



HOW PIANOS ARE MADE.

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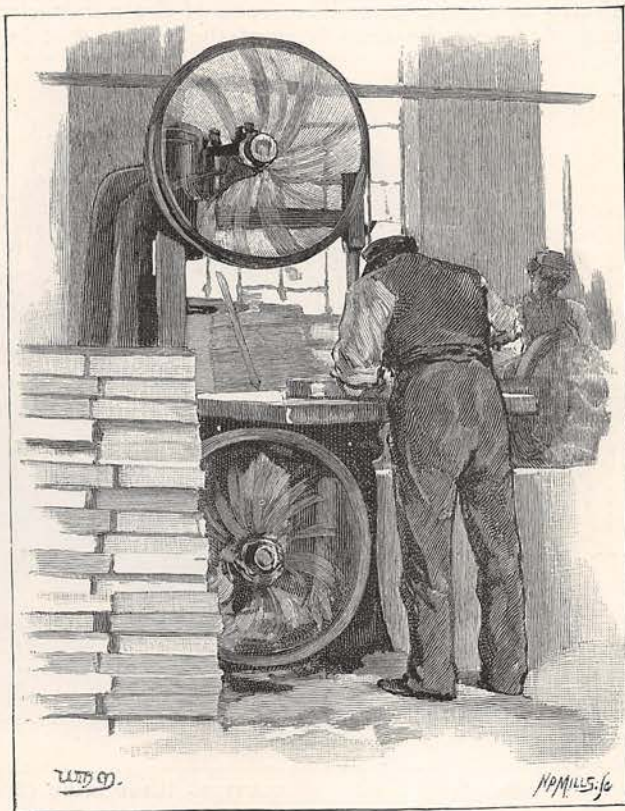
VAST wood-yard that mounts up, tier upon tier of baulk and plank into the clouds, and is met there by what one might call an aerial repetition of itself; for on the roofs of a series of buildings several tall stories high in the heart of Kentish Town Messrs. John Brinsmead and Sons have constructed a further store of woods, not "all a-blowing, all a-growing" but all "a-drying," until such time as they may be fit to share in the mechanism of the most popular instrument of the century, the pianoforte. Making a tour of the works we begin with a stroll through symmetrical piles of timber packed close and in order upon the firm earth, and afterwards ascend by elevator or stairway to the storage on the roofs. Here the timber stacks rise high above us just as they did in the yard. We might fancy ourselves still on the level ground but for certain glimpses of a busy world below us, with its street traffic of 'bus and waggon, its rush of railway trains, and all the miscellaneous life of a great city. Each plank is separately wedged, free from touch of its fellow, so that the wind may circulate through the great stacks as it circulated through their branches when they rustled in the breezes of their native hills and valleys. They have been brought from all parts of the world, these drying timbers on this Kentish Town roof. Here are oaks from English woods; Kawri pines from New Zealand forests; cedars from the Philippine Islands; mahogany, spruce, black walnut, beech and other woods from other lands; the United States supplying several varieties, notably a beautiful white timber known as "American poplar." This is what our guide calls "a very grateful wood under treatment," possessing besides a certain freedom of response to the planer and the carver all the vibrating power that belongs to most of the hard, close-grained trees. Before any of these woods, however excellent their quality, are ready for their ultimate destiny in the factory, they must be from three to five years old, not simply dating from the time they fell before the woodman's axe, but from the day their journeys over land and sea ended in the Grafton Road, London, where they enter the Kentish Town piano factory. In some cases the woods are not used for eight years after they are unloaded here. They have all to undergo that system of drying that may be said to be without system, since it is the primitive method of drying by the simple aid of nature. The timbers are exposed to the air, in all weathers, hot or cold, in rain and tempest. Now and then the wind makes frantic efforts to remove them into the adjacent roadways, but they are moored to their high-in-the-air quarters with iron bonds. "Whistle the wind never so fiercely" through their avenues and airways they stand firm and

ready for the day when they are carried indoors to undergo a year of probation in a moderate atmosphere of artificial heat. By this time the sap is dried up within them. There has been no steaming and forcing of the sap away from the fibre which it nourishes as it dries; it has been amalgamated with the wood, closed up and imprisoned dry and resinous, so that when the musical wire of the piano is struck the dried and resinous sap, broken up into infinitesimal particles, acts like so many tiny notes that sing among the fibres of the wood and help to give tone to the instrument. The handicraftsman when he manipulates the woods that come to him thus prepared will make them all take part in the general chorus; the pinewoods shall by and by sing as finely in the genial atmosphere of the factory as they sang to the tempest when they tossed their lofty heads in the northern winds of their mountain homes; the Italian walnut-wood shall be clear and ringing in the *timbre* of the new choir; and the Philippine cedars shall murmur their love-songs as sweetly as when they whispered them to dusky beauties in the sunlands of eastern seas.

Over four hundred tons of choice selected timber are stacked on these roofs, frowning over the adjacent buildings like some feudal castle of old. The tale of quantity is continued in yards and inner rooms. Timber here, there, and everywhere, and always numbered. Because it is in masses, stacked on all sides, it is by no means an unknown quantity. Each parcel bears its ticket; each plank and baulk has its history. Corresponding numbers identify every scrap to the smallest stave in the books of the firm. No proud bit of timber from some grand domain need fear that it will be mixed up unrecognized amidst the vagabond pines and beeches of a foreign shore. And by the way this system of check is a notable feature of the commercial management of the factory. Every detail of labour, skilled or unskilled, is recorded.

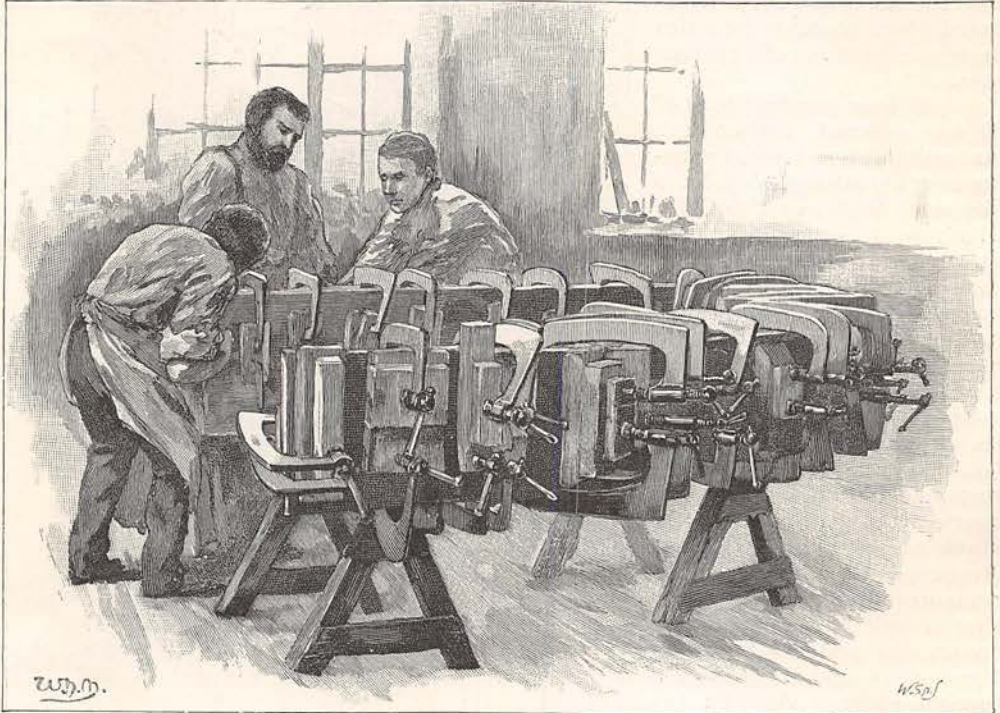
In the multifarious operations of each shop there is no chance of a man scamping his work if he would. His hand is always visible. The eyes of numbers and records are always upon him. He and what he has done are duly registered. They belong to the history of the house. Ten years hence the work he is doing to-day might be challenged; or the labour of ten years back might be brought up for or against him. The foreman has only to turn to the books to learn at once who made or fitted any one particular piece of work in any one particular piano selected from the thousands that have gone out to all parts of the world.

While we are on the ground-floor we pass through the japanning room, where the iron frames are enamelled and polished. One notices here, as one noticed later, that a good deal of what is called "elbow grease" is used in the making of a piano; it is not by any means all the work of machinery this business; the hand is a great factor, and the japanner is not the least important of the labourers who help to finish the good work of the more skilled artisan. While we are on the ground-floor of the famous



IN THE SAW-MILL.

factory we also make the acquaintance of the engine-house to find that the universal servant, steam, after it has done with the piston-rod and the fly-wheel, goes off in many pipes all over the works supplying heat and vapour for various purposes, steaming wood that has to be bent into various circular shapes, boiling glue, and providing the supple quality that walnut veneer must possess before it can be dealt with as a decorator and a strengthener of other first-class timbers. On this same ground-floor we are introduced into one of the most interesting of the many shops in a notable establishment. It is called the "The saw-mill." A pleasant perfume of sawdust and shavings and a genial warmth meet us here, in contrast with the cold wind we left outside blowing upon the dry woods. In the saw-mill all is geniality. Even the humming whirr of the circular cutters is agreeable. It is full of a fascinating variety of mechanical music. There is the small insidious ribbon-saw with its sharp falsetto note; the tenor-like tones of the minor circular-saw; the baritone of the eccentric; and the deep bass of the planer that is grouting its way through the

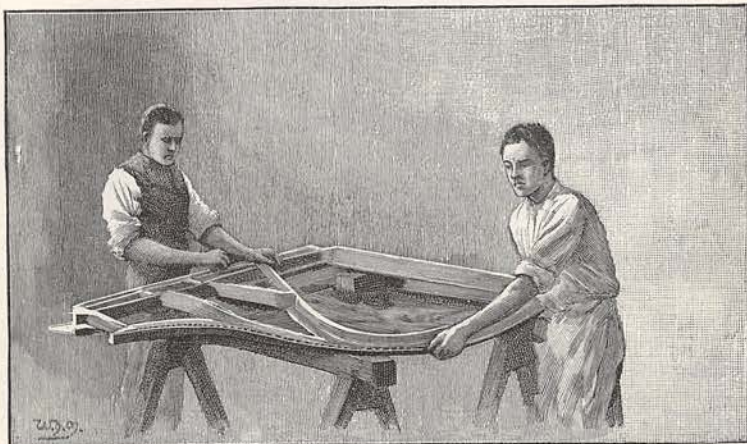


CLAMPING GRAND PIANO CASE.

hardest of seasoned beech. And all the while the little heaps of sawdust and shavings increase, and the piles of straight timbers and square blocks are changed into curious shapes which we shall meet later in the day as they pass through their strange evolutions before losing their identities in the completed pianos, upright and grand, for the cottage and the palace. Everything that a saw or a planer or a boring, polishing or refining machine can do is done in this shop. One of the saws is called "the drunkard." "Why?" we asked. "Because it wobbles and rolls," was the reply, and it was true indeed; but the strange many-toothed disc wobbled and rolled to some purpose, its eccentric setting giving it an enormous power and an action as true as the most sober of the many seriously sober-looking implements around it. There was a planer close by which made four thousand revolutions in a minute. Moreover it planed four sides of an object at once, and ran through material at the rate of fifteen feet a minute.

Adjoining the saw-mill is the veneer store-room. Here are layers of walnut and other veneers that have the appearance of dressed skins ready for the bookbinder. Many of them are quite as costly as the most choice preparations for the binder's art. The veneer used for the higher decorative work in cabinet-making and piano cases is

made from the great burrs or warts that are seen on old misshapen trees. Falstaff boasted of turning diseases to commodities; that is what the cabinet-maker does with trees that are knotted with abnormal growths; and very costly commodities they are. When a sufficiently large burr is found it is cut away and shaved by a wonderfully ingenious and powerful razor into sheets about double the thickness of ordinary cardboard. The ebullition of the sap that has been going on for many years produces that beautiful floral-like figure which you see in the finest piano cases. The sheets of wood are of exquisite colour, rich in browns and fascinating in varied tones of smoky-looking greys, the figures curiously matching each other as the knife shaves down to the tree itself. At first the veneers are brittle, but softened with water and a slight mixture of glue they become as pliable as leather and in many respects as strong. The fibre running in every kind of eccentric way gives exceptionally great binding strength, so that when it is amalgamated with other wood the combination is strong as iron. Veneering in the old days, when it was difficult to obtain mahoganies and other expensive timber, was more or less of a disguise; but to-day it is adopted for decorative purposes, and so complete is the modern method that the veneer practically becomes part and parcel of the underlying wood.



PREPARING IRON FRAME FOR ENAMELLING.

At the same time one notices that as a rule the cases of pianos made for sea and tropical countries are constructed of solid unveneered timber, and in some instances bound with brass. For these as indeed for all instruments the new method of tuning and the check-repeater action are a special boon. A child can manipulate the tuning-key in vogue here. The wrest-plank and bearings are of solid iron instead of wood, and the tuning-pins are at the top of the wrest-plank in a direct line with the strings instead of at right angles with them. The tuning is effected by means of a simple nut and screw that can be turned with ease by the thumb and finger alone. What an improvement this is on the old peg system any one not an expert who has ever tried to tune a piano or connect a single string can well understand; while the professional tuner now gets through his work in half the old time, and fifty per cent. more efficiently. This is only one of the many improvements the piano has undergone at the hands of Brinsmead and Sons. But an elevator on this ground floor (which we have found it so difficult to leave) is waiting for us, and we ascend to the highest shop in the buildings, whence we shall descend shop by shop concurrently with the creation of a piano, until we arrive at "the chamber of horrors," where we propose to write "Finis" upon these brief descriptive notes.

"What is the chamber of horrors?" All in good time, *mes amis*. Meanwhile we have arrived upon the first floor of the shops next the roof. Here the backs of the pianos are mostly being put together. Many of the pieces of wood which we observed in the sawmill in course of manipulation for backs and cases are here in the hands of workmen who know their use in building up the instrument which so far as construction goes may be said to have its beginnings in this room. Referring back for a moment to the registration of woods and work it may be mentioned that every part of the piano made by hand or by machinery is similarly numbered for identification, and stored in careful order; so that a workman need never inquire for his materials; they are collected and placed with care and precision, very much on the

plan no doubt adopted by one of the great watch factories, where every part of a watch is stored in its separate box, so that a man has only to pick up the several parts and put them together; and in case you make a break you have only to mention the wheel or what not and write to the factory for a new one; but this is too mechanical an arrangement for a piano factory though the principle is an excellent one. Skilled judgment, deft fingers, good taste, and a cultivated imagination—all have their calls and uses in the manufacture of a piano.

In the adjoining shop we come upon the sounding boards.



STRENGTHENING A SOUNDING BOARD, USING GOBARS.

The bridges are being adjusted, the pins driven in; and here for the first time we get a tone as of music, not what a fastidious person would call music, it is only the twanging of strings, but it is the sound we have been expecting; it may be called the key-note of this paper. There is not only a skeleton piano in every cupboard at Brinsmead's but in every shop. So perfect is the modern iron construction of the piano that add a keyboard, the so-called skeleton is playable. One might take it home and use it without a case. It is simply a piano undressed; as we wander from shop to shop we find it everywhere not always finished but often simply waiting to be clothed. Here in this shop, where we hear the first sound of music, they are stringing and tuning the skeletons. Most of the wires are steel, plated with copper; others are copper-plated with a new kind of white metal. The united tension of the

strain of the strings on the iron frame of a piano is about twenty-two tons. What strikes one in watching the workmen is the careful and minute attention to detail. Patience is a special virtue in this piano factory. Wood is continually being wrestled with and controlled. The sounding board receives formidable attention and requires it. It is always being held down as it were. Passing a flight lower in our gradual descent to *terra firma* for example, we come upon several curious arrangements, that look like collections of the unstrung bows of ancient archers. They are bent between a false roof, and what turns out to be a sounding board, bringing upon every square foot of it a level pressure. They represent at least a force of twelve tons upon the board. Readers of the life of Mozart will recall his commendations of Stein, one of the early makers of pianos who "guarantees

the solidity of the sounding-board" said the famous composer, "for when he has finished one he exposes it to the air, the sun, the rain, the snow, in a word to the inclemency of the weather until it cracks; then by means of tongues which he fixes solidly with glue he fills up the cracks. When a sounding board is thus prepared one may be sure that no accident will happen to it." The sounding boards in the Kentish Town factory undergo, as we have seen, not only years of the natural preparation that Stein thought necessary, but the wood is so manipulated that there is no chance of crack or flaw, and wherever glue is used even in the casing of the piano it is

subjected to such pressure that every particle that has not penetrated into the natural pores of the wood is forced out; and the glue itself is of the most refined character, "far sweeter and even more wholesome if you ate it than much of the gelatine that is made into confectionery," remarks our guide. Whenever we found glue in use it was noticeable that there was no unpleasant smell; indeed one of the notable reminiscences of the factory is its agreeable atmosphere of clean woody perfume. We are pausing to make these few observations in what is called "the grand sounding-board shop," and here are more skeletons, but most of them are now in the hands of expert work-

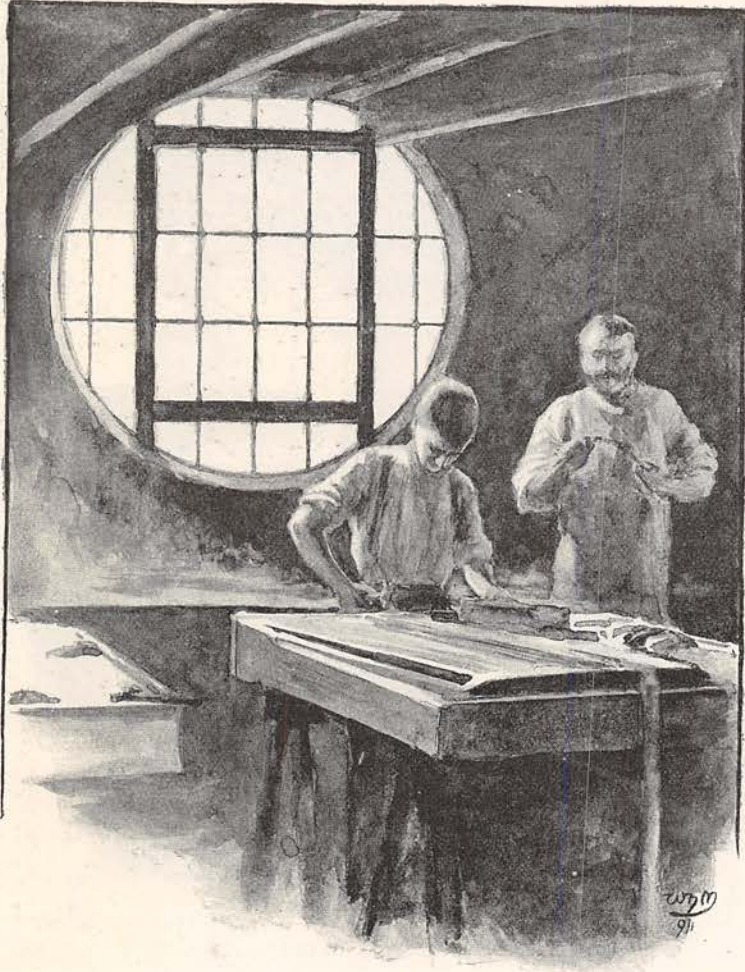


FITTING ACTION TO GRAND.

men, who are fitting them with their outer garments of wood or tuning those which are ready to pass into their next stage of evolution. These instruments are here practically undergoing their first tuning at the hands of apprentices who give the strings their first indications of correct scale. A piano is tuned by nine or ten different tuners before it goes to its final operator and it begins considerably above concert-pitch. A deck piano for a great steamship company was being finished here and another undergoing repair. The latter had been two or three voyages to the East without requiring to be tuned. It had now come home to be overhauled. If its musical speech were intelligent and intelligible language what stories it could tell, what social romances of the sea, what sentimental episodes, what strange reminiscences!

Another flight of stairs in our downward passage brings us to "the grand fitting shop." We enter it literally through a tunnel of grand pianos. Here the last touches are given to skeletons, and in some instances to the instruments in all their glory of decoration and polish. Here are two pianos the cases of which have been designed by Caldecott, fine examples of massive work relieved by a deft and striking border of

superb carving. They are destined for the music-rooms of two new ocean steamers. The case of a Brinsmead grand is in one piece of bent wood, cut into different thicknesses, a very remarkable example of what can be done with the hardest timber through the persuasive powers of heat, glue, and machinery. On this floor of far-reaching shops are several cases undergoing a final screw and cramp pressure, the last piece of coercion to which it is necessary to subject the beautifully rounded structure. Each enveloping case in the cramp and screw embrace



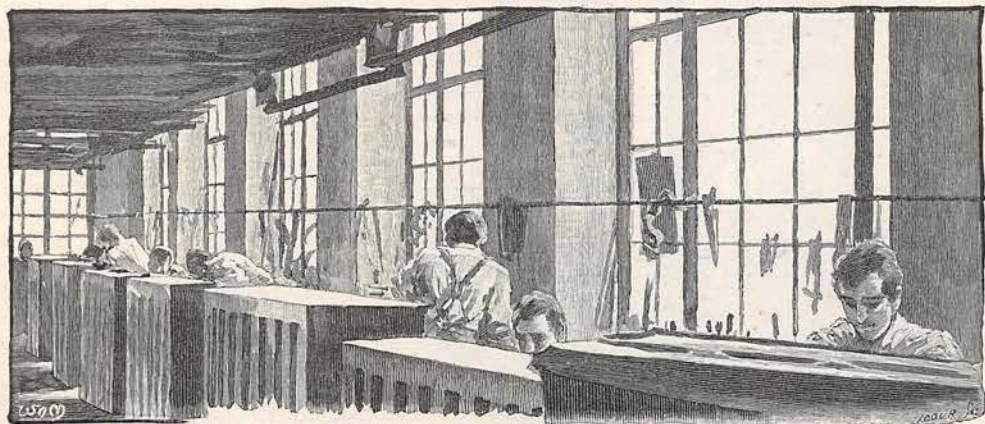
STRINGING.

is a finely wrought piece of American walnut, the most popular wood at present for pianos, and largely used for furniture of all kinds. It was Gilbert Scott who gave the first impetus to its adoption, more particularly in this country. It is worth to-day tenpence half-penny a foot. Twenty years ago they made fences of it in many parts of the United States. From the first the manufacturer has always done his best to present the piano artistically. The spinet and the harpsichord were often very daintily bound, as it were, in pretty inlaid woods. Many of them are still extant and are artistic examples of correct work. As an accompaniment to a quartett of the period the spinet has still a sympathetic jingle: how effective it was in *Olivia* at the Ly-

ceum when the evening closed in with the old-fashioned song and its sweetly harmonized refrain! It was for the harpsichord that Mozart wrote his sonatas, which shows how much genuine imagination went into his work. Berlioz is by some credited with a still higher fancy. He regarded the piano as too talkative. A composer, he contended, should originate his melodies and harmonies from the depths of his own soul, and should shun intercourse with his piano lest this repository of so many musical confidences should tell him apparent secrets which would be recognized by the percipient in such matters as old stories.

We pass on through several well ordered stores containing many shelves of carefully arranged packets. Here are the white ivory keys which dainty fingers and strong are to press in many lands. Close by we come upon parcels of felt, that is used for the hammers. It is almost as white as the ivory itself, made of the very finest wool and compressed until it is a thick pliable material graded as to thickness for the various

strings, the higher notes demanding a hammer of exceptional hardness. In another corner of shelves are collected the pins that carry the wires, and the new tuning pin, with its ingenious nut and simple method of binding the string. Next we come upon all kinds of screws and tools, coloured cloths for bearings, hinges, pedals, candle-brackets and every other miscellaneous kind of fitting that belongs to the modern piano. The same system of numbering and book-keeping previously noted is apparent here, with its debtor and creditor accounts and its other checks of work and cost. It is only by the severest system of record and personal discipline, that great factories can be conducted without fuss and friction. Leaving these museums of mechanical contrivances, keys, screws and ingenious devices for saving labour and giving lasting qualities to every detail of the work that is put into a piano, we arrive at the final fitting shop. Every shop it seems to us is more or less of a fitting shop. All over the place workmen are engaged in adding something to instruments in course of construction, or justifying something that has already been done; but the shop we have now entered is that in which the final fittings are supposed to be accomplished.



IN THE SPECIAL FITTING ROOM.

Here we found the work of tuning in full blast. Single notes and double, chords, in many keys both major and minor, trills, runs, bits of scale, now and then a dash of harmony and even a hint or two of melody; but all jumbled into what was indeed a general "tuning up," as if some strange and curious orchestra were preparing for some strange and curious concert. Oddly enough the tuners had a distinct and interesting competition in several unwearied songsters that piped, often high above their discordant sounds and often with pure snatches of melodious song. They were canaries, sweet and gentle links between the workshop and the home. Almost the last canary the present writer had seen in a cage was in connection with the wreck of a yacht off the Goodwins. The victorious life-boat had arrived in port with the crew and passengers of the lost vessel. Some of the household gods, or one might better say the ocean-going baggage of the rescued had been brought ashore. One of the strongest of the life-boat crew, who had been first and foremost in the rescue, was carrying a canary in a cage, and carrying it as proudly as if it had been the greatest treasure-trove of the time. The canaries in the fitting room of the Kentish Town piano works seemed to be great favourites, and the more the men tuned the more energetically they sang. It is in this shop that the simplex action fitting is done, and in the adjoining room skilled workmen are engaged in adding to the other perfections of the modern piano the perfect check-repeater, one of the special inventions that years ago made the Brinsmeads famous in the piano-making world. Several artists were at work in a quiet corner of this department, upon pieces of a decoration which has happily taken the place of the old fret-work with which pianos at one time were mostly fronted; they were making marquetry adornments for the more costly instruments, having before them various exquisite designs. In these days the fine arts work their humanising way into all branches of industry. It is quite in keeping with the elevating influences of music that the painter, the carver and the artist in marquetry should lend their aid to the beautifying of the piano.

At length we are again on the ground-floor of the factory. The noise and hum of the works are shut off. We have arrived, our guide tells us, at the chamber of horrors. Dim recollections of certain wax-work exhibitions, and realistic tableaux of battle, murder, and sudden death in Paris, London and New York, occur to one. Presently the door of the mysterious hall is open. Unlike every other chamber of horrors we have seen it is very light and airy. There are top lights and side lights. The room is indeed bathed in a flood of light. In the centre are a collection of pianos awaiting their turn to be finally passed either for delivery to railway station, dock-yard or Wigmore Street where the general show-rooms are situated. "The last stage of all," remarks our guide closing the door behind us. One might be pardoned for



A TUNEFUL CORNER.

thinking that the pianos whose evolution we had watched had been submitted to every test, but it is not so. "Here," says our guide, "each piano before it is sent out is subjected to a final criticism and examination. It is the workmen who have christened the room the chamber of horrors, for the reason that if one of them is sent for to this department, he knows there is something wrong, something to complain of, or something to be mentioned by way of warning in the future; I am bound to say it is very seldom that a workman is carpeted here; and the fact of its rarity no doubt makes the occasion all the more serious." The light in the chamber is made effectively strong, so that every part of a piano may not only be sounded but seen, every detail examined.

Probably very few persons who play upon them ever think of the tremendous amount of

work that is put into pianos. The history of the instrument shows that much of the perfection is due to the manner in which composers and musicians untrained in the mechanical arts, have lent their aid to the maker in the matter of suggestion and invention. Schumann among the great masters interested himself in the mechanism of the piano. He invented a contrivance for strengthening the fingers of the executant, the third especially, and incapacitated himself thereby as a pianist but what the world lost by this accident to the inventor it gained in his permanent work as a composer. Thalberg knew thoroughly the principles and mechanical necessities of the manufacturer. In a paper which he wrote on the piano, referred to and quoted at length in the report of the jury of the London Exhibition of 1851, he gives a most concise and at the same time graphic description of the best characteristics of the piano, which since the famous Exhibition year has been strengthened and improved in a thousand ways; though the principles laid down by Thalberg remain the foundation of all the inventive skill and sincerity of construction which go to the making of a fine piano. "In this instrument," says Thalberg, "the object is to convey from the point where the finger acts upon the string, all the delicacy of action of the finger, so that the piano may participate to a certain extent in the sensibility of touch which is observable in the harp, and which is in consequence of the finger acting immediately on the string, in that instrument without the intervention of any other mechanism. The power of the piano depending on the quantity of matter brought into vibration; the resonance or the perfection of that vibration depending on the correct proportion of its parts; and the accuracy of intonation depending on the nature of the bridging, the proportions of the strings, and their arrangement with regard to the blow of the

hammer—which are all most admirable ; while the action of depending on the peculiar mechanism employed far surpasses everything else of the kind, for it enables the player to communicate to the strings all that the finest-formed and most skilful hand can express ; and becomes as it were a part of himself, reflecting every shade of his feelings, from the most powerful to the softest and most delicate sounds. This action is indeed so perfect, particularly in its power of delicate repetition, that if any note is missed in execution it is the fault of the player and not of the instrument.”

There was a good deal of the foresight that belongs to imagination in this vivid tribute to the pianoforte of 1851. What would Thalberg have said to the piano of to-day, with its check repeater action, its easy method of tuning, its fine resonance of tone, its delicacy and its organ-like power ! Since the date of his paper something like five hundred improvements in connection with the instrument have been patented, many it is true of a somewhat frivolous character, but nevertheless of the greatest utility, including several of the Brinsmead patents which belong to the greatest advance in pianoforte mechanism of our day. One is delighted to endorse the ideal character of the instrument as an interpreter of a fine player's sentiment and feeling when before we leave the factory a master sits down to one of the pianos about to be shipped to an Indian palace, and extemporises in various keys and in many times and measures, appealing to the fancy with suggested reminiscences of wind swept-seas and dreamy lakes, of busy streets and purling brooks, hints of love and passion, with interludes of operatic memories of Wagner, Verdi and Balfe—if one may name these two tuneful composers with the immortal master of dramatic orchestration—not to mention bits of orchestral accompaniments to famous plays ; an *ollapodrida* of melody and harmony of familiar strains and fanciful interpretations of current thought, and feeling which (if one were Hans Christian Anderssen) might result in a story of how the new music vibrating through the hearts of the polished woods of the case and the bearers within compensated them for their exile and imprisonment ; the sounding board particularly pluming herself on achieving the height of a lovely destiny, regarding herself, of course, as the chief and perhaps the only singer in the instrument destined to charm and adorn a palace.

As we leave the great factory with its three hundred busy workmen, and its grand march of pianoforte evolution, the sounds of tuning follow us out into the prosaic streets. Distance gives it something of the weird harmonies of the old-fashioned Æolian harp, and the idea is *à propos* of the dominating fancy that haunts you after a time in a piano factory. You feel that dealing with sounding boards and vibrating casings, inventors, and mechanics are after all unconsciously engaged in giving fresh and idealised voices to “mountain and to forest, to the quivering aspen and the sturdy oak,” with all their unspoken memories of sighing gales, songs of birds, the leafy rustlings of summer and the rush of winter winds, the silent music of the budding spring, and the golden time of harvest, and all the other poetic harmonies that crowd the composer's fancy when he strives to interpret the soul of Nature, listening to “what unshorn Apollo sings to the touch of golden wires.”

