THE STRUCTURE OF MATTER.

Read before the New York Academy of Sciences by Prof. C. F Kroeh, of the Stevens Institute of Technology.

It is a well recognized fact that much of the progress in chemical and physical science is due to the increased attention given by investigators to the molecular structure of matter. The labors of Clausius in founding the mechanical theory of heat, of Tait, Sir William Thomson, and others in studying the motions of gases, the researches of Helmholtz in hydro-dynamics, of Clerk-Maxwell in electro-dynamics, of Julius Thomsen in thermo-chemistry, and of Crookes on residual gases, may all be attributed to this cause; while Graebe and Liebermann have shown by their discovery of a method for preparing artificial alizarine, that "mere theory," as the practical man of the past was wont to call it, may become of great industrial utility.

Seeing, then, the obvious importance of the results already reached, and believing that we are only upon the threshold of higher achievements in the same direction, it occurred to the writer that the interests of science might be promoted by bringing together precise information concerning the views held at present by the most prominent workers in this field, and the evidence upon which these views rest.

In a series of articles published in the SCIENTIFIC AMERICAN of May 17, June 7, June 14, July 19, and August 23, 1879, the arguments, from which the following results are derived, were presented:

1. That the elements and compounds combine in invariable simple or multiple proportions by weight.

2. That this fact is explicable by the assumption of ultimate particles having different weights.

3. That gaseous bodies combine in invariable proportions by volume.

4. That this fact, together with the behavior of gases under variations of temperature and pressure, enables us to ascertain the relative weights and volumes of the ultimate particles of gaseous bodies.

5. That the ultimate particles, whose relative weights are thus found, and which we may now call molecules, must themselves consist of still smaller particles or atoms, about which we have no definite information, except that the number of them contained in the molecule of one substance bears a simple numerical ratio to the number of them contained in the molecule of another substance.

6. That, until the absolute size of molecules is known, a molecular volume can be regarded only as the cubical space of which, at a given moment, the molecule forms the center.

7. That, starting with this conception, ingenious attempts have been made to determine the relative molecular volumes of elements in their compounds, and that different investigators have reached different results. To this I might add,

8. That finally considerable insight has been gained by this means into the properties of compounds.

These papers were preceded by a statement of a few facts warranting the assumption that matter is composed of exceedingly minute particles. It will be necessary in the following papers to give further evidence, after showing what opinions the master minds of the past held concerning the structure of matter. Impressed as I am with the consciousness that we are but too liable to be biased by prevailing hypotheses, and to accept them as demonstrated truth, simply because the erosive action of habitual use has worn channels in our minds from which our thoughts cannot escape without a great effort, it has seemed to me an imperative duty of scientific men to return, from time to time, to first principles, and to review the opinions of the past by the aid of the new light of modern thought.

THE EXISTENCE OF MATTER.

It seems to be a prevalent belief that no one but a metaphysician would take it into his head to doubt the existence of matter and the reality of the universe outside of ourselves. However, it was but a few years ago that a friend, standing on one of the balconies of Horticultural Hall at the Philadelphia Exhibition, and lost in admiration of the region of wonders before him, was accosted by a stranger who persisted in trying to prove that it was all unreal.

It was recognized early in the history of philosophy that the perceptions of our waking hours do not differ much from those of our dreams, and the question naturally arose: How do we know that life is not a continual dream? This and all similar questions have been long ago disposed of, however, by the recognition of the fact that our reason sits in judgment upon our perceptions and decides upon their validity. In other words, we know when we have been dreaming. Yet the fact remains that our senses do deceive us.

When we look at the starry heavens, science teaches us that there is no reality in what we see. Light, with its enormous velocity of 186,000 miles per second, takes 3½ years to reach us from α Centauri, 22 years from Sirius, and 50 years from the Pole Star. It is evident, therefore, that what we see simultaneously is not simultaneous in reality. We see at the same moment one star at the place where it was 3½ years ago, and another where it was 50 years ago. The sun himself has traveled onward for over eight minutes since the light started from the place where we see him at a given moment. Have we then ever really seen the sun?

If our senses so obviously deceive us in this as well as in many other experiences, what guarantee have we that they do not deceive us in all? Simply this, that we are not really deceived even in these experiences, but we have the power to make the necessary corrections. No argument in favor of the unreality of the material world based upon such considerations can prevail against the universal experience of mankind. When many persons receive the same impression under the same conditions, there must be something external to them to produce that impression. According to the calculus of probabilities, the chances that they would all, each of his own accord, think the same thoughts or dream the same dreams, are infinitesimal.

Let us now inquire into the views held by the thinkers of the past concerning the structure of matter.

ARISTOTLE.

The first conception of matter that merits our attention, though not the most ancient, is that of Aristotle (384 to 321 B.C.).

Our daily experience teaches us that the properties of bodies continually change. The tints of the sky, the sea, and the mountains vary from hour to hour; water is at one time a liquid, at another a solid, or a vapor; the air is now at rest, then it assumes a gentle motion, or rushes onward with a frightful velocity.

It is a natural inference that in all these phenomena there is something that changes, something that moves, and that none of the properties, motions, or changes we observe are essential to it. Thus we arrive at Aristotle's conception, that matter is something without any properties whatever, yet capable of assuming all properties; something without power of its own to move, yet capable of receiving motion. It possesses nothing but quantity, and that quantity must be unlimited.

Aristotle recognizes a first cause through whom this matter received motion and properties, but assumes that matter is coeternal with God, *i. e.*, that it existed *from* all eternity.

According to this system the first act of the Deity upon matter was its endowment with properties and motion. This is equivalent to a creation, since the objects we now see are its results, and it is perhaps difficult to conceive why Aristotle did not represent God as creating these objects out and out, matter and properties together. The explanation lies in his conception of the Deity, a conception arrived at as follows:

Passive matter must be moved either by a cause that is itself in motion, or by a cause that is at rest. Now, a cause that is itself in motion would need to have its own motion explained by a cause yet more remote, and soon indefinitely. We have left only a cause that is itself at rest. Such a cause can be only a mind, a spirit. Accordingly the god of Aristotle is pure thought, a perfect mind, that is the object of its own contemplation. Now, a mind could think properties, but it could not think concrete, material objects.

The difficulty with Aristotle's world of uncreated matter without properties is, that motion must be imparted to it by mere thought, and that in such a world there must be a constant intervention of the Deity, a continuous miracle.

LEUKIPPOS AND DEMOKRITOS.

We pass in the next place to a system that has more affinity with modern thought, the system of Leukippos and Demokritos, who maintained, about 400 B.C., in opposition to Anaxagoras, the teacher of Sokrates, that bodies are not infinitely divisible. We finally reach particles infinitely small and invisible, which are called atoms and are indivisible. By reason of their indivisibility they are indestructible and unchangeable, and they completely fill the space they occupy. All atoms are identical in substance and differ only in shape and size. Differences in substance are produced by different groupings of these atoms, which have only one physical property, weight.

All invisible bodies consist of atoms and empty spaces. Motion, it is argued, is a necessary result of this. The atoms have always been falling, like snowflakes, through empty space. The larger ones overtake the smaller and form still larger bodies. Thus accretion goes on, a whirling or vortex motion is produced, and worlds are formed. There is no evidence, according to these philosophers, that motion is the result of purpose or design.

Unfortunately for this system large bodies do not, as a matter of fact, fall faster in vacuo than smaller ones.

EPIKUROS.

Epikuros (342 to 271 B.C.) endeavored to rectify the errors in the system of Leukippos and Demokritos. He reasoned thus:

Matter consists of indivisible atoms differing from each other only in size, shape, and weight. A finite body could not have an infinite number of parts; therefore its divisibility cannot be infinite.

Atoms have a limited number of shapes and sizes; but of each kind there exists an infinite number.

Space and the number of atoms that exist in it must both be infinite. Finite space could not contain an infinite number of atoms, and on the other hand, a finite number of atoms would be lost in infinite space.

Now for motion. From all eternity atoms have been falling through space by reason of their weight. There being no resistance in a vacuum they must all have had the same velocity, and they could never have met and combined to form bodies and worlds, if their fall had always been vertical. So Epikuros invented a lateral deviation that he ascribed entirely to *accident*. Granting this, we may have collisions and repulsions, whirling motions and aggregations that spring into being and pass away again without law.

But we cannot grant this. We cannot at the same time pretend to search out the laws of nature, and admit the word accident into our scientific vocabulary. Accident is simply an unknown cause. When, therefore, Epikuros attributed the meeting of atoms to accident he practically confessed that he did not know what made them meet.

It is worthy of note that Epikuros gave as his motive for inventing his system a desire to destroy superstition, to remove the dread of the gods, and to restore tranquillity to the mind. This means, in plain English, to abolish the Deity and personal responsibility.

Curiously enough, these mischievous atoms, after having become the basis of modern science, were so modified and adapted in the course of time that they have furnished Sir John Herschel and Prof. Maxwell with a very powerful argument to show that they could not have been evolved, but must have been created.

DESCARTES.

In more modern times thinkers endeavored to find in matter some fundamental property that inhered in it, while all other properties were only accidental or derived. Descartes, the inventor of analytical geometry (1596 to 1650), was led by the universality of geometric truth to regard extension as the very essence of matter. According to his system there can be no material atoms. A particle, however small, must still have dimensions, and it must therefore be divisible. If there are no atoms, there is no further necessity for imagining empty spaces. Nothing existing in nature corresponds to the conception of a void. If a void existed, no motion could be communicated through it. Space is only a figment of the imagination, and motion is possible by contact only. The whole universe is everywhere equally full of matter. When a body moves it does so by displacing other matter. It crowds out what is before it, while at the same time the matter behind it fills its former place. It is thus that a fish swims. While Descartes denied the existence of atoms, which, by their own nature, are indivisible, he admits that the Deity may have made certain particles indivisible in the sense that no creature can divide them.

According to this conception the sum total of motion imparted to the world at the creation remains unchanged. The universe is a vast machine, which transmits motion from one part to another, but does not destroy it.

(*To be continued.*)

NEW INVENTIONS.

Mr. Levi H. Roberts, of Cadillac, Mich., has patented an improved fastening for tool handles. The object of this invention is to secure handles to tools in such a manner that they will be held in place firmly, and can be attached and detached easily and quickly. The invention consists in a fastening for tool handles formed of a key and a plate roughened upon one side and smooth upon the other. The plate and key are inserted between the rear edge of the handle and the rear edge of the tool eye.

An improved attachment for fire-places has been patented by Mr. Frank S. Elsberry, of Montgomery, Ala. The object of this invention is to so construct the back of a fire-place or fire-place grate, and to provide it with such attachments in the form of pipes and valves that it shall be adapted for receiving a supply of water and holding it while being converted into steam, which is distributed in pipes to different parts of the dwelling or other structure in which the grate is located.

An improved double-tree has been patented by Mr. John J. H. Parrott, of Salem, Oregon. The object of this invention is to provide a device to be applied to a vehicle whereby the hindmost horse shall be enabled to pull with more advantage than usual when endeavoring to draw abreast with the foremost horse. The invention consists of a straight rack fixed centrally on the front edge of a double-tree and gearing into a corresponding segment rack that is fixed on the tongue of the vehicle.

Mr. David James Rogers, of Bardstown, Ky., has patented an improved ice cream freezer of that form in which the can containing the cream is rotated upon a central pivot, and is provided with a vertical lifting beater or scraper, which removes the frozen cream from the sides of the can as it freezes.

An improved nose piece for bridles, patented by Mr. Rhodes Arnold, of Waltham, Mass., consists in the combination with the bit and the head piece of a bridle, of straps for counteracting the pressure of the bit on the mouth and lower jaw of the animal.

Mr. Francis M. Foster, of Coffeyville, Kan., has patented an improved sulky plow, which is so constructed that the plow shall be in front of the wheel, so that the plowman can see the plow and the team without changing his position.

Successful Treatment of Tetanus.

Dr. John C. Lucas, in the *Medical Times and Gazette*, strongly advocates the treatment of tetanus by smoking Indian hemp. The leaves of the cannabis indica are mixed with three or four times their quantity of ordinary tobacco. Directly there are indications of a spasm coming on, the fumes are inhaled until the attack ceases. The patient is then left quiet, but carefully watched, so that the pipe may be instantly handed to him on any appearance of the spasm returning. In this way the patient is kept continuously under the influence of hemp, day and night, nourishment being carefully administered at the same time. The advantages claimed for this mode of treatment are these: 1. The spasms are cut short. 2. They reappear gradually at longer and longer intervals. 3. They gradually become not only less frequent, but less severe. 4. This saves the patient's vital powers. Mr. Khasligir, of India, has also treated five cases of traumatic tetanus, all recovering by this method.

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The Convention of the American Medical Society.

The thirty-first annual convention of the American Medical Society, in this city, the first week in June, brought together a large number of distinguished physicians and surgeons. In his presidential address Dr. Sayre spoke of the indebtedness of the world to American physicians and surgeons, in the development of new methods and novel operations, commencing with anæsthesia, as associated with the name of Morton, and passing to ovariotomy, another American surgical discovery. This operation, said he, was first performed in 1809, in Danville, Ky., by Dr. Ephraim McDowell. Dr. Atlee, in 1844, revived the operation, and by persevering effort, in spite of all opposition and the very general condemnation of his contemporaries, was enabled at last, by his numerous brilliant successes, to establish the operation as a proper one in certain cases. Dr. Peaslee has stated that, in the United States and Great Britain alone, ovariotomy has, within the last thirty years, directly contributed more than 30,000 years of active life to woman.

In gynecology, the whole professional world gratefully acknowledges the original and invaluable contributions of Sims, Thomas, Emmet, Peaslee, Atlee, Kimball, Dunlap, Minor, Taylor, Pallen, and others. The new operation of litholapaxy, which consists in the fragmentation of calculous material, and the removal of the *débris* by aspiration through a tube, first performed and described by Dr. Bigelow, is also one of the grandest triumphs of modern surgery, and one of which any American surgeon may well feel justly proud. In conservative surgery, Americans certainly compare most favorably with Europeans. In the treatment of diseases of the joints, by which means the patients are able to take free exercise in the open air during the whole progress of the disease, thus acquiring power to overcome the constitutional dyscrasia better than by any means heretofore employed, and when the disease has progressed beyond repair, then to perform the sub-periosteal exsection of the joint in such a manner as to leave the muscular power intact, and by judicious after-treatment to restore the function of motion, America has obtained a triumph in surgery of which the profession may well be proud. Another triumph of American surgery is seen in the application of the principle of absolute rest to diseases of the vertebræ.

A large number of papers were read, and several important meetings were held by related societies, among them the second annual convention of the American Laryngological Association, the fourth annual meeting of the American Medical College Association, and the fifth annual session of the Association of American Medical Editors.

A Lesson to Young Men.

In the nomination of General James A. Garfield for President at the recent Chicago convention, a lesson is taught from which all young men may profit. It may not be possible for every youth, be he ever so industrious and studious, to obtain a nomination for President of the United States, but by untiring industry and a persistent determination to acquire an education, as illustrated in the life of General Garfield, summarized by one of our contemporaries, it is possible for every young man of ordinary intelligence, be his origin ever so humble, to elevate himself to an honorable position in life.

After eulogizing General Garfield's military and political career, which it is not our province to discuss, the *Public Ledger* proceeds to say of his early life:

And what he is he has made himself, so far as any man is the builder of his own character, distinction, and honors. Left an orphan when he was but two years old, his widowed mother, with four children, being the possessor of a small farm in the "backwoods" of Ohio, he began to work as soon as he was old enough to aid in the support of the family. At sixteen he was a carpenter's boy; then driver of a canal boat, and subsequently a boatman, though not a man in years. He then intended to become a sailor on the lakes, but being persuaded by a young village teacher, he went to Geauga Seminary, and this turned the whole current of his life. Here the sturdy character of the future man showed itself. He had no money, except a very small sum his mother had saved. He and some others took a room and boarded themselves in a very abstemious fashion, being their own cooks. In the mornings and late afternoons he turned his hand to carpentering, and so supported himself. Continuing at the seminary, and at one of the country institutes, he kept himself going in the same way, varying his carpentering resources with teaching school in the winter, until he was twenty-three, and on his way to college, where he went through a two year term, came out the best Latin and Greek scholar, and was soon made professor and president of another academical institution.

More Inflammable Silk.

A recent fire in a bonded warehouse in this city, by which $5,000,000 worth of goods were in danger, was traced to a lot of German black silk twist. Not long before a case of what was classed as silk goods was brought out of the hold of a Bremen steamship. The case had not been long on the wharf when it was discovered to be on fire. It was immediately thrown in the water, and, after the fire was extinguished, it was discovered that the case contained German black silk twist.

The ready combustibility of the silk in question is said to be due to a certain acid used in its preparation. Under very ordinary conditions oxidation takes place, and the silk becomes burning hot. When cooled it is found to be completely rotten. The large quantity stored in the endangered warehouse, it is thought, became overheated, the doors and windows being closed, and spontaneous combustion was the result.

Iron and Steel Making in Great Britain and America.

There are few British journals that are more thoroughly insular and anti-American in editorial ideas than the London *Engineer*. The following from its leading article is, therefore, quite refreshing:

Nothing connected with the crude iron trade possesses just now greater interest than the individual output of blast furnaces. For many years we were content in this country to blow with a comparatively small pressure, and to get from 180 to 220 tons of pig per week from each furnace. As time went on and competition increased, attempts were made to get more iron in a given time, and about fourteen years ago began the era in this country of large blast furnaces. In a very short time the dimensions increased from 14 foot to 16 foot boshes, and a height of 45 feet to 50 feet to 28 foot boshes and a height of as much as 80 feet. These enormous furnaces turned out a great deal of iron as a matter of course. It does not appear, however, they were eminently satisfactory either as to the quality of the product or the price at which it could be made. In the Lehigh Valley in the United States ore had for years been smelted with anthracite, the pressure of blast being 3½ pounds to as much as 6 pounds per square inch; the furnaces were small and the yields high. As the iron trade of America extended under the fostering influence of protection, a competition seems to have sprung up among iron manufacturers in the States. Each man tried to make more iron in a given time than his neighbor, and, as we have already recorded in our pages, a furnace of no great dimensions at the Edgar Thompson Steel Works has recently been making as much as 700 tons of excellent pig iron each week. Much of this success is due to the Cowper stoves which heat the blast. Something is due to the ore, but most is due to the skill and energy of the managers, who avail themselves of every chance, and rest not until they have satisfied themselves that no more can be got out of their furnaces. In this respect we are now far behind our American rivals, although it is not to be disputed that progress is being made. In 1860 the average annual make of iron per furnace in Great Britain was 6,574 tons. In 1866 it reached 7,384 tons; in 1871 it was 9,696 tons; it 1875 it was 10,119 tons, and in 1878 it attained 12,831 tons. Assuming fifty weeks to be a blast furnace year, there was for 1878 a weekly production of about 257 tons per week, or not one-half the duty of many American furnaces.

Next in importance to the production of iron is the production of steel. Here, again, we are beaten by the United States. In 1878 there were in America 27 converters, 20 of which were at work, and these turned out on the average 36,988 tons of steel per annum each. Last year there were at work in this country 68 converters out of 104, and the average annual production of these was but 12,272 tons each, or less than one-third of the yield of the American plant. Why this should be so is a question well worth discussion. We shall be under the mark if we say that Bessemer plant costs £10,000 per converter. However, for our present purpose the estimate is near enough. It appears, then, that we require 60 × 10,000 = £600,000 of capital, to turn out the same quantity of steel that can be turned out in the United States with 20 × 10,000 = £200,000 capital. The interest and depreciation on this sum cannot be reckoned at less than 10 per cent. Each converter, therefore, represents £1,000 a year, but its make in Great Britain being but, in round numbers, 12,000 tons, each ton must be charged with ten-twelfths of a pound sterling, or 16*s.* 8*d.*; while in the United States, as each converter turns out, in round numbers, 36,000 tons per annum, each ton must be charged with 5*s.* 9*d.* The balance in favor of the American on this item alone is, therefore, nearly 11*s.* per ton. When it is borne in mind that 2*s.* 6*d.* per ton in the price of rails may make all the difference between losing and obtaining an order, and that the cost of rolling Bessemer ingots into rails is now actually less than the cost of inspecting the rails, it will be seen that 10*s.* or 11*s.* per ton is an enormous percentage in favor of the American ironmaster. We shall not now stop to explain why the difference exists, nor is it, indeed, certain that the causes are as fully known as is desirable, but the questions involved are so important that they deserve prompt and full discussion.

As to the open hearth process of making steel, we have no means of knowing what the average production per hearth is, but, so far as we can learn, it may be taken at about 150 tons per week on the average. No good statistics exist as to the open hearth work being done abroad, so that we are unable to say with certainty which country obtains the best results; but there are not wanting indications that in this method of making steel America is ahead of us in the quantity turned out. We have said enough, we believe, to show that we cannot remain as a nation content with the progress we have made. Competition with the United States will become keener and keener every day. Protection, combined with other causes, has enormously stimulated the production of iron and steel in the United States; and internal competition prevents the consumer from feeling the evil effects of the tariff. The present demand from the States cannot last. The greatest energy is being displayed at the other side of the Atlantic in putting down plant. In the matter of new Bessemer and open hearth steel works alone, plant is now being constructed capable of turning out 600,000 tons per annum, or, in other words, of doubling the present total make of the country.

The Howgate Arctic Expedition.

Notwithstanding the unfavorable reports of the board of naval officers as to the seaworthiness of the Gulnare, the vessel chosen to convey the Howgate Colony to Greenland, the expedition sailed June 21. The persons composing the expedition are: H. C. Palmer, captain; T. H. Bailey, first mate; A. L. Kenebler, engineer; J. H. Richardson, assistant engineer; Francis Hughes, assistant engineer; E. Smith, carpenter; W. C. Farquhar, steward; Frederick Keyes, cook; William Dowell, fireman; George Jones, fireman; Hugh McKenney, Peter Lawson, Peter Duprince, H. A. Evans, T. H. Dowling, Andrew More, and Arthur Keefe, able seamen; John McFarland, ordinary seaman. Ten of the enlisted men of the army who had been detailed for the service were, at their own request, discharged from the service, so as to go out with the expedition in the employ of Captain Howgate.

The scientific members consist of Dr. O. Pavy, naturalist; Henry Clay, secretary; G. H. Rohe, surgeon; O. T. Sherman, astronomer; W. S. Jewell, meteorologist; George W. Rice, photographer.

The Gulnare will sail direct to Halifax and there take on board Lieutenants G. C. Doane, of the Second United States cavalry, and W. H. Low, of the Twentieth infantry, who have been granted leaves of absence by the Secretary of War, the former for four months and the latter for twelve months. After these officers are shipped the vessel will proceed to St. John's and coal. In consequence of the large quantities of ice floating in the neighborhood of Labrador, the Gulnare will sail to the east and thence to Lady Franklin Bay.

The colony to be established at Lady Franklin Bay will be under the command of Lieutenant Doane. Having landed the permanent party, the Gulnare will return to the United States for a second colony to replace the first, which having become acclimated, will then move further on toward the unknown interior. Though the Gulnare sailed without government aid or indorsement, she was permitted to fly the American flag.

Discoveries at Pompeii.

An almost perfect house has been lately disentombed at Pompeii. It is probably the best preserved of all the Roman dwellings hitherto discovered. There are two atria and a very spacious peristyle, in the middle of which there is an ornamental fountain. There is also a complete bath, which must assist in clearing up some of the doubtful points concerning the arrangement of Roman baths. The paintings in the interior of the house seem to have been executed with considerable taste, and they are in good preservation. Those on the first floor, representing for the most part marine animals, are especially interesting. The frescoes also which are contained in the wings of the building are excellent representations of scenes from animal life. They are so admirably preserved that they cannot fail to shed much light on the condition of painting among the Romans at the time, although they also give evidence of the influence of Greek art.

The Ice Trade in Maine.

Recent reports from the Kennebec Valley state that there is great activity in the ice trade of that region, and prices at Gardner, the headquarters, are fast approaching a fancy basis. The bulk of the sales were made at $2 and $2.50 per ton, but now dealers are refusing $3.75 and holding for $5 later in the season. The supply is fast going into the hands of the large dealers and speculators, and the cities of the Atlantic coast may soon look for another advance in their ice bills. The figures show that there were 800,000 tons secured on the Kennebec last winter, which at $2.50 per ton will produce $2,000,000, a large proportion of which comes into this valley for labor and profit on capital invested. This is more ice by 100,000 tons, than was ever secured on the river before, and the total crop of the State is estimated at 1,500,000 tons.

Another Gorilla in Philadelphia.

Rev. Dr. R. H. Nassau, of Gaboon, West Africa, has laid science under a second obligation by forwarding to Dr. Thomas G. Morton, of Pennsylvania Hospital, Philadelphia, another and larger specimen of the gorilla than the one dissected in that city two years ago. The last specimen is a full grown female and weighs about one hundred and eighty pounds; it is 4 feet 4 inches in height, and measures 41 inches around the chest; the arms are 38½ inches in length and 11 inches in circumference, and the legs are 21 inches long. It is in an excellent state of preservation, save that much of the beast's thick coat of hair has been removed by the action of the rum it was brought in. The animal was shot by an agent of Dr. Nassau, last February.

Fastest Time on Record.

Train No. 4 of the Pennsylvania Railroad recently made the fastest run on record from Philadelphia to Jersey city. The train consisted of locomotive No. 724 and two cars. Edward Osborne was the engineer, and Lewis Lilance conductor. The train left Philadelphia at 12:51, and Jersey City was reached at 2:24 P.M., the trip of ninety miles having been accomplished in precisely ninety-three minutes. Four stops were made, and twice the train was slowed up to cross bridges.—*New York Sun.*

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