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OBSERVATIONS
ON THE
Automaton
CHESS PLAYER,

NOW EXHIBITED IN LONDON,

AT

4, SPRING GARDENS.

—
BY AN OXFORD GRADUATE.
—

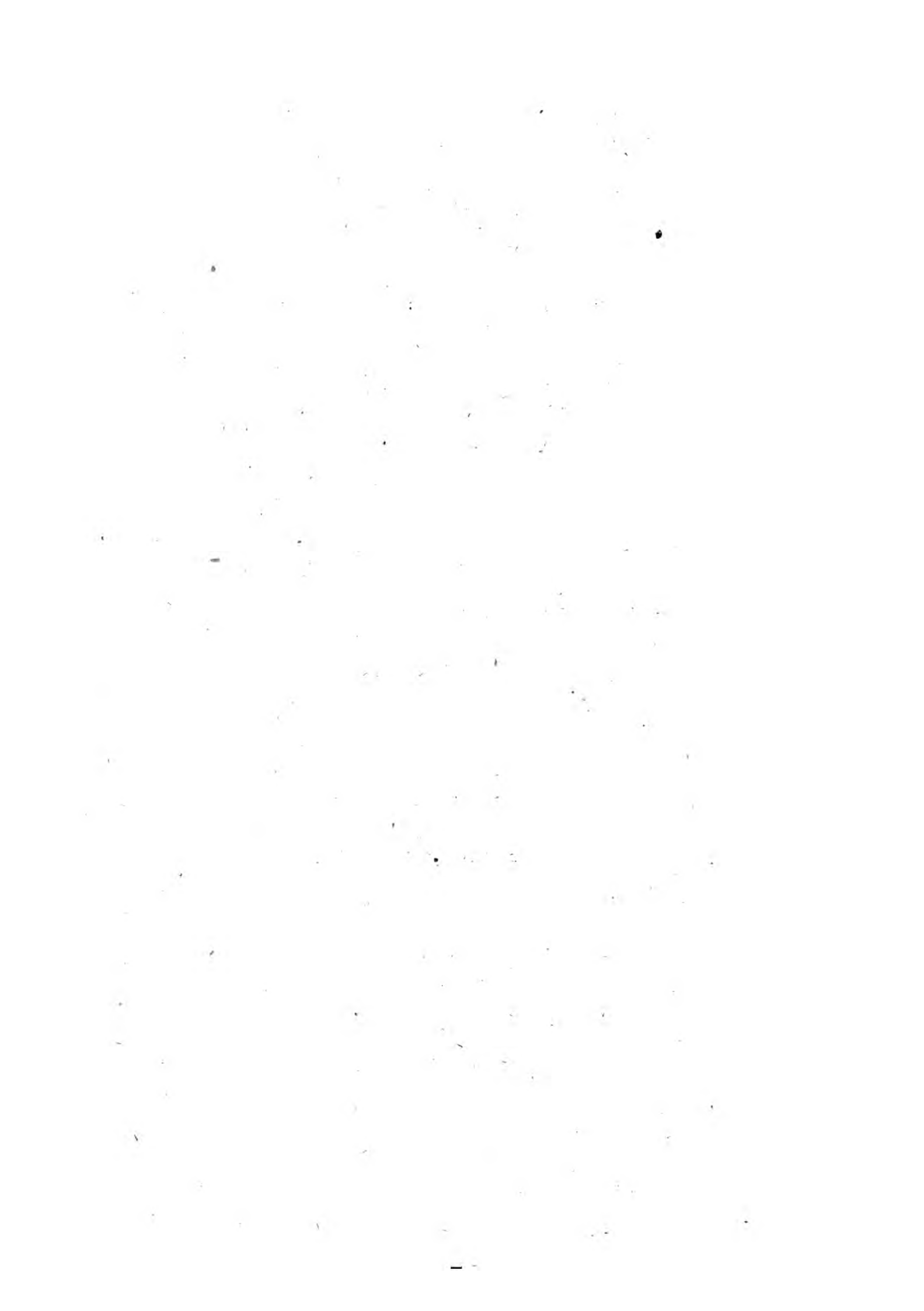
—ut speciosa dehinc miracula promat.—Hor.

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PREFACE.



THE science of mechanics is one of those in which the ingenuity of modern artists appears with superior advantage. The ancients, with the single exception of Archimedes, had but an imperfect knowledge of the mysteries of this science, as their attempts in the construction of instruments for marking time, and of the organ, sufficiently prove. This inferiority may be accounted for upon the principle, that the highest discoveries in mechanics do not depend upon the capacity, however en-

larged, of any individual, but upon the successive discoveries of many individuals, during ages, combined at length, by some powerful genius, and directed to the completion of one great object. Hence it was reserved to modern times, to witness the invention of those exquisite and grand combinations of mechanism, which are displayed in the numerous kinds of watch and clock work, and in the higher order of wind instruments, in their several varieties: and hence the present age has produced the most finished pieces of mechanical science, in the Flute-player of Monsieur de Vaucanson, the Trumpeter of Maelzel*, the Panharmonicon of Mr.

* This piece of mechanism is shown, together with the Automaton Chess Player, at 4, Spring Gardens.

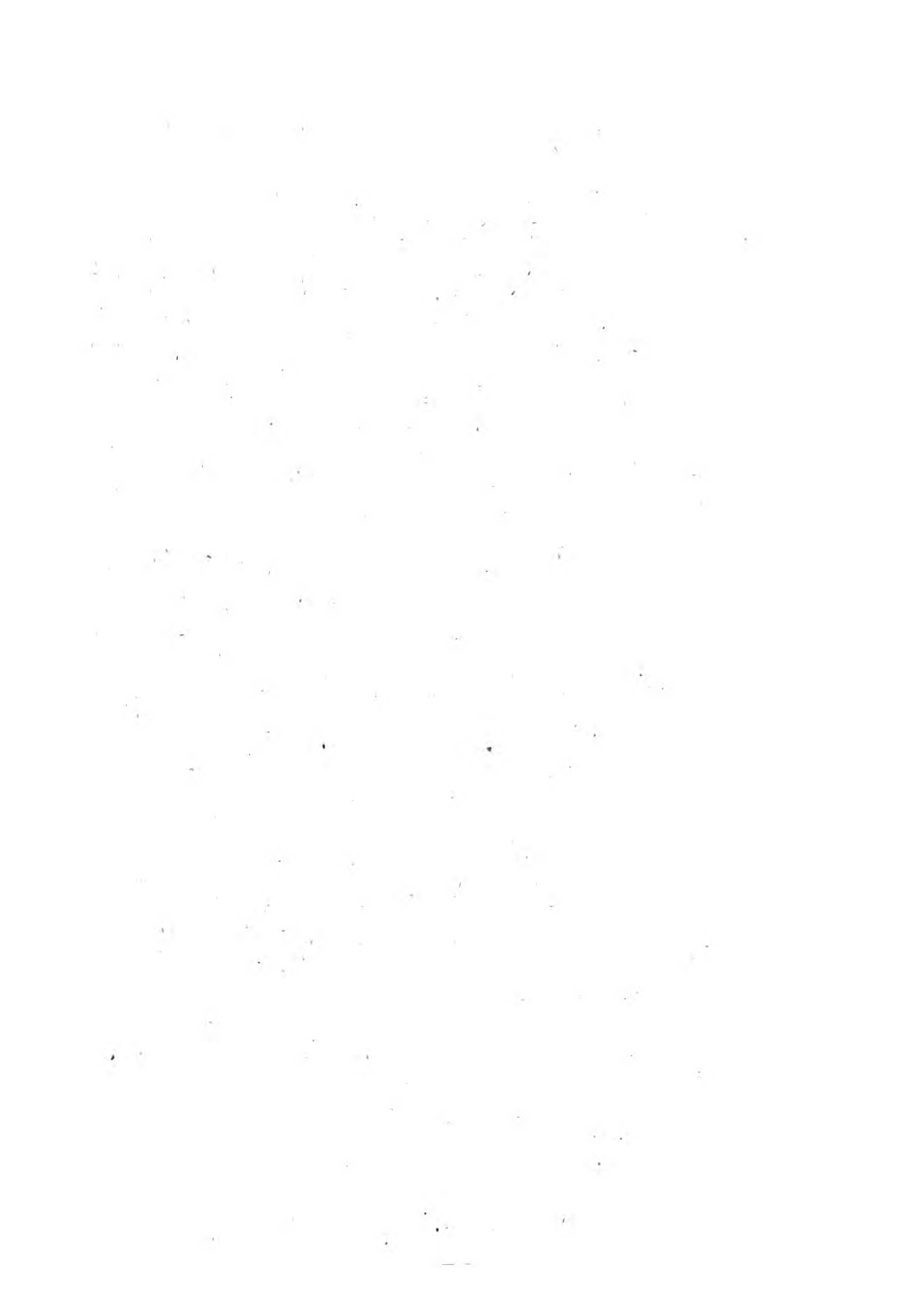
Gurk, and the Apollonicon of our celebrated native mechanics, Messrs. Flight and Robson*. Notwithstanding, however, the superior ingenuity of modern artists, in mechanics, which these scientific inventions discover, it seems to be a thing absolutely impossible, that any piece of mechanism should be invented, which, possessing perfect mechanical motion, should appear to exert the intelligence of a reasoning agent. This seeming impossibility is surmounted in the construction of the Automaton Chess Player. The stretch of invention shown in this unparalleled instance of mechanical skill, will

* This grand instrument, which performs by mechanical action, or may be played upon by five professors at once, is shown at the rooms, No. 101, St. Martin's Lane.

be fully appreciated only by those who can form an estimate of the variety of combinations amongst the pieces which a game of Chess presents : the constant exercise of acute judgment required in anticipating the designs of an antagonist, or in frustrating those which cannot be foreseen ; and the experience in the game, which must be attained by any individual, before he can become qualified to be a skilful Chess Player. Some accurate notion, however, of the surprising powers which the inventor of this singular piece of mechanism has displayed, even they who are unacquainted, or but slightly acquainted, with the game of Chess, may derive from a faithful description of it, with respect to its construction, so far as that can be explained, and its general manner of work-

ing. Such a description, likewise, may be acceptable to those who are adepts in the game, to call to their recollection, any interesting circumstance relating to the Automaton, which they may have forgotten; and to be a slight memorial of a masterpiece of human ingenuity which excited their liveliest curiosity and admiration.

“Indocti discant, ament meminisse periti.”



OBSERVATIONS,

&c.



THE celebrated piece of mechanism, called the Automaton Chess Player, was the invention of Wolfgang de Kempelen, a Hungarian gentleman, Aulic Counsellor to the Royal Chamber of the domains of the Emperor in Hungary. His genius for mechanics appeared in early life; and when matured by study, and experimental observation to which the leisure that his employment afforded him, was chiefly devoted, displayed itself in various inven-

tions and improvements of great public utility.

Being at Vienna, in the year 1769, upon business of office, he was invited, by order of the Empress Maria Theresa, to be present at certain experiments of magnetism, which were to be exhibited before herself and the Imperial court, by a Frenchman, of the name of Pelletier. During the exhibition, M. de Kempelen, who was honoured with the familiar conversation of the Empress, dropped a hint that he thought himself competent to construct a piece of mechanism, which should produce effects far more surprising and unaccountable than those which she then witnessed. The curiosity of the Empress being strongly raised, she expressed a lively desire to see his idea carried into execution, and drew from him a promise that he would gratify her wishes

without delay. M. de Kempelen kept his word ; and within the space of six months completed his Automaton Chess Player.

At Vienna, where it was first produced, it excited the highest astonishment and admiration of the Empress and her court, and of many illustrious and scientific persons, who examined its extraordinary powers. The report of them quickly spread ; and the newspapers of the time speak of them in unmeasured terms of approbation. The inventor, however, with that indifference to popular favour which characterizes true genius, not only declined making a public exhibition of his Automaton, and refused considerable pecuniary offers from persons desirous of purchasing it ; but in his ardour for prosecuting some new mechanical pursuit, actually laid it aside, and even proceeded in part to take it to pieces.

In this disordered state it remained during many years, when, on the occasion of a visit made by the Grand Duke Paul, of Russia, with his consort, to the court of Vienna, the Emperor Joseph II. recollecting the invention of M. de Kempelen, signified a wish that he should exhibit it for the gratification of these august personages. In the course of five weeks, the numerous repairs which it required, were completed by the indefatigable genius of its inventor; and on being produced before the Imperial visitors, it excited no less astonishment and admiration than at its first appearance. Upon this occasion, M. de Kempelen was urged and prevailed upon to satisfy general curiosity by exhibiting it publicly in Germany and in other countries. Accordingly, the Emperor having granted him permission to absent himself from the duties of his employment during two years, he travelled with his Automa-

ton, into various parts of Germany and to Paris; and in the year 1785, he visited England. At his death, which took place about the year 1803, the Automaton came into possession of his son, who sold it to the present exhibiter, a man, apparently of great ability in the science of mechanics, and inferior only to M. de Kempelen himself.

This short historical notice, touching the inventor of the Automaton Chess Player, and the circumstances which led to its invention and first exhibition, naturally precedes a description of the Automaton itself.

The room where it is at present exhibited, has an inner apartment, within which appears the figure of a Turk, as large as life, dressed after the Turkish fashion, sitting behind a chest of three feet and a half in length, two feet in breadth,

and two feet and a half in height, to which it is attached by the wooden seat on which it sits. The chest is placed upon four casters, and together with the figure, may be easily moved to any part of the room. On the plain surface formed by the top of the chest, in the centre, is a raised immoveable chess-board of handsome dimensions, upon which the figure has its eyes fixed; its right arm and hand being extended on the chest, and its left arm somewhat raised, as if in the attitude of holding a Turkish pipe, which originally was placed in its hand.

The exhibiter begins by wheeling the chest to the entrance of the apartment within which it stands, and in face of the spectators. He then opens certain doors contrived in the chest, two in front, and two at the back, at the same time pulling out a long shallow drawer at the bottom of the

chest made to contain the chess men, a cushion for the arm of the figure to rest upon, and some counters. Two lesser doors, and a green cloth screen, contrived in the body of the figure, and in its lower parts, are likewise opened, and the Turkish robe which covers them is raised ; so that the construction both of the figure and chest internally is displayed. In this state the Automaton is moved round for the examination of the spectators ; and to banish all suspicion from the most sceptical mind, that any living subject is concealed within any part of it, the exhibiter introduces a lighted candle into the body of the chest and figure, by which the interior of each is, in a great measure, rendered transparent, and the most secret corner is shown. Here it may be observed, that the same precaution to remove suspicion is used, if requested, at the close as at

the commencement of a game of Chess with the Automaton.

The chest is divided, by a partition, into two unequal chambers. That to the right of the figure is the narrowest, and occupies scarcely one third of the body of the chest. It is filled with little wheels, levers, cylinders, and other machinery used in clock-work. That to the left contains a few wheels, some small barrels with springs, and two quarters of a circle placed horizontally. The body and lower parts of the figure contain certain tubes which seem to be conductors to the machinery. After a sufficient time, during which each spectator may satisfy his scruples and his curiosity, the exhibiter recloses the doors of the chest and figure, and the drawer at bottom; makes some arrangements in the body of the figure, winds up the works with a key inserted into a small

opening on the side of the chest, places a cushion under the left arm of the figure, which now rests upon it, and invites any individual present to play a game of Chess.

At one and three o'clock in the afternoon, the Automaton plays only ends of games, with any person who may be present. On these occasions the pieces are placed on the board, according to a preconcerted arrangement; and the Automaton invariably wins the game. But at eight o'clock every evening, it plays an entire game against any antagonist who may offer himself, and generally is the winner, although the inventor had not this issue in view as a necessary event.

In playing a game, the Automaton makes choice of the white pieces, and always has the first move. These are small

advantages towards winning the game which are cheerfully conceded. It plays with the left hand, the right arm and hand being constantly extended on the chest, behind which it is seated. This slight incongruity proceeded from absence of mind in the inventor, who did not perceive his mistake till the machinery of the Automaton was too far completed to admit of the mistake being rectified. At the commencement of a game, the Automaton moves its head, as if taking a view of the board; the same motion occurs at the close of a game. In making a move, it slowly raises its left arm from the cushion placed under it, and directs it towards the square of the piece to be moved. Its hand and fingers open on touching the piece, which it takes up, and conveys to any proposed square. The arm, then, returns with a natural motion to the cushion upon which it usually rests. In taking a

piece, the Automaton makes the same motions of the arm and hand to lay hold of the piece, which it conveys from the board; and then returning to its own piece, it takes it up, and places it on the vacant square. These motions are performed with perfect correctness; and the dexterity with which the arm acts, especially in the delicate operation of castling, seems to be the result of spontaneous feeling, bending at the shoulder, elbow, and knuckles, and cautiously avoiding to touch any other piece than that which is to be moved, nor ever making a false move.

After a move made by its antagonist, the Automaton remains for a few moments only inactive, as if meditating its next move; upon which the motions of the left arm and hand follow. On giving check to the King, it moves its head as a signal. When a false move is made by its antago-

nist, which frequently occurs, through curiosity to observe in what manner the Automaton will act: as, for instance, if a Knight be made to move like a Castle, the Automaton taps impatiently on the chest, with its right hand, replaces the Knight on its former square, and not permitting its antagonist to recover his move, proceeds immediately to move one of its own pieces: thus appearing to punish him for his inattention. The little advantage in play which is hereby gained, makes the Automaton more a match for its antagonist, and seems to have been contemplated by the inventor as an additional resource towards winning the game.

It is of importance that the person matched against the Automaton, should be attentive, in moving a piece, to place it precisely in the centre of its square; otherwise the figure, in attempting to lay

hold of the piece, may miss its hold, or even sustain some injury in the delicate mechanism of the fingers. When the person has made a move, no alteration in it can take place : and if a piece be touched, it must be played somewhere. This rule is strictly observed by the Automaton. If its antagonist hesitates to move for a considerable time, it taps smartly on the top of the chest with the right hand, which is constantly extended upon it, as if testifying impatience at his delay.

During the time that the Automaton is in motion, a low sound of clock-work running down is heard, which ceases soon after its arm returns to the cushion ; and then its antagonist may make his move. The works are wound up at intervals, after ten or twelve moves, by the exhibiter, who is usually employed in walking up and down the apartment in which the Auto-

maton is shown, approaching, however, the chest from time to time, especially on its right side.

At the conclusion of the exhibition of the Automaton, on the removal of the chess men from the board, one of the spectators indiscriminately is requested to place a Knight upon any square of the board at pleasure. The Automaton immediately takes up the Knight, and beginning from that square, it moves the piece, according to its proper motion, so as to touch each of the sixty-three squares of the chess board in turn, without missing one, or returning to the same square. The square from which the Knight proceeds is marked by a white counter; and the squares successively touched, by red counters, which at length occupy all the other squares of the board.

The description now given of the Automaton Chess Player, with respect to its construction, so far as that can be explained, and its general manner of working, naturally suggests an interesting inquiry: What are the immediate causes by which its unparalleled phenomena are produced?

To this inquiry no satisfactory answer has yet been made. It is allowable, therefore, to hazard some observations in reply to it. The causes sought for appear to be two, which are distinct from each other—a moving force from which the left arm and hand of the Automaton derive the action peculiar to those parts of the body; and a directing force, by which the same arm and hand, when raised and prepared to act, are guided on this side or that, according to circumstances, many of which cannot possibly be anticipated, and each of which requires the exertion of the rea-

soning faculty, sometimes in a high degree. To explain the nature of the moving force, which is employed, is the province of the professed mechanic, who can account for it upon fixed mechanical principles. The operation of that force at a certain time after each move of an antagonist, seems to depend upon the momentary interference of the exhibiter, who though usually employed in walking up and down, approaches the chest when the Automaton is about to make a move (p. 20), and appears to touch some spring, near to the arm of the figure, on the right side, which spring may set in motion the works by which the arm and hand of the Automaton are raised from the cushion, are made to bend at their several joints, so as to grasp the piece to which they may be guided by the directing force, and to retain it for a given moment of time, after which, on disposing of the piece, the arm and hand become relaxed, and are

brought back to their usual position. In case a piece is to be taken, or a false move is made by an antagonist, or the Automaton castles (p. 21), by a peculiar manner of touching the spring, these mechanical motions of the arm and hand might be repeated *de suite*; with a variation only in the return of the arm, which would not take place until the end of the repetition. But the mystery in the action of the Automaton—a mystery not less hard to be solved by professed mechanics, than by persons unacquainted with the science of mechanics, arises from the nature and operation of the directing force by which the arm and hand of the Automaton, when raised and prepared to act by the moving force, are guided with a precision and judgment that baffles the skill even of experienced chess players. Various conjectures have been made upon this subject. It was supposed, for a time, that the di-

recting force was some concealed loadstone, until the inventor of the Automaton showed the groundless nature of such a supposition, by permitting any person to place the most powerful loadstone in contact with the figure, or upon any part of the chest to which it is attached.

The most obvious solution of the nature and operation of the directing force may be drawn from the hypothesis, that a living subject is enclosed within the left or larger chamber of the chest, who guides the arm and hand of the Automaton when raised, either in this or that direction, according to the ever varying appearance of the game, which might be discerned through a transparent chess-board. It is sufficient, however, in order to refute this hypothesis, to repeat what has been already mentioned in page 17, that both before and after the exhibition of the Auto-

maton, the exhibiter is willing to lay open for the examination of every spectator its entire construction internally, so as to satisfy the most incredulous person, that no concealment whatsoever of a living subject can take place.

With more semblance of reason, it has been conjectured that there is a communication between the left arm and hand of the Automaton, and a person placed in an adjoining room, who, though unseen, himself, is a spectator of the game; and that by means of this communication, the directing force required may be conveyed at the time when the arm and hand are raised. This conjecture, however plausible, may be answered by the statement of a plain fact, referred to before, that M. de Kempelen exhibited his Automaton, on two different occasions, at the Imperial palace of Vienna; and it is absolutely chimerical to suppose, that upon those occa-

sions, any communication could be opened with an adjoining apartment in the palace to that in which the Automaton was exhibited. Still the question returns, What is the nature and operation of the directing force, by which the left arm and hand of the Automaton when raised, and prepared to act, are guided?

With respect to the nature of this directing force, there can be only one reasonable opinion, that it must proceed from the immediate direction of some human agent; and since there is no communication with such an agent concealed within the chest, or in a room adjoining, it must proceed from the immediate direction of the exhibiter himself.

Nevertheless the operation of this directing force, or in what secret manner the exhibiter directs the arm and hand of the Automaton when raised, yet remains to

be explained. M. de Kempelen once threw out a hint, that the chief merit of his invention lay in the successful manner in which he deceived the spectators; by which hint he seemed to imply not only that the exhibiter does interfere in an unperceived manner in directing the arm and hand of the Automaton when raised, according to the varying circumstances of a game of Chess; but that the mode of such interference is very simple. In fact, when the arm and hand are raised and prepared to act by the operation of the moving force already explained, the action of a wire or piece of catgut, not much thicker than a hair, would be sufficient to guide them in any direction; which action, from the delicacy of the medium used, might be communicated in a manner wholly unperceived by the spectators*.

* There can be little doubt that the peculiar action of the Automaton (p. 24), by which the Knight is

Probably the precise time and instrument of communicating this action, which are circumstances systematically kept secret, will never be discovered; and the conception of them, reflects the highest honour upon the ingenuity of the inventor. To construct an arm and hand capable of performing the ordinary functions of those parts, would be of itself sufficient to secure the reputation of an artist; but to make the same arm and hand almost counterparts of living members in a reasoning agent, displays a power of invention as bold and original, as any that has ever been exhibited to the world.

made to touch each of the 63 squares of the chess-board in turn, depends upon the action of machinery alone, without any interference of the exhibiter, except in previously winding up the works. The motions of the head of the figure, and its tapping on the chest (pp. 20—23), are a kind of hors d'œuvre.

THE END.

