While a sovereign is being weighed, a succeeding one is on its way from the hopper to the platform, and the moment the preceding sovereign is disposed of, according to its value, another is placed in its stead. To keep the hopper supplied with gold, and remove it from the till as it is filled, is all the attendance necessary.

The more minute parts of the mechanical arrangement of the machine, such as the fulcrum, the forceps, &c., are described in detail, and the following statement by Mr. Miller is given, as a comparison with the old method of weighing:—

"With the bullion-scales 4,000 may be stated as the number a person can weigh in six hours. As the sovereigns now tendered at the Bank counter are most of them new, the scale dips quickly in weighing, and one person can weigh 5,000 in six hours; but a short time ago, before the issue of the new coinage, the same person could only weigh 3,000, as it took a longer time for the scales to indicate.

"The bullion-scales cannot indicate nearer than $\frac{4}{100}$ths of a grain at the above rate.

"The machine is perfectly free from the sources of error to which the scales are subject, and weighs as quickly, whether sovereigns are new and of full weight, or old and doubtful; it can weigh 10,000 in six hours, and divide coin varying only $\frac{1}{50}$th of a grain."

The paper is illustrated by two drawings of the internal arrangement of the machine, and a model showing the action of the tongues and platform.

Mr. Oldham exhibited the automaton balance at work weighing coin; and after describing, with the aid of a diagram and model, the action of some of the more delicate parts of the machine, he observed that in seeking to obtain extraordinary performances by machinery, mechanical propriety of construction was too often overlooked, and premature deterioration in the action of many parts was the result. Mr. Oldham.

The automaton balance was peculiarly worthy of notice from the judgment exercised in its relative proportions, as was proved by the fact that, after being at work for several months, it had become more delicate in detecting slight variations between standard and light coin than when it was first constructed.

Mr. Cotton's object in this invention should be well understood. Public convenience demanded great accuracy in weighing the currency; by the ordinary mode of weighing gold with the bullion scales—although it was due to the bank-tellers to state, that they gave the utmost attention to their monotonous duty—it was nearly impossible to guard against the various difficulties detailed in the paper. The injury sustained by the optic nerve, from constantly watching the

indicator of the scales, was a serious inconvenience to the operative, which, coupled with the incidental sources of error referred to, created even greater absence of delicacy than the paper stated. Errors to the amount of one-third or even half a grain were not unfrequent.

By the "automaton balance," the number weighed in a given time was increased, and undeviating accuracy obtained. The delicacy of the instrument was such, that from thirty to thirty-five coins per minute could be passed through the machine, detecting a difference of only $\frac{1}{50}$th of a grain.

It should be mentioned that much greater delicacy could be accomplished, that is, to the $\frac{1}{100}$th of a grain, but not at the same rate; because it would be understood that a slow action of the beam was necessary for very small variations, and that must regulate the speed of working; but such delicacy was beyond all useful purposes in those transactions which it was intended to improve.

Mr. Cotton. Mr. Cotton said that his attention had been attracted to the point by the inconveniences to which the "tellers" were subjected in weighing gold for the public: with balances so delicately constructed as the bullion scales, the agitation of the air by the sudden opening of a door, or even by the breathing of those around, sufficed to cause errors. It was possible, also, by pressing the fulcrum against the bridle, to produce such a degree of friction as materially to interfere with accuracy; and the tellers confessed, that after weighing two or three thousand coins the sight was injured, and they no longer observed with the same degree of correctness. He therefore imagined that a machine might be contrived, which being defended from external influence, might weigh coins as fast as by hand, and within one-fourth of a grain; but he certainly did not contemplate attaining such perfection as the machine now possessed. His first idea was, that the light coins should be taken off by a forceps, and that those of average weight should be pushed off by the succeeding ones; but it was found, that the slightest inaccuracy in the milled edges sufficed to give them a wrong direction: therefore, when he made the first rough sketch, and consulted with his friend, the late Mr. Ewart, he recommended that Mr. Napier, of York-road, Lambeth, should be employed to make the machine, and to him was due the suggestion of the two alternately advancing tongues, as well as several other arrangements of the machinery, which he had so successfully constructed.

When the first machine was tried, out of one thousand sovereigns, one hundred and sixty were found to be light. They were given to a teller to be verified, and he returned several of them as being of the proper weight; but upon again weighing them more carefully,

the result given by the machine was found to be correct. As an instance of how many circumstances should be taken into consideration in delicate machines, he might mention that, after being used for a time, the machine varied in its results, and on examination it was discovered that the end of the lever, which traversed the pendant, had become magnetic, and thus affected the balance. An ivory end was substituted, and ever since that period its accuracy had been maintained.

Mr. W. Miller observed, that the efficiency of any scales must be determined, in a great degree, by the fineness of the edge of the fulcrum of the beam; and it would be easily imagined that the friction, to which the edge in a pair of bullion scales was subjected whilst weighing five or six thousand sovereigns per day, must soon impair its delicacy, and consequently the efficiency of the whole apparatus: for, whether the sovereigns were light or heavy, the beam must turn upon its fulcrum. Such was not the case with Mr. Cotton's machine: its beam did not act at all, unless a light sovereign was placed upon the platform; so that among one thousand sovereigns, if only one hundred were light, the beam of the machine would only move one hundred times, while that of the ordinary scales would oscillate one thousand times. An immense advantage was thus given to the machine in point of durability. Mr. W. Miller.

All weighing was but an approach to correctness, and the nearest point to which the best kind of common scales were sensible, might be stated as $\frac{3}{100}$ of a grain, and one-fourth of a grain would hardly cover their errors: but the machine was sensible to $\frac{5}{1000}$ of a grain, and $\frac{3}{100}$ would cover its errors, which were not a twentieth part so numerous as those of the scales.

Mr. Fairbairn exhibited a model, showing the plans, sections, and architectural elevation of a Woollen Factory, to be constructed of cast and wrought iron, near the town of Ismet (Turkey), for the Sublime Porte. Woollen Factory for Turkey.

Mr. Fairbairn said that, in 1839, he visited Constantinople under the instructions of the late Sultan Mahomed, and reported upon nearly all the government works. Their extension was checked by the death of that prince, but the present Sultan was disposed to carry them into effect, and by his orders Mr. Ohanes Dadian had arrived in England, in furtherance of the plans for ameliorating the state of the Turkish community by introducing useful arts and manufactures, in which he was aided by his Excellency Ali Effendi, the ambassador to the court of England, and the consul-general, Mr. Edward Zohrab. Mr. Fairbairn.