traits as Rudolph inherited were modified by less fortunate ones derived from his mother, Mary of Austria, who was Maximilian's first cousin, being the daughter of Charles V. She inculcated in her son "a machine-like devotion that found religious virtue in the scrupulous observance of ceremonies and useless mortifications." She led him to regard his confessor's counsel as an oracle that could neither be questioned nor disobeyed. Besides this tutelage the instruction imparted by the Jesuits to the youthful prince in Spain was better fitted to produce a University professor than a monarch. After her husband's death Mary retired to a nunnery in Spain where she remained till her life ended in 1603.

Imbued through these influences with intense bigotry and hatred of liberty of conscience, Rudolph had not long been seated on his father's throne when he began to frame laws against the Protestants, depriving them of legal rights, closing their schools and places of worship, expelling their ministers and granting official positions exclusively to Catholics; such edicts as these embittered the lives of some of the most sturdy inhabitants and caused them to hate the despotic ruler of their destinies.



RUDOLPH II.



Religious animosities, which had begun to subside, broke out afresh, and the Jesuits, growing bolder as they acquired more power, induced Rudolph to further curb the liberties of the Protestants, thereby exasperating many of his best subjects and engendering jealousy and hatred among all ranks. Moreover, feuds between the Lutherans and Calvinists divided the Protestant party into two camps arrayed against each other, a situation of which the Catholics were not slow to avail themselves. The Order founded by Loyola seized upon the revival in art, literature and science to accomplish their schemes; they secured the adhesion of Pontanus, one of the Emperor's poets laureate, and he became a most eloquent and zealous preacher; they induced the wealthy and powerful William von Rosenberg to establish an institution for the education of the poor, and the pupils under Jesuit training became active in propagating the policy of their masters.

The principal Protestant body in the kingdom was known as "The Brethren", or "The Brotherhood"; in the religious communities of this order the individual members were expected to earn their livelihood by the work of their hands; all being on an equal footing, even the clergy were expected to follow the example of the Apostolic tentmaker. This charming theory of equality, fraternity and liberty was however disturbed by the admission to the Brotherhood of certain aristocratic and opulent magnates whose cooperation in resisting their aggressive opponents was of worldly advantage; dissensions within the Brotherhood ensued and its members became unpopular. Perceiving this the Jesuit party urged the nobles to drive out the revolutionary heretics from their estates, a scheme which was partly successful; Lutheran schools were closed, liberty of conscience was restricted, and the Emperor sought to suppress the literature published by the Reformers in two decrees:—he suspended all printing presses except two

at Olmütz, and ordered that all books sold in Moravia should first be approved by a certain bigoted censor.

Nevertheless, Rudolph was a grievous disappointment to the intriguing Jesuits, owing to his vacillating conduct, and his engrossing devotion to science and art within the precincts of the palace on the Hradschin. His unreliability as an opponent of Protestantism was shown by his willingness to meet persons of that faith in friendly discourse on his favorite studies, and notably by his inviting to his court Kepler, who had been driven out of Gratz on account of his adherence to the reformed faith. Moreover among Rudolph's devoted supporters were several Protestant princes.

The death of the influential William von Rosenberg, in 1592, was a great blow to the Jesuit party, for he was succeeded by his nephew whose wife induced him to join the Brotherhood. About the same time Rudolph dismissed from office another champion of the Catholics, George von Lobkowitz, transferring his estates to a man who was supposed to be a zealous Catholic, but who proved to be friendly to the Lutherans.

With advancing years Rudolph's weakness as a ruler became more conspicuous, his innate shy and melancholy disposition assuming a suspiciously morbid phase; he grew hypochondriacal, irritable, and sometimes his mental condition bordered on insanity. As the poet expresses it:

"Melancholy is the nurse of frenzy."

His jester failed to amuse him, the little sense of humor in his disposition abandoned him. His condition was aggravated by increasing aversion to bodily exercise of any kind; he had always been phlegmatic and never had taken much interest in manly sports other than tennis and the chase, and now he disliked to undertake even short journeys from Prague, though a visit to the distant provinces of his exten-

sive Empire would have been politic and might have allayed growing discontent among his subjects. He lived in a little world of his own, doing nothing to control the public movements for weal or for woe taking place in his dominions, and naturally events marched forward against his interests. He had fallen into the habit of postponing for weeks and even months decisions on affairs of state that demanded immediate action; he shortened more and more his visits to the Privy Council, and in place of manfully grappling with problems of public policy, he amused himself in directing the labors of alchemists, in studying astrology and botany, as well as in the more active pursuits of carving in wood, painting on canvas and polishing precious stones.

Rudolph lived in terror of apparitions and was a victim to superstitious fears of death; these were exaggerated in part by a prophecy made by Tycho Brahe. Both, the Emperor and the astronomer were greatly impressed by the assassination of Henry III of France, in 1589, by a monk named Jacques Clément, and a similar fate was thought to await Rudolph.

At the beginning of the seventeenth century the aggressiveness of the war-loving and Christian-hating Turks on the borders of Hungary combined with the civil and political disorders in Bohemia to increase the perplexity of the crown, and at the same time did not decrease the indifference of Rudolph to his duties as Emperor. Disregarding the fact that

"The king who delegates
His pow'r to other hands, but ill deserves
The crown he wears,"

he entrusted military operations against the Mahommedans to his brother Matthias, whereupon the Austrian Archdukes conspired to force Rudolph to abdicate and to seat Matthias

on the throne. Believing that the Protestants were instigators of this effort to undermine his power, Rudolph resorted to stringent and irritating measures directed against them; meanwhile an insurrection broke out in Hungary, and disasters rapidly succeeded which led to the deposition of the Emperor by the Bohemian Assembly in April 1611, Matthias being crowned in his stead. Just before his abdication, Rudolph is said to have looked out of a window of the palace on the Hradschin, and to have exclaimed:

"Prague, O unthankful Prague! Thou who hast been so highly elevated by me, now thou spurnest thy benefactor; may the curse and vengeance of God fall on thee and on all Bohemia!"

The deposed monarch, now enfeebled in body and mind, was allowed to reside in Prague and was awarded a pension of 400,000 florins together with certain productive estates. Early in the year 1612, his pet lion Ottakar fell sick and died, an event regarded by Rudolph as a fatal omen, for Tycho Brahe years before had stated that the lion and the Emperor were subject to the same celestial influences. Rudolph breathed his last on the morning of the 20th of January, 1612, and the court decided to keep his death a secret until his brother Matthias had reached the Capital. Kaspar Rucky von Rudz, one of the Emperor's valets and alchemists, whom we met at the Rudolphine Academy of Medicine, took advantage of this opportunity to steal all the powder of projection and the alchemistical gold that he could lay his hands on, ransacking the royal laboratories and the cabinet of curiosities. This bold theft became known to the Prime Minister almost immediately, and Rucky, with several other retainers, were arrested and imprisoned.

Being threatened with the horrible torture of the rack, Rucky hung himself in his dungeon by the aid of the cord

that was ordinarily used to hang around his waist the huge keys of his office. His body was delivered to the executioner who transported it to the usual place of judgment, a public square in the Hradschin quarter, where he hacked the body to pieces, cut off the hands and feet and gouged out the tongue and heart; the mutilated remains were then buried. In spite of this public execution the people living in the precincts of the Castle maintained that Rucky's ghost still wandered about the buildings and had been seen riding a goat, accompanied by six cats; to appease this popular clamor the body was afterwards dug up and burned.

Rudolph's death brought troublous times to several other members of the court, many were arrested for political reasons, including the antiquarians Fröschel and Hans Heyden, the librarian Hastal, and the artist Johann Kürbach who was a baptized Jew. Besides these the discoverer of perpetual motion, Cornelius Drebbel, was temporarily incarcerated.

Rudolph II. of Germany never married, though he sent ambassadors to the royal courts of several nations to make inquiries about marriageable Princesses, and he is said to have been betrothed at different times to the Infanta Isabella, to Maria de Medici, to a Princess of Lothringen, to a daughter of the Archduke Carl and to a daughter of the Grand Duke of Russia.

Rudolph's whole reign of thirty-five years was marked by persecutions and intolerance on his side and by discontent and insurrection on that of his subjects, yet Bohemia is credited with attaining under his rule the "golden period" of its existence; perhaps this gold was no more genuine than that produced in the crucibles of his alchemists.

Partisan historians, attempting to establish the verity of transmutation, narrate that Rudolph II. left twenty-four hundred weight of gold and sixty hundred weight of silver

in the form of bricks, incontestable witnesses of his success as a disciple of Hermes. The facts are that after Rudolph's death Matthias had an inventory made of the art treasures in the palace, and the commission reported finding gold and silver articles weighing twenty-four, and sixty hundred weight respectively; this did not include the silver dishes, the precious stones and pearls, and other valuable objects, so that the value of the entire treasure was set at seventeen millions.

Augustus, Elector of Saxony, is likewise said to have left several millions of thalers in his alchemical laboratory, and after the death of Pope John XXII. in 1334, no less than two hundred ingots of gold each weighing one hundred pounds were found in secret storage; by such specious tales were people in the sixteenth and seventeenth centuries strengthened in their belief in alchemy and in the other Follies of Science.



CHAPTER XIX.

DECLINE OF THE FOLLIES OF SCIENCE.

..... "Ye Rosicrucian schools,
Ye number-prickers, ye physiognomists,
Ye dream-expounding, treasure-seeking fools,
Alchemists, magnetizers, kabbalists!
Ye 're wrong!"

Hellgren.



THE QUADRATURE of the circle, the multiplication of the cube, perpetual motion, judicial astrology, alchemy and magic have been characterized as the "Six Follies of Science." While a great deal of time and energy were wasted by intellectual men in these studies and chimerical pursuits, it must be admitted that these follies gave great impetus to the progress of true learning. The study of abstruse problems in pure mathematics even though non-solvable, attempts to construct mechanical devices on principles opposed to a fundamental law of nature, erroneous conceptions of the relation of celestial phenomena to mundane affairs, the vain quest for the Philosophers' Stone, the Elixir of Life and the riches and bodily vigor they would ensure, even the painful degradations of a false philosophy exhibited in magic and sorcery, each contributed its quota to the advancement of human knowledge on rational lines. The period of tutelage has its drawbacks,

and these sophistries during their sway fostered superstitions that inflicted much misery on mankind, which was gradually being prepared for the appreciation of a rational philosophy and the benefits flowing from its practical applications.

The decline of the follies which had attached themselves to the sciences like barnacles to a ship's bottom, progressed in the ratio in which truths were revealed by experimenters in the several fields; workers with telescopes, microscopes, dissecting knives, retorts, balances, thermometers, barometers, and somewhat later, with air-pumps and electrical machines, strove to interpret the phenomena of nature, instead of blindly following dogmatic assertions made in by-gone ages, and applied to the accumulating observations the principles of the inductive philosophy, thus brushing away the barnacles that befouled the ship of science, long anchored in sluggish waters, so that with polished sides and favoring breezes she glided rapidly through the channels of reason into the harbor of truth. To enumerate the superstitions abandoned one by one, would be superfluous; the progress towards truth is better reviewed by describing the instruments used to free the vessel from obstructions, to-wit, the influences that effected the improved conditions and speeded the boat towards her destination.

The sixteenth century witnessed some of the most momentous events in the history of the world and gave birth to men of superior intellectual endowments; the discovery of America at the close of the preceding century prepared the way for its exploration and occupation in the sixteenth, opening up new fields of enterprise to the old world; the Reformation established the liberty of conscience and revived an evangelical spirit of Christianity; though the invention of printing dated from the middle of the fifteenth century, the wonderful power of the printing press in the diffusion of knowledge

made itself felt at the beginning of the epoch of which we write, and accomplished marvels in the abatement of superstition. The most effective agent, however, in exterminating the superstitious features of natural science was the introduction into every branch of study of the experimental method of investigation.

The doctrines of astrology were being gradually undermined by discoveries of astronomical laws at variance with the ancient theories; although Tycho Brahe and John Kepler, to amuse and oblige their eccentric patron Rudolph, practiced divination by the stars, they were formulating at the same time the fundamental laws of their motions, laws which demonstrated the fallacy of a belief in the correlation of planets and terrestrial events, either national or personal. When Brahe calculated the path of the comet of 1577 he proved that the stars, sun and planets could not possibly be carried around in huge spheres of impenetrable crystal, revolving, orb within orb, every twenty-four hours. When Kepler by severe mathematical analysis defended the system of Copernicus, the

"Best endow'd and bravest Pole of Poles,"

he had to combat the prevalent notion that each planet is directed in its movements and carried around the earth by an angel; "in that case," he said, "the orbits would be perfectly circular, but the elliptic form which we find in them rather smacks of the lever and material necessity."

"Kopernik fix'd the Sun, the work began;
And Kepler raised the time-infolding plan."

Alchemy, after astrology, probably contributed more directly than any other of the six follies of science towards the advancement of the genuine science associated with it. The zealous searchers for the secrets of transmutation, stimulated

by golden hopes, laboring with an industry and perseverance in difficulties worthy of imitation, acquired great skill in manipulation, becoming familiar with solution, crystallization, and sublimation, as a means of purifying solids, with distillation of liquids, and particularly with all operations involving the management of fire. By mixing all known chemicals in divers ways and treating these mixtures in every conceivable manner, though intelligent system was lacking, alchemists obtained hundreds of substances, many of which became indispensable agents in medicine, pharmacy, manufactures and household economy.

To enumerate the gifts of alchemy to chemical science would necessitate chronicling the history of the latter for centuries; before alchemists began their labors only seven metals were recognized, and as there were seven days in the week and seven planets, this branch of knowledge was thought to be complete; a Benedictine monk, however, working with athanors and crucibles added bismuth and antimony, and Paracelsus is credited with first recognizing zinc as a distinct metal; more important than the recognition of a metallic substance was the discovery of the preparation of the mineral acids, whose power became known in alchemical days.

While in search of the Philosophers' stone a poor shoemaker of Bologna, Vincentius Casciorolus by name, discovered in 1602 the wonderful substance long known as the Bologna stone, having the property of emitting phosphorescent light in the dark; about seventy years later another disciple of Hermes, a merchant of Hamburg named Brandt, obtained in his retort *the Phosphorus* which possessed the same property to a superlative degree; and ten years later Godfrey Hanckwitz, a laboratory assistant to the eminent philosopher Robert Boyle, himself a dabbler in alchemy, made with this miracle-working phosphorus the first friction matches. A

German alchemist Bötticher, imprisoned in the royal castle of Königstein for numerous attempts to swindle his Highness, the Elector of Saxony, happily saved himself from severer punishment by discovering the process of manufacturing porcelain, justly celebrated as Dresden porcelain to this day.

The Hollander, Cornelius Drebbel, after leaving Prague, discovered the superb red dyestuff obtained by the action of tinsalts on cochineal; this preparation of tin having been itself discovered thirty years before by another alchemist and long called by his name the "fuming liquor of Libavius."

"The search itself rewards the pains;
So though the chymist his great secret miss,
For neither it in art nor nature is,
Yet things well worth his toil he gains,
And does his charge and labor pay
With good unsought experiments by the way."

The mediæval alchemists are credited also with being the first to seize the grand idea of evolution in its widest extent as a "progress from the imperfect to the more perfect, including lifeless as well as living nature in an unceasing progression, in which all things take part, towards a higher and nobler state. In this slow development nature has no need to hasten, she has eternity to work in; it is for us to ascertain the favoring conditions and by imitating them or increasing them to accelerate the work." (Draper.)

The contributions to chemical science made by the indefatigable alchemists were not appreciated in their day and failed to demolish the belief in transmutation, because the isolated discoveries were not correlated by general laws; it is true that the alchemists propounded a theory that three principles, designated symbolically as "salt," "sulfur" and "mercury," were the basis of all substances, but it remained for Becher and Stahl in the seventeenth century to formulate

the theory of "Phlogiston," which, though weak and false, greatly promoted the scientific aspects of chemistry and contributed to its divorce from the supernatural.

Technical chemistry received an invaluable gift from Bernard Palissy the famous French artist in earthenware, who died about the time Rudolph was bestowing favors upon the unworthy "Golden Knight." After twenty-five years of persevering toil, "groping for glazes like a man in the dark," Palissy discovered the white glaze which was the basis of all the others, and his genius for artistic effects produced the superb ware for which he is famous. Being an earnest student of natural history, he decorated his vases and dishes with imitations of shells, fishes, reptiles, etc., made by taking casts of the objects themselves. He also did much to abate the superstitions regarding the fossil shells found in the rocks of the tertiary near Paris; these were supposed to be either proofs of the universal deluge or shells dropped by the Crusaders returning from the Holy Land, but Palissy boldly maintained that they were the actual remains of once living marine animals. Palissy wrote in French of great vigor, simplicity and perspicuity, and his works have been greatly admired by posterity; his naturalness in studying the book of nature with great modesty, yet with confidence, has set an example to all who would promote the separation of superstition from science.

Although pure mathematics was not barnacled with superstitious growths, its advances may be briefly noted, for it lies at the foundation of all physical science. A Franciscan friar of Italian birth, Lucas de Borgo, (also called Pacioli), who taught mathematics in Naples, Venice and Milan, published several treatises on arithmetic, algebra and geometry about the middle of the sixteenth century, which exerted a marked influence; and another Italian, Benedetto, published

in 1585 at Turin, a work on geometrical analysis. About the same time Simon Stevin, of Flanders, enriched arithmetic by the invention of decimal fractions. Algebra was improved by the genius of Jerome Cardanus, and especially by Viete of France, who introduced the use of letters of the alphabet to represent known quantities, thus facilitating the expression of general truths. The signs plus + and minus — were first used in a mathematical work published in 1544, and the sign equality =, appeared three years later in an English algebra by Robert Recorde. The important invention of logarithms by the student of astrology, John Napier, Baron of Merchiston, of Scotland, was not publicly announced until 1618; while the influence of the genius of Descartes was not felt until the middle of the same century.

The foundations of the science of mechanics were laid by Jerome Frascator, Jerome Cardanus and Ubaldo del Monte (1577), but this mathematical science as well as physics was but in its infancy at Rudolph's time. The treatise on Natural Magic written by the precocious youth Giovanni Baptista Porta of Naples in 1560, contained evidence that the author had successfully experimented in optics, and had constructed apparatus on scientific principles, capable of producing such marvellous illusions as to be ascribed to magic. The so-called "magic lantern" is often attributed to Porta, but he had been anticipated by that wonderful master of many arts, Leonardo da Vinci. Porta's treatise which went through several editions, deals much with lenses and mirrors of various kinds and seems to describe vaguely the telescope; in fact, after Galileo had perfected the instrument known as Galileo's tube, Porta claimed the invention as his own. Porta was indebted to the Venetian ecclesiastic, statesman and scientist Fra Paolo, whose real name was Pietro Sarpi, for several items of learning, notably those concerning the pro-

perties of the lodestone. Sarpi was so great a scholar that Galileo spoke of him as his "master"; and his contemporaries say he was profoundly versed in the "Hebrew and Greek languages, mathematics, astronomy, history, the nutrition of life in animals, geometry including conic sections, magnetism, botany, mineralogy, hydraulics, acoustics, animal statics, atmospheric pressure, the rising and falling of objects in air and water, the reflection of light from curved surfaces, mechanics, civil and military architecture, medicine, herbs and anatomy." He is credited with anticipating Harvey in the discovery of the circulation of the blood, and Kepler in certain optical phenomena. Unhappily his valuable manuscripts were destroyed by fire in 1766, and the extant extracts are being tardily appreciated by historians of science.

The foolishness of science did not always assume debasing forms like judicial astrology and sorcery, but was characterized by fervent beliefs in the false assertions of venerated authorities that became veritable superstitions; these dogmas were endorsed by scholars without any attempt to test their verity, until some independent genius arose, who broke loose from the shackles of a great name and hardily ventured to ascertain the facts for himself. In this way the dogma of Aristotle, that the heavier of two bodies falling to the ground moves faster than the lighter one, was disproved by Galileo in experiments made from the top of the Leaning Tower of Pisa. So blinded were the Aristotelians, that, when they saw the one pound weight and the ten pound weight strike the ground simultaneously, they asserted as strenuously as before, that the weight of ten pounds would have reached the ground ten times as quick as the one pound, had not "the natural velocities been interfered with" from some unknown cause.

None of the harmless follies of science were more firmly

established in the estimation of philosophers than that embodied in the assertion: "Nature abhors a vacuum;" and when in 1590 the well-sinkers of the Grand Duke of Florence found their pumps would not lift the water out of a well forty feet deep, Galileo was applied to for explanation of the difficulty and for a remedy. The great man is said to have informed the workmen that nature's abhorrence of a vacuum did not extend beyond thirty-three feet! Galileo himself being unable to assign the true reason, which was afterwards determined by his famous pupil Torricelli.

In the last year of the sixteenth century an English physician, Dr. William Gilbert, published a book that laid the firm foundations of a new branch of physics, electricity. The familiar behavior of a magnet in attracting particles of iron, and of amber in drawing to itself bits of paper and light articles, had been known to the ancients, but Dr. Gilbert made a thorough experimental study of these and related phenomena, discovering that glass, resins and certain precious stones had the same property as amber. He also demonstrated the laws of magnetic polarity and the uses of armatures; and while he deduced no general law he announced the theory that the earth itself is a great magnet. This grand monograph worked prodigies in removing from magnetic phenomena the superstitions clustering around them.

Pliny's Natural History, written in the first century, remained the unquestioned authority on all matters pertaining to plants, animals and minerals for more than thirteen hundred years, and was responsible for a mass of extraordinary superstitions, many of which lingered as "vulgar errors" until very recent times. Pliny transcribed from all known writers on natural history the most absurd tales and made no effort to examine their authenticity; he peopled the water, land and air with fabulous creatures having wonder-

ful habits and powers, and he described imperfectly well-known animals without essaying systematic classification. This was first attempted in a scientific spirit by the "German Pliny," Conrad Gesner, Professor of natural history at Zürich, whose "History of Animals," published in 1551, is the basis of all modern zoology; his younger contemporary, Ulysses Aldrovandus, who held the chair of natural history at Bologna, published six large folio volumes illustrated with wood cuts of many of the animals, his descriptions being in part taken from the work of Gesner. Aldrovandus founded a museum of natural history, and established one of the earliest of botanical gardens, in Bologna (1567), in which medicinal plants were especially cultivated. And about the same time Dr. Pierre Belon in France published a most important treatise on birds (1555); Belon resided in a chateau near Paris given him by the reigning sovereign and while collecting plants in the Bois de Boulogne was murdered by highwaymen. Another French physician, Guillaume Rondelet, was engaged at this period on a complete history of fishes (1558); these two works being early attempts at specialization in natural history.

The labors of scientific men do not become part of popular knowledge in their generation, and correct ideas of animals were less widely held than the far more fascinating notions of fabulous monsters; credence was given to the phoenix, a bird that after many hundred years burned herself in order that another might arise from her ashes; to the salamander that lived comfortably in the hottest of fires; and to the basilisk, or cockatrice, a monster hatched by a serpent, or by a toad, from a cock's egg, and possessing the power of killing men at a distance by venom projected from its eye:

"Mischiefs are like the cockatrice's eye;
If they see first, they kill; if seen they die."

According to popular belief ostriches eat and digested iron; bears licked their new-born cubs into shape; moles had no eyes and elephants no knees; the swan sings before it dies; the chameleon lives only on air; the fish remora swimming beneath a ship retards the movements of the vessel as a lodestone attracts iron; and

“ The toad, ugly and venomous
Wears yet a precious jewel in its head.”

To these extraordinary fancies may be added the firmly grounded belief that barnacles growing on trees fall into water and are transformed into geese; lovely mermaids with captivating manners entice men to their destruction; water-bulls perform terrifying deeds; while preposterous behavior was attributed to young vipers, birds of paradise, pelicans, tarantulas, scorpions, and to every “living creature after its kind, creeping thing and beast of the earth.” The temptation to enumerate more of the barnacles that were attached to zoology is great but must be resisted.

Pliny in his Natural History included botany, enumerating six hundred plants, and commentators in the sixteenth century made efforts to identify the imperfectly described species; physicians using botanical remedies felt the need of greater accuracy and began to form collections of their own, and to study them systematically. The first to suggest the classification by classes, order, genera and species was Conrad Gesner just named. During the sixteenth century many treatises on plants appeared, the most valuable contributions being made by Andrea Caesalpinus, Professor of Botany at Padua, who proposed a sexual classification, and by the brothers John and Gaspard Bauhin of Switzerland, one of whom published a systematic index to plants in which synonyms were grouped together.

The establishment of botanical gardens in the sixteenth century greatly advanced exact knowledge of plants, especially those of medicinal value, to which the gardens were at first limited. Italy was early in the field, a garden at Pisa under the care of Luca Ghini dated from 1544; Bologna, Padua, Venice soon followed suit, and the University of Paris began one in 1558. Germany at this period had only private botanical gardens, the best being that of Dr. Joachim Camerarius at Nuremberg. Sinapius, already mentioned, founded the imperial botanic garden under Rudolph II., which was afterwards in charge of Charles de l'Ecluse, of Flanders.

The botanical barnacles were nearly as numerous as the zoological, but these have been noted in connection with medicine, for plants were used as charms against misfortunes quite as much as for remedies in sickness.

In 1534, Andreas Vesalius, a Flemish youth, discrediting the anatomical descriptions of the human body by Galen, with great boldness stole the corpse of a criminal hanging in chains on a gibbet in the outskirts of Louvain, and at immense risk dissected it in his own bedroom; he found that Galen had based his account on the examination of lower animals, and cautiously continued his studies which resulted nine years later in a classical treatise on human anatomy, containing excellent drawings and minute descriptions of the parts of the body. Some of the plates in this magnificent work- (*De humani corporis fabrica*, 1543.), are said to have been designed by Titian; others were certainly drawn for Vesalius by his countryman Johann Calcar, then a pupil of Titian. Vesalius' zeal in dissection was indirectly the cause of his death; according to a tradition, denied by some authors, he was condemned to death for having opened the body of a Spaniard before the sick man was quite dead. The sentence was commuted at the intervention of Philip II., to a pilgrim-

age to the Holy Land. On his return from this journey Vesalius was shipwrecked on a desert part of the island of Zante, and died of hunger and neglect in 1564.

During Vesalius' occupancy of the chair of anatomy at the University of Padua, the Medical School became famous and it retained its celebrity two hundred years. Italy being the only country in which human bodies could be dissected without legal penalties, anatomy and physiology made great strides at the Universities of Padua, Pisa, Bologna, and Naples. Fallopius, incredible as it now seems, wrote that the Duke of Tuscany was obliging enough to send him criminals, whom he killed and then dissected. To sketch the progress of the study of the human body would require a volume; Eustachius, Arantius, Verolius, were some of the great names; "Piccolomini laid the foundations of general anatomy by his descriptions of cellular tissue, Coiter created pathological anatomy, Prosper Alpinus diagnosis, Plater the classification of disease, and Ambroise Paré modern surgery."

(Draper.)

Fabricius ab Acquapendente discovered the valves in the bloodvessels; Michael Servetus, of Villanova in Aragon, was one of the first to revive the idea of pulmonary circulation, but his talents did not prevent his becoming the victim of the fanatical John Calvin, at whose instigation he was "very slowly burned" at the stake for heresy in 1553.

If the medical school at Padua had done nothing else than educate the Englishman, William Harvey, its existence would be justified; Harvey's prime discovery of the circulation of the blood dates from about 1616, when he began to teach it to his pupils in London. About forty years later the microscope was applied to anatomical and physiological investigations....., but this superficial survey of progress in science must be closed, for two more events of great influence

demand brief notice, namely, the foundation of scientific societies and the introduction of Baconian philosophy.

The *Academia Secretorum Naturae* was founded at Naples in 1560 by Giovanni Battista Porta, and the *Accademia dei Lincei* at Rome in 1603 by Prince Frederigo Cesi. The former was chiefly made up of a small circle of Porta's friends devoted to pursuits like his own and who met to discuss new experiments; the society encountered opposition from ecclesiastics but cautiously avoided furnishing the Church pretense for persecution. The Lyncean Academy began as a sort of club of only four members, but it afterwards opened its doors to "philosophers eager for real knowledge, who will give themselves to the study of nature and especially to mathematics;" at the same time they were not to neglect "the ornaments of elegant literature and philology, which, like a graceful garment adorn the whole body of science." Galileo became one of the distinguished members of this society.

The renowned *Accademia del Cimento* was founded at Florence nearly fifty years later, but even this preceded the British Royal Society by five years and the French *Académie des Sciences* by nine. The influence of these societies in promoting the advancement of science was immense, but the most aggressive foe to superstition, the most efficacious instrument in removing the barnacles of folly, was the method of reasoning embodied in the inductive philosophy, which became the only recognized system pursued by the members of these societies as well as by independent investigators.

Francis Bacon, Lord Chancellor of England, who was very nearly a contemporary of Rudolph II, being however nine years younger, is often credited with the invention of the "Baconian" philosophy so-called, but the principles of the system had been distinctly expressed by Leonardo da Vinci,

and had been applied in their researches by William Gilbert, Bernard Palissy, Copernicus, Tycho Brahe, and other successful scientists. Lord Bacon, however, was the first to analyse the inductive methods of reasoning and to insist that this system is the only proper basis on which to build scientific truths; moreover, he explained the method in a powerful work devoted to the purpose, the "Novum Organum Scientiarum," published in 1620. The prevailing opinions had been "founded on vague and insufficient observations, and often they were nothing better than preconceived ideas and assumptions so fantastical that nothing but the prescription of authority and the sanction of antiquity could ever have secured their acceptance by successive generations of thinking men," but the application of Baconian principles effected a revolution of lasting benefit to science.

"From these and all long errors of the way,
In which our wandering predecessors went,
And, like the old Hebrews, many years did stray
In deserts, but of small extent,—
BACON, like Moses, led us forth at last;
The barren wilderness he passed;
Did in the very border stand
Of the blest promised land.
And from the mountain's top of his exalted wit
Saw it himself, and showed us it.
But life did never to one man allow
Time to discover worlds, and conquer too:
Nor can so short a time sufficient be
To fathom the vast depths of Nature's sea."





“The scientific spirit has cast out the demons and presented us with Nature, clothed in her right mind and living under the reign of law. It has given us for the sorceries of the alchemist the beautiful laws of chemistry; for the dreams of the astrologer, the sublime truths of astronomy; for the wild visions of cosmogony the monumental records of geology; for the anarchy of diabolism, the laws of God.”

JAMES ABRAM GARFIELD.



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