stantial and workmanlike manner, and is equal to anything of the kind in Europe.

The government of Bombay have recorded the eminent services rendered by Mr. Stevens in connection with this vast work, and the directors of the Great Indian Peninsular Railway Company have marked their appreciation of his services by recommending him an honorarium of 5,000 rupees.—*London Graphic*.

THE PALACE OF THE LIBERAL ARTS AT THE FRENCH EXHIBITION.

GROUP II. includes the following classes :

6. Education of infants, primary teaching, instruction of adults.

7. Organization and material for secondary instruction.

8. Organizations, methods, and material connected with advanced teaching.

9. Printing and books.

10. Paper, bookbinding, and materials employed in the arts of painting and drawing.

11. Ordinary applications of the arts of drawing and modeling.

12. Photographs and photographic apparatus.

13. Musical instruments.

14. Medicine and surgery, veterinary and comparative medicine.

15. Mathematical instruments.

16. Maps and other apparatus connected with geography and cosmography. Topography.

These various classes are distributed in the Liberal Arts Palace, on the ground floor and on the first story.

On the ground floor, along the side adjoining the Avenue de Suffren, will be Classes 14 and 15; near these will be Class 16 on the inner side next to the nave. Class 13 will be placed against the vestibule which separates the building from the gallery of mis-

of their elegance of form, their richness of materials, or their beauty of detail. Thus there are often seen real *chefs d'œuvre* on an old map, on the handle of a chisel, or on the barrel of a gun. Our ancestors had not the same passion as ourselves for speed and cheapness; from that order of things the arts benefited and production was limited. Our Exhibition, in presenting a collection of such objects, will gain greatly in brilliancy and attraction. The national museums, the municipal collections, the storehouses of our great workshops, contain large numbers of such objects, which can be easily put in a state fit for exhibition, and which would form the foundation of the proposed collection. The authorities believe that in calling the attention of artists, manufacturers, and collectors to this subject they will probably have suggested a means of making interesting discoveries, and of bringing to light forgotten or unknown treasures of this nature. By the side of the instrument or of the machine may be exhibited the various objects in the production of which these instruments and these machines have been employed, provided always that such objects are of artistic value or of historical importance."

The titles of the various sections are of themselves almost sufficient to indicate the character of each special exhibition. The first, subdivided into anthropology, ethnography, archæology, will comprise prehistoric collections, and will be, to a certain extent, a general review of rudimentary industries; it will illustrate tools in stone and bronze, the origin of glass and of enamel, the early applications of fire to industry, and will institute a comparison between these old-world processes and those of modern savage life. Connected with this section will be the very remarkable creation of M. Garnier, who has constructed at one of the entrances to the Exhibition, upon the river quay, dwellings of various ages and different countries, an extensive series, which will form a history of human habitations.

per part, invisible from below, will be glazed. All the rest of the surface will be covered with porcelain tiles, fitting into one another by means of ribs and grooves, so as to form a continuous surface without any overlapping. Altogether each dome will be divided into twelve wide gores separated from each other by narrower ones. The bottom of the former will be white, and in the center, upon a large scroll, will be the initials R. F. in gold surrounded with a turquoise border. The remainder of the surface will be in blue. The mosaic will thus present a combination of blue, red, and yellow on a white ground; and the effect produced, so far as can be judged from the work actually done, will be very satisfactory. The construction of this enameled covering will require no less than 50,000 tiles, of 630 different types, and they will cover a surface of 1,248 square meters. At the foot of each dome will be placed twenty-four large vases 10 feet high. Besides the mosaics on the domes, Mr. Muller has also on hand the decorations of the main central entrances giving on the gardens. The spandrels of the arches are filled in with terra cotta panels representing groups of children, in relief on a gold ground. These panels, 6 feet high, have been finished in one piece—a somewhat remarkable *tour de force*. The liberal arts palace will show, on the side of the Seine, two smaller domes about 60 feet in diameter, and crowning the corner pavilions. These domes will also be covered with enamel tiles in blue and yellow on a cream colored ground; this work is being carried out by MM. Parvillée Brothers. The remainder of the facade will be filled in with large terra cotta panels placed between the iron framework of the building. The edifice will be surmounted by a balustrade constructed by Mr. Muller; it will have an area of 2,000 square meters, and will be formed of about 8,000 pieces of terra cotta, weighing nearly 500 tons.

From what we have said, it will be seen that ceramic art will play a most important part in the construction of these buildings. It is an innovation very cleverly

THE PARIS EXHIBITION OF 1889—THE PALACE OF THE LIBERAL ARTS.

cellaneous industries. On the first floor, and around the outer galleries, the other classes will be distributed in their numerical order. The minister of the interior will have on the ground floor and on the outer side of the palace an important exhibition of objects connected with his department.

Foreign nations will exhibit each separately in the spaces allotted to them, the grouping being arranged collectively so far as may be possible. Italy will occupy on the ground floor the interior pavilion adjoining the separating vestibule; Switzerland, Belgium, and Holland will be placed in the gallery adjacent to the Avenue de Suffren. On the first floor, England and the United States will each of them fill one of the corner pavilions. The distribution of space and the installation of exhibits are in the charge of M. Sedille, to whom also is due the design of the elaborate and very beautiful internal pavilions made principally of carved wood, which will occupy nearly the whole area of the great central nave, and which will present a variety of ornamental facades, internal galleries, etc. The perspective view that we publish this week gives a good idea of the beauty of this very original structure. This inner pavilion will be devoted to the Retrospective Exhibition of Work and of Anthropological Sciences, which will certainly be one of the most attractive curiosities on the Champ de Mars. The organizing committee of this special exhibition has for its president M. Jules Simon; MM. Jurien de la Gravière and De Quatrefages are vice-presidents. It will comprise five sections: 1. Anthropology, Ethnography. 2. The Liberal Arts. 3. Arts and Industries. 4. Means of Transport. 5. The Art of War.

The special object of this scheme has been clearly set forth in a letter addressed by the president to probable exhibitors; from it we may take a few of its most important paragraphs: "This exhibition will have a special historical and technical interest; it is not intended to exclude works of art, because in various periods, tools, especially those employed in the liberal arts, were true artistic productions, either on account

of their elegance of form, their richness of materials, or their beauty of detail. Thus there are often seen real *chefs d'œuvre* on an old map, on the handle of a chisel, or on the barrel of a gun. Our ancestors had not the same passion as ourselves for speed and cheapness; from that order of things the arts benefited and production was limited. Our Exhibition, in presenting a collection of such objects, will gain greatly in brilliancy and attraction. The national museums, the municipal collections, the storehouses of our great workshops, contain large numbers of such objects, which can be easily put in a state fit for exhibition, and which would form the foundation of the proposed collection. The authorities believe that in calling the attention of artists, manufacturers, and collectors to this subject they will probably have suggested a means of making interesting discoveries, and of bringing to light forgotten or unknown treasures of this nature. By the side of the instrument or of the machine may be exhibited the various objects in the production of which these instruments and these machines have been employed, provided always that such objects are of artistic value or of historical importance."

The section of arts and industries will be divided into four groups; those relating to the development and utilization of power; the collection and treatment of raw materials; their further elaborations and transformations; the practice of arts and industries necessary to individual and social life. One feature of this collection will be a large number of wax figures representing various periods and costumes, and the industries to which the section refers.

The section relating to means of transport will certainly be one of the most interesting and important. Very curious, also, will be the section relating to the art of war, which will prove an exhibition of high interest, and one which France knows well how to produce.

In examining the plans of the building which it is intended shall contain these various collections, the serious doubt presents itself that there is a vast disproportion between the size of the official programme and the dimensions of the gallery. Pending a solution of this somewhat disquieting suggestion, we may turn to the actual construction of the palace, of which a good idea is given by the perspective view herewith presented, in which the outer walls are supposed to be removed, in order to show the interior. The ironwork of the liberal arts palace—as well as that of the picture gallery—is now completed, and work has entered for some time upon an entirely new phase, which involves a different series of operations—covering the dome with colored tiles and decorating the façades with terra cotta panels. This very considerable work, to which we some weeks ago made a passing reference, is being carried out by Mr. E. Muller. The central dome of each building is about 100 feet in diameter; the up-

put into practice by M. Formige, who has been ably seconded by the artists with whom he has surrounded himself.—*Engineering*.

NEW MIXTURE FOR SEPARATING CARBON FROM PIG IRON, STEEL, ETC.

By T. W. HOGG.

THE most accurate methods that have been proposed for the determination of carbon in steel, pig iron, and other ferro-carbon alloys are those in which the carbon is first separated in a state of proximate purity, and afterward burnt in a current of oxygen.

In order that this separation may be effected, it is simply necessary to treat the particular ferro-carbon alloy with some salt whose base can either be substituted entirely, or where the salt can be reduced to some lower compound by the iron present in the alloy; the carbon not taking any part in the reaction is left behind as such, and may be filtered off for further treatment.

It is obvious that quite a considerable number of salts are capable of effecting this separation, and a great many have been recommended for the purpose, but none of them have given such general satisfaction as a neutral solution of cupric chloride. However, even this cupric chloride possesses one objectionable quality—the decomposition of the alloy is accompanied by the production of cuprous chloride, and, as this is comparatively speaking an insoluble compound, it is necessary to provide against its precipitation; this is accomplished by adding an abundance of concentrated hydrochloric acid, or by having present in great excess a saturated solution of some salt, such as sodium or ammonium chloride.

Whatever plan may be adopted, this insolubility of the cuprous chloride is always troublesome, and occasionally proves an intolerable nuisance; and it is the object of this short paper to draw attention to a reac-

tion familiar to every chemist, by means of which this inconvenience may be entirely removed.

When a solution of ferric chloride is added to cuprous chloride an immediate change takes place, cupric chloride and ferrous chloride being formed.

The ferric chloride solution may be utilized in different ways by the operator; he may conduct the analysis by means of cupric chloride as usual, and at the end decompose the cuprous chloride by adding sufficient ferric chloride, or he may add this salt as soon as the mixture of metallic copper and carbon is obtained. A little gentle heating, aided by a few drops of hydrochloric acid, will suffice to cause the whole of the metallic copper to be dissolved by the ferric chloride.

The ferric chloride may be used in a still more advantageous and economical point of view; it will itself, as is well known, decompose most ferro-carbon alloys, but not without some loss of carbon; but if a small proportion of cupric chloride be present, this loss is entirely prevented. The decomposition proceeds entirely through the medium of the copper salt, which is at first reduced and then reformed at the expense of the ferric chloride.

The ferric chloride should possess a sp. gr. of about 1.30, and the copper salt 1.35, but so long as these solutions are kept pretty concentrated, the exact strength is not a matter of very great consequence; a little ammonium hydrate should be added to neutralize any excess of free acid that might be present. The ferric chloride will dissolve ferric hydrate long after all free acid is neutralized, so that it is best to try the mixture with a high carbon steel, and ascertain whether there is any indication of the evolution of hydrocarbons.

After weighing the requisite quantity of the alloy, and placing it in a beaker, sufficient cupric chloride is added to cover the borings to the depth of about half an inch, and then a considerable excess of the ferric chloride solution is added; after about five minutes' stirring the beaker is placed upon a lamp and heated gently up to boiling point, and if the borings have been in the proper state of fineness, the decomposition will be completed within twenty minutes, and, after adding a few drops of hydrochloric acid, to prevent the precipitation of basic compounds, the carbonaceous residue may be filtered off, and washed prior to further treatment.

In dealing with alloys containing silicon up to about 4 per cent. the carbon should always be filtered off as soon as the alloy is quite decomposed; it is a common occurrence to allow the borings and the cupric chloride to stand all night, and, if this is done, the silicic acid which results from the oxidation of the silicon, and which at first passes almost entirely into solution, is often partially precipitated in the gelatinous condition, with the result that the filtration becomes very tedious. —*Chemical News.*

[Continued from SUPPLEMENT, No. 676, page 10801.]

ALLOYS.*

By Professor W. CHANDLER ROBERTS-AUSTEN, F.R.S.

LECTURE III.†

TWENTY-FOUR years ago the accomplished artist, architect, and antiquary, the late Mr. William Burges, delivered a course of Cantor lectures before the Society of Arts.‡ He stated that he "had been requested by the council to show how the arts have formerly been applied to industry; how they are at present applied; and what may possibly be done to increase their application." Mr. Burges dwelt at some length on bronze, brass, gold, and silver, and his lectures, generally, were considered to be so important that the present director for art at South Kensington made them the text for an address delivered before this Society in February, 1887, when he reviewed the progress which has been made during the past thirty years. But you will say the metallurgist cannot speak with authority on themes such as these; I have, however, treated the subject in a manner which will, I believe, enable me to bring before you important truths affecting a wide range of industrial operations, and, at the same time, to sustain the true function of art by pointing to the direction in which we may have increased pleasure in things that constitute our most ordinary possessions, and which we use in daily life. First, permit me to explain that I intend to include under the title of the lecture any facts which are, in my opinion, connected with the colors of metals and alloys, whether natural to them or produced by artifice, as well as a brief examination of the influence which the colors of metals appear to have exerted on the history of science.

I propose to begin at what will appear to be a somewhat remote starting point. We say that copper is red, gold yellow, and silver white, but it is by no means certain that the early races of the world had any very clear perception of the difference between these several metallic colors. With regard to early Hebrew and Greek civilization, Mr. Gladstone has expressed his belief that the color-sense—that is, the power of recognizing color and distinguishing it from mere brightness or darkness—was imperfectly developed, and he considers that "the starting point is absolute blindness to color in the primitive man," and he urges that the sense of color has been gradually developed "until it has now become a familiar and unquestioned part of our inheritance." He adds: "Perhaps one of the most significant relics of the older state of things is to be found in the preference (known to the manufacturing world) of the uncivilized nations for strong and, what is called in the spontaneous poetry of trading phrases, loud color."§

Dr. Magnus holds the view that the color sense in man has undergone a great improvement within the last 2,000 years, and Professor Haeckel supports this speculation. But it is opposed by Romanes, who has favored me with some observations on the subject, in view of this lecture; and it seems to me strange, if savage nations are really deficient in the sense of color, that the use of such colors as they can get in metals

and fabrics, blended, for instance, in a war club or a pipe stem, should be so thoroughly "understood" and so discriminately employed as we sometimes find them to be. It may further be observed that primitive man may even have derived from his more remote ancestry some power of being influenced by color, and we are told that the attraction which gorgeous coloring in flowers has for birds and insects, and which color generally possessed for our nearer ancestors, has been of great importance in the origin of species and in the maintenance of organic life.

No doubt in ancient times there was much confusion between mere brightness and color, such as is evident in the beautiful sentence in which St. Augustine* says: "For this queen of colors, the light, bathing all which we behold, wherever I am through the day, gliding by me in varied forms, soothes me when engaged on other things, and not observing her." If, however, it were proved that the power of distinguishing the color of metals was not widely diffused among the Egyptians, Hebrews, and Greeks, it is at least certain that there were individuals of these nations to whom, in very early times, the color of metals was all-important; and although they may have confused different precious stones under generic names, they certainly appreciated their various colors, and knew, moreover, that by fusing sand with the addition of a small quantity of certain minerals they could produce artificial gems of varied tints.

My object in leading you so far back—in discussing what appears to be a very matter-of-fact subject—is to point to the close connection between the early recognition and appreciation of color in metals or minerals and the foundation of the science of chemistry.

In early scientific history the seven metals known to the ancients were supposed to be specially connected with the seven principal planets whose names they originally bore, and whose colors were reflected in the metals. Thus gold resembled the sun, silver the moon, while copper borrowed its red tint from the ruddy planet Mars. The belief in the intimate relation between colors and metals, the occult nature of which they shared, was very persistent, and we find a seventeenth century writer, Sir John Pettus, saying† that "painters" derive "their best and most proper colors from metals, whereof seven are accounted the chief, produced from the seven chief metals, which are influenced by the seven planets." A survival of this feeling is suggested by a modern writer, Leslie, who supposed that "when Newton attempted to reckon up the rays of light decomposed by the prism, and ventured to assign to them the famous number seven, he was apparently influenced by some lurking disposition toward mysticism."‡

It would be impossible for me to overrate the importance of the color of metals in relation to scientific history, for the attempt to produce a metal with the color and properties of gold involved the most intense devotion to arduous research, sustained by feverish hope, attended by self-deception and elaborate fraud, such as hardly any other object of human desire has developed. It led to despair, to madness, and to death; but finally, through all, alchemy prepared the way for the birth of chemistry and for the true advancement of science.

In early times, as now, gold was an extremely desirable form of portable property, and its color was, perhaps, held to be the most distinctive and remarkable fact about it. I may incidentally observe that the dominant idea of color in connection with the metallic currency survives in the familiar phrase, "I should like to see the color of his money," which curiously expresses a desire, tempered by doubt as to its fulfillment. On looking back, we find that, at least from the third to the seventeenth century, the color of gold haunted the early experimenters, and induced them to make the strangest sacrifices, even of life itself, in the attempt to imitate, and even actually to produce, the precious metal. Let us see what kind of facts were known within the period I have indicated. In barbaric times, hammered pieces of gold, or gold beaten into thin sheets or plates, were used with colored stones and coral for personal adornment. The next step was to make gold go further by gilding base metals with it, and, in order to do this, the color was for the moment sacrificed by combining the gold with quicksilver. This was done at least in the time of Vitruvius, B. C. 80, heat being used to drive away, as vapor, the quicksilver which had been united to the gold, leaving a thin film of precious metal on the surface to be gilded. But this was possibly not the first method of gilding, for we now know, from a papyrus of about the third century§ of our era, that lead was used for this purpose. Gold, when fused with lead, entirely loses its golden color, and yet, by the application of heat in air, the lead may be made to flow away as a fusible oxide, leaving the precious metal on the metallic object to be gilt, the base metal being as it were transmuted, superficially at least, into gold. The point I want to insist upon is that the metallic color of the gold vanished during the process as carried on by the craftsman, only to reappear at the end of the operation; and I am satisfied that it was from such simple technical work as this that the early chemists were led to think that the actual production of gold—the transformation of base metals into gold—was possible. The more observant of them, from Geber, the great Arabian chemist of the seventh century, to our own countryman, Roger Bacon, in the thirteenth, saw how minute a quantity of certain substances would destroy the red color of copper or the yellow color of gold. A trace of arsenic will cause the red color of copper to disappear; therefore, the alchemists very generally argued, some small quantity of the right agent, if only they could find it, will turn a base metal to the color of gold. Look, they said, how small a quantity of quicksilver will change the appearance of metallic tin. Here is a bar of tin two feet long and one inch thick, which it would be most difficult to break, though it will readily bend double. If only I rub a little quicksilver on its surface

a remarkable effect will be produced, for the fluid metal will penetrate the solid one,* and in a few seconds the bar will, as you see, break readily, the fractured surface being white, like silver. It was by such facts as this that men were led to believe that the white metal, silver, could be made.

Successive workers at different periods held divergent views as to the efficacy of the transmuting agent. Roger Bacon, in the thirteenth century, held that one part of the precious substance would suffice to turn a million parts of base metal into gold. Basil Valentine, in the fourteenth century, would have been content with the transmutation of seventy parts of base metal by one part of the agent; while, coming to the end of the eighteenth century, Dr. J. Price, F.R.S., of Guildford, only claimed that the substance he possessed would transmute from thirty to sixty parts of base metal.†

It is a curious fact that no one seems to have actually prepared the transmuting agent for himself, but to have received it in a mysterious way from a "stranger;" but I must not dwell on this. I will merely point out how persistent was the view as to the singular efficacy of the transmuting agent, and I will content myself with a reference to Robert Boyle, our great countryman, an accurate chemist of the seventeenth century, who did more than any one else to refute the errors of alchemy. He, nevertheless, characteristically records the following experiment,‡ in which, instead of ennobling a base metal, he apparently degraded gold to a base one. He first purified a small quantity of gold, about "two drachms," with great care, and, he states, "I put to it a small quantity of powder communicated to me by a stranger"—it is singular that even he should have received the transmuting agent in the usual way—"and" he adds, "continuing the metal a quarter of an hour on the fire, that the powder might diffuse itself through it, . . . the metal when cold appeared to be a lump of dirty color. . . . It was brittle, and, being worked with a hammer, it flew into several pieces. From hence," he adds, "it appears that an operation almost as strange as that called 'projection' (or transmutation) 'may safely be admitted, since this experiment shows that gold, . . . the least mutable of metals, may in a short time be exceedingly changed . . . by so small a portion of matter that the powder transmuted a thousand times its weight of gold." He elsewhere observes of a similar experiment, "Transmutation is nevertheless real for not being gainful, and it is no small matter to remove the bounds which Nature seems very industriously to have set to the alterations of bodies."§ The change in the color of the gold was remarkable, but Boyle had only produced one of the series of alloys most dreaded by every jeweler—"brittle gold"; for the way in which an alloy of gold and copper is affected by a small quantity of impurity presents one of the most serious difficulties in working gold. It has been known since the seventh century that minute quantities of certain metals change the color of gold and render it brittle, and it may be well to demonstrate the fact.

Here are two hundred sovereigns; I will melt them, and will add in the form of a tiny shot a minute portion of lead amounting to only the 2,000th part of the mass, first, however, pouring a little of the gold into a small ingot, which we can bend and flatten, thus proving to you that it is perfectly soft, ductile, and workable. The rest of the mass we will pour into a bar, and now that it is sufficiently cold to handle, you see that I am able to break it with my fingers, or, at least, with a light tap of a hammer. The color of the gold is quite altered, and has become orange-brown, and experiments have shown that the tenacity of the metal, that is, the resistance of the gold to being pulled asunder, has been reduced from eighteen tons per square inch to only five tons. These essential changes in the property of the metal have been produced by the addition of a minute quantity of lead. I have cited these facts mainly to show that the changes produced in the color and properties of metals by small variations of composition were such as to lead the alchemists on in their belief that it was possible to change lead or tin into gold, and the hope in which they worked enabled them to gather facts out of which chemical science was gradually constructed. We shall see presently that changes in the color of metals and alloys produced by the addition of small quantities of foreign matter are of great importance in the application of metals to artistic purposes, but we must first try to examine more closely some of the prominent facts connected with the color of metals, that is, the effect metals have on light, so as to produce the effect of color in our eyes. We are apt to think of gold as being essentially and distinctly of golden-yellow; it may, however, possess a wide range of colors without in any way losing the condition of absolute metallic purity, its relations to light depending entirely on the nature of its surface, and especially on whether the metal is in mass or in a more or less fine state of division. Interesting as gold is to us in mass, it is, perhaps, still more interesting to us when beaten so fine that a single grain, of the value of 2d., would cover a space of forty-eight square inches, or when it is so finely divided that the dimensions of a single particle may closely approximate to those of the ultimate atom.

This aspect of the question was investigated by Faraday, and the experimental part of the subject as regards gold remains practically as he left it. It is well known that a leaf of gold, when seen by transmitted light, is either green or blue, according to its thickness. Here is such a leaf of green gold, as seen when light is actually sent through it (Fig. 1), so as to project a green disk on the screen. A portion of the light will be reflected from its surface, and this reflected ray may be caught in a mirror and thrown on the screen, so that you have, shown side by side, the green disk of transmitted light and the golden one of reflected light from the same leaf of gold.

Gold may readily be converted into a soluble chloride which produces a beautiful golden solution. If such a solution contains very little gold, not more than

* Three lectures delivered before the Society of Arts, London, 1888. From the *Journal* of the Society.

† This lecture was originally delivered in 1886, to the operative classes of Birmingham, in connection with the British Association. It is now published in this *Journal* as modified for delivery before the Society of Arts, in order that it may form part of the series of lectures (delivered by the author) which began, in 1884, with a course of four lectures on "Alloys Used for Coinage."

‡ "Art Applied to Industry," by W. Burges. 1865.

§ "Nineteenth Century," p. 367, 1877.

* "Confessions of St. Augustine," Edition edited by E. B. Pusey, D.D. (p. 211).

† "Treatises on Various Subjects of Natural and Chemical Philosophy."

‡ "Fleta Minor," 1686, appendix, "Essay on Metallic Words: Color."

§ "Les Origines de l'Alchimie," par M. Berthelot, 1885, pp. 82, 83. It is interesting to compare the account of this method of gilding by lead with the expression used by Homer, who says: "As when gold is fused around the silver by an experienced man." "Odyssey," vi. 232-35, (quoted by Schliemann, "Ilios," p. 258, in relation to a gilded knife of copper which he permitted me to analyze in 1878).

* Homberg, "Mem. de l'Acad. Royale des Sciences," 1713 (vol. published 1739), p. 306.

† "An Account of Some Experiments on Mercury, Silver, and Gold made at Guildford, in the Laboratory of James Price, M.D., F.R.S.," Oxford, 1782.

‡ "The Philosophical Works of the Hon. Robert Boyle" (Shaw's second edition), 1738, vol. i., p. 78.

§ Loc. cit., vol. i., p. 262.