nearly, or quite, all of this work were published to the world from time to time as each investigation was completed, but the collection of them together in book form impresses us with the magnitude of the work, and shows how much can be accomplished in a single institution. Of course, many of these investigations are the direct product of Professor Kolbe's fertile brain, and equal results cannot be expected everywhere. But some results like these, though fewer in number and of less importance, ought to be produced in a dozen of our highly endowed American institutions, where to-day the dust lies deep on long unused apparatus.

It may be objected that these investigations have neither lead to startling discovery, nor brought in much money to the investigator. But science can point out so many occasions where the pursuit of knowledge for her own sake has benefited the world at large, that this charge will not avail much among the thoughtful, and especially among intelligent capitalists and inventors. From the time when Priestley discovered oxygen or Liebig prepared chloroform, to the time when Hoffmann discovered the beautiful aniline dyes that bear his name, the most valuable and beneficial chemical inventions have sprung from the study of science for her own sake. Nature can be compared to the wary heiress, who repels each suitor who, as she thinks, is courting her for her money, and bestows her heart only on the true lover who, ignorant of her wealth, adores her for herself alone; and like the cautious heiress too, she often disguises herself as a pauper to test the devotion of her followers. On the other hand, the fortune seeker, who marries the milliner's apprentice in the expectation that she will turn out a millionaire in disguise, deserves the disappointment; and science often thus disappoints her mercenary followers.

SINGULAR CAUSE OF FIRE.

The works of the Rubber Cloth Company, at Naugatuck, Conn., were destroyed by fire several weeks ago under the following singular circumstances: The building, an old one of wood, was 100 feet or more in length. The cloth is prepared by treatment with alcohol and linseed oil, and, during the operation, is passed over wooden rollers and extended along, for fifty feet or more, into a smaller vulcanizing chamber some thirty feet in length, where it is hung in folds from the ceiling to be dried and heated. The heating is done by steam pipes. Electrical sparks had often been noticed in passing the cloth along over the rollers. On the morning in question, which was exceedingly cold, the sparks had been observed to crackle louder than usual. A snow storm was in progress at the time. The workman, who was engaged in hanging the folds of cloth in the vulcanizing chamber states that suddenly there seemed to come from his hands a sheet of electrical fire, there was an explosion, the whole place was instantly in flames, and himself and others had to run for their lives. The building and contents were soon destroyed. The theory is that the fumes of alcohol and oil formed an explosive gas in the apartment, which the electrical sparks ignited, just as gas ordinarily is fired by electricity.

New works have been put up and the rolling machines have been connected by conducting wires with the earth. We are indebted to Mr. Allerton, the manager of the company, for these particulars.

VESUVIUS.

About two thirds of the way up the side of Vesuvius, stands a small building, plainly visible from the Naples side of the bay. During cloudy and wet weather, it is shrouded in the dense veil of smoke which settles around the summit; and in times of eruption, the fiery streams seem to encompass it and flow far below its level. In this structure, thus dangerously located, Professor Palmieri, a well known Italian savant, has established an observatory and, with marvellous intrepidity, has remained at his post watching the convulsions of the volcano at times when his house stood between torrents of liquid fire, the heat from which cracked the windows and scorched the solid stone of the walls.

The knowledge obtained at so great a risk has been recently given to the world in an ably written volume, which contains *data* calculated to be of invaluable assistance in the future investigation of volcanic phenomena. Professor Palmieri considers that, to a certain extent, eruptions may be predicted, a belief which he bases upon late observations that the central crater commences the agitation, which is then followed by a series of light convulsions which terminate in the grand outbreak. This concluded, the volcano becomes again quiescent. A vivid impression of the enormous force developed during an eruption is conveyed in the fact that on April 26, 1872, the volume of smoke, ashes, lava fragments and bombs projected upwards from the crater attained the hight of no less than 4,265 feet from the edge.

It is difficult to convey an adequate idea of the appearance of Vesuvius when thus convulsed. It was our fortune to witness the eruption of 1868, which, in point of magnitude, was probably little inferior to that of last year. Pictures of the phenomenon invariably exaggerate it, as they depict a steady column of fire of a hight equal to or greater than that of the mountain. As the latter is over 3,000 feet above the sea level in altitude, the impossibility of a fiery pillar of such proportion is obvious. Red hot stones are occasionally, as we have above stated, thrown to greater hights; but such is by no means of common occurrence. By day, an unceasing flow of white smoke rises like a gigantic plume from the crater, and is visible for miles distant; while at night, the base of the column becomes radiant with a lurid glare. During the hight of an eruption, the smoke is ejected in greater quantities, and the summit of the mountain belches fountains of flame. The latter, however, are by no means continuous. The volcano will often remain quiet for hours and sometimes days, often causing it to be believed that the convulsions are over. Then all of a sudden, the smoke clouds will thicken, a rumbling becomes heard, and a great jet of fire rises for a short distance above the crater and instantly falls back. At the same time, stones and red hot *scoriæ* rise high in the air and add, by their fall, to the noise of the commotion. This goes on at varying periods, sometimes ceasing immediately and again continuing for a day or more. There is a prevalent though mistaken idea that lava, at the time of these great outbursts, pours in rapid torrents down the declivity. In times of repose, it is very seldom that the streak of light due to the red hot mass is seen on the mountain side; though when an eruption first begins, probably after night fall, a jagged lurid line will be remarked reaching below the crater. This extends as the convulsion progresses, and, after several weeks, it expands into several dull red streams reaching down a distance perhaps of two thirds of the slope. The onward movement of the lava is very slow, and of course it is totally unlike the molten rivers represented in popular prints. Its surface soon cools sufficiently to permit of being walked over, though a stick thrust a few inches down becomes quickly charred.

The danger to the villages at the base of Vesuvius does not lie so much from stones or ashes being heaped upon them, as we have recently seen it stated, but from these descending lava streams extending down far enough to reach populated portions. In regard to the mountain throwing ashes, such is often the case when the wind is high; but the quantity ejected is never enough to cause apprehension. The substance which buried Pompeii and Herculaneum, which seems to be nothing more than fine dry pumice, must have been the result of an eruption to which modern convulsions furnish no parallel. We have seen ashes carried to points several miles distant from the volcano; but, during the entire course of the eruption, the aggregate depth to which they fell could not have exceeded from one eighth to one quarter of an inch. The substance was in black friable grains somewhat resembling gunpowder, but very unlike the material which entombed the Roman cities.

Professor Palmieri has produced a very instructive work on Vesuvius. Now, we would suggest that he supplement his efforts by turning his investigations from an intermittent to a constant volcano—from Vesuvius to Stromboli. The latter, situated on an island in the Mediterranean, is in perpetual eruption, and the light from its summit serves as a well known beacon to sailors. For how long the phenomenon has existed, history does not state; but it seems to us that much valuable cosmical knowledge might be gained from the results of such continuous volcanic action.

THE GREEK NEW TESTAMENT.

The manuscript copies of the Greek New Testament, written before the art of printing was discovered in Europe, are known to differ among themselves in many small points, such as one or two letters in the spelling of a word, which frequently changes the meaning of the word. After the Testament was put in print, in the sixteenth century, different manuscripts were compared with the printed text, and the variations from it noted. The further this comparison, or collation of manuscripts, was carried, the greater was the number of variations discovered; and soon, alarm was excited for the safety and integrity of the text itself. The collation of manuscripts, however, still went on, until a mass of "various readings" was secured, numbering many thousands and constituting in textual criticism what a body of observed facts does in physical science.

About one century ago, Dr. John J. Griesbach began to apply these "various readings" to the actual correction of the text; doing it however in a cautious and sparing manner, yet going far enough to show that the text might be both preserved, and purified and established, by the proper application of scientific principles in the use of the observed facts. But the opinion continued to prevail that the genuine text was to be arrived at by the agreement of the greatest number of readings. As the modern manuscripts far outnumber the ancient ones, this was equivalent to settling the text on their authority, as though, the further you go in time from the original autographs, the nearer you must thus become in fact to the very words and letters in which those autographs were penned. Considering the liability to error in copying, the truth is indubitably in the opposite direction. The nearer we can go to the first century of the Christian era, during which all those autographs were written, other things being equal, the nearer we must get to the actual readings of the autographs themselves.

When our common English version was first put in print, in 1611, the oldest Greek manuscripts available to the translators were written as late as the tenth century. Since their day, manuscripts have been brought to light, and many of them printed, dating back to the middle of the fourth century, and from that point down to the tenth. Two eminent scholars, Dr. S. P. Tregelles, of England, and Dr. C. Tischendorf, of Germany, have also each devoted thirty years to the collection of readings from the ancient manuscripts, and the practical use of them in revising the text. In addition to the testimony of the ancient manuscripts thus secured, they have also developed other principles of criticism, and reduced them to practical rules, so definite in their application that, in most cases, the revised texts of these distinguished scholars entirely harmonize.

Thus through the medium of textual criticism, and by the patient and intelligent application of its principles during long years of toil, we now have the text of the Greek New Testament restored essentially to its original purity, and established on a firm and scientific basis.

Previous to the tenth century, the manuscripts were written in capital letters, and without a space between the words. The three most important and valuable of them are the Sinaitic, the Vatican, and the Alexandrian, many of whose various readings are given by Tischendorf in his Leipsic edition of the English New Testament. The Sinaitic manuscript, critically marked *Aleph*, written about the middle of the fourth century, was discovered by Tischendorf, February 4, 1859, in the convent of St. Catharine, on Mount Sinai, in Arabia, and published by him in facsimile in 1862, and in the common type in 1865. It contains the entire New Testament, and is deposited in the Imperial library at St. Petersburg. The Vatican manuscript, marked B, also written about the middle of the fourth century, has been published only since 1857. It is in the Vatican library at Rome. The Alexandrian manuscript, marked A, written about the middle of the fifth century, was first published in 1786. It is in the British Museum, at London. The Ephraim or Royal Paris manuscript, marked C, of the fifth century, and the Cambridge manuscript, marked D, of the sixth century, are next in value.

As specimens of various readings: In Matt. 7:14, *Aleph* and B have *OTI*, "*because* strait is the gate," putting it on the same ground as the preceding motive for "entering in at the strait gate," and *OTI*, "*because* wide is the gate," etc. But later copyists dropped the *O*, and made it read *TI*, "*How* strait is the gate." In Luke 13:24, *Aleph* and B have ΘΥΡΑΣ, "door," corresponding with "the door" spoken of in verse 25. But later copyists changed three letters and made it read ΠΥΛΗΣ, "gate," as in Matt. 7:13, 14. The doxology to the Lord's prayer is not found in any of the oldest manuscripts in Matt. 6:13; just as all omit it in Luke 11:4. But in later times, the prayer, having come into general use in the church service, was closed with the doxology, and with that addition was copied into the later manuscripts of Matthew.

In 1862, and 1865, the American Bible Union, of New York city, published a first, and a second revision of the English New Testament, under the direction of Dr. T. J. Conant, following the revised Greek text, so far as it was then settled. That society is now preparing a third revision, from the completed text of Tregelles and Tischendorf, in the current English of the present day. The Canterbury diocese, of England, is also employing revisers for a similar purpose; but they propose retaining the antiquated English of the common version, except where it cannot be readily understood.

CONTAGIOUS AND INFECTIOUS DISEASES.

Dr. Symes Thompson, a well known English physician, recently lectured on the above topic in London; and from his discourse we glean the following:

It is considered a settled fact that diseases of a contagious nature are caused and spread by influences largely within the sphere of human government and control. Every form of infectious fever has its idiosyncrasy. Enteric fever and cholera tend chiefly to disseminate themselves through water, passing into the wells and fountains of daily supply, and at times traveling from house to house in the milk cans of easy conscienced diarymen. Scarlet fever hibernates in a drawer and, after long months, comes forth with some old and cast aside garment, to be thrown with it around the throat or head of some new victim, and so start thence upon a fresh career. Typhus fever crawls sluggishly from hand to hand and mouth to mouth and is immensely sociable in its spirit, languishing away when condemned to solitary confinement. Typhoid fever generates itself where filth, overcrowding and impure habits of life prevail; and relapsing fever glides in the track of privation and misery.

The means now known of controlling these evil ministrants are, in the main, careful isolation of the sick, the preservation of the water from which daily supplies are derived in uncontaminated purity, the uninterrupted ventilation alike of hospitals and dwelling houses, the immediate removal from the vicinity of active human life of all excretions of the sick and the destruction of their morbific influence by mixing them with antiseptic and disinfecting agents (such as carbolic acid, sulphuric acid, chlorides of lime and zinc, permanganate of potash, and charcoal), temperate living, avoidance of any kind of excess, and above all the cultivation of an intelligent familiarity with natural laws.

In regard to antiseptics and disinfectants, Dr. Thompson states that it should be understood that agents of the character of carbolic acid are properly antiseptics, and operate mainly by arresting the process of fermentation and decomposition, while agents of the nature of Condy's fluid (permanganate of potash), chloride of lime, and especially charcoal, are disinfectants, and act by absorbing the noxious products of decomposition. This he showed by experiment, a few drops of carbolic acid causing a cessation in the evolution of gas bubbles from a fermenting solution of sugar; and the violet color of Condy's fluid was instantly discharged when combined with water in which was a trace of sulphureted hydrogen. The lecturer also exhibited the remains of a rat which had been placed in a jar of charcoal six years ago. Only the bones and a few hairs were to be seen; and although the jar had been covered with but a piece of paper, throughout the lengthened period of decomposition, no trace of disagreeable smell was at any time emitted.

NITRIC ACID IN SPRING WATER.—The water supplied to the city of Munich, Ger., contains nitric acid and saltpeter. Professor A. Wagner states that the amount of water used by the city in one year, by the ordinary water pipes, contains saltpeter, sufficient to make 18,106 cwt. of gunpowder.